

# RETRACK

## FINAL REPORT

REorganization of Transport networks  
by advanced RAil freight Concepts



## Colophon

### Title

The RETRACK Project – Reorganization of Transport Networks  
by Advanced Rail Freight Concepts

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### Editors

T. van Rooijen, P. van de Lande, M. Zhang (TNO), Ph. Mortimer,  
R. Jackson, D. Islam (Newrail), J. Vleugel, O. Eidhammer (TOI).

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#### TNO

Van Mourik Broekmanweg 6, 2628 XE, Delft, The Netherlands  
PO Box 49, 2600 AA, Delft, The Netherlands  
[www.tno.nl](http://www.tno.nl), Phone +31 88 866 30 00

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# RETRACK

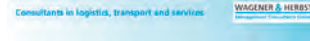
## FINAL REPORT

REorganization of Transport networks  
by advanced RAIL freight Concepts

Project coordinator



Project partners



# Management Summary

**The main goal of the RETRACK project (038552/ May 2007-August 2012) was to demonstrate that a fully privately owned and operated international “open” rail freight service was achievable using the freedoms endowed by the Railway Reform measures introduced by the EC. The project has successfully achieved this and has introduced, developed and sustained a new rail freight service on the corridor between the Benelux countries and Hungary.**

The RETRACK pilot service grew from one train per week in the first half year of operation to more than 25 per month in the final half year of the pilot operation. By the end of the project 17 destinations were served via the distribution lines of the service.

The service has now been moved into a fully commercial environment following the completion of the project and EC support for this.

The project has successfully demonstrated that new privately operated rail freight services can be developed and sustained and achieve modal shift to rail as a consequence together with the achievement of environmental gains and the reduction of road freight.

The project has demonstrated that private rail operators and other entities can collaborate in consortium arrangements to successfully solicit and transport cargo over a major corridor and linked satellite routes in response to flexible requirements set by shippers and cargo interests.

The management structure put in place to organize and develop the project to the current level of activity was based on “Lean” principles and could be replicated in other situations for multi-party start-up operations. The development of a successful consortium structure and the operation of a thin

but interventionist management position is a major feature of the project and went a long way to underpinning its success.

The project has demonstrated that new train services can compete with incumbent rail operators and road freight in terms of speed and attract cargo on the basis of availability, frequency and reliability without recourse to deep pricing discounting to secure business.

The project has developed as a consequence of the railway reform packages instigated by the EC. There are residual concerns that the reforms are still not fully implemented and that some of the incumbents are still able to exert commercial, operating and other influences to constrain competition. Further intervention is required by the EC to ensure that the full railway reform package measures are implemented to a common and complete level across the EU and that any transgressions will be adequately dealt with by the regulatory agencies.

The project has successfully demonstrated that, correctly managed and planned, single wagonload and wagon group traffic can be secured and operated successfully. The project has not been marketed particularly intensively and the application of further orchestrated marketing effort may potentially enhance traffic the service is able to attract and retain. This defies conventional wisdom that SWL traffic is no longer attractive to rail operators. The project has demonstrated that rail has a particular niche for heavy weight and sometimes hazardous traffic flows and this has underpinned the success of the project.

The project was the beneficiary of support funding to facilitate the development of the new service. This was important given the project was being

developed as a major economic recession was developing (2008). The funding mechanism or a similar model may be needed to act as a source of repayable working capital for further new start up rail freight services operated by non-incumbent operators.

There remain issues relating to access to an adequate pool of competent and certificated train crews able to operate international services. There are also issues that remain to be addressed in terms of access to terminals, sidings, servicing facilities and priorities when major infrastructure works are planned.

The use of multi-voltage electric traction has demonstrated rail's energy and environmental credentials during this project. There are still issues regarding cross border acceptance and deployment of capable multi-voltage equipment. Rail needs to achieve the same sort of interoperability that applies in the road and airfreight sectors.

The further development of the RETRACK core concept and its extension or replication in other scenarios has been examined in relation to traffic developments in Southern Europe, Romania, Turkey, Bulgaria) and beyond into Central and East Asia. These developments appear to be feasible but are governed by other strategic commercial and operational arrangements. The replication of the RETRACK model into other domains within Europe appear to be entirely feasible and the core model could be adopted and adapted to suit local conditions.

# Inhoudsopgave

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# 1

## **Background and approach**

# 1 Background and approach

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## 1.1 Introduction to the RETRACK project

**In the RETRACK Consortium, new European railway undertakings, market-oriented rail freight operators, experienced IT and training specialists and leading European research and development organisations have taken the initiative to design, develop and implement a new and innovative trans-European rail freight service concept.**

This trans-European rail freight concept began with a planned service setup on a West-East corridor linking major ports of the North Sea (e.g. Rotterdam) together with major industrial areas in Germany, Austria and Hungary and the Black Sea (e.g. Constanza). It also explored, at a later stage, the potential of extending this corridor further to Russia and China across a number of promising Eastern European and Central Asian countries (e.g. Kazakhstan) using the service model developed in the project. The chosen trans-European corridor for RETRACK was an ambitious one, with an identified high potential for a shift of cargo from road to rail, creating an effective and scalable freight corridor between economic core areas in Western and Eastern Europe. With this new rail freight service concept, the RETRACK partners want to demonstrate that rail freight services on trans-European corridors can be successfully offered on merit as a genuine competitive alternative to road haulage. This will subsequently be beneficial for a number of organisations and entities:

- a) The shippers and logistics service providers in Europe and potentially also in Asia: because they can choose to use door-to-door rail based services with high levels of reliability and frequency coupled with competitive prices. The use of such a rail freight service could fit seamlessly into their Supply Chain Management (SCM) requirements, and using rail freight service could be as easy and cost effective as using road haulage.
- b) "New" European rail freight operators: because of the market enlargement and rail liberalisation, they have taken opportunities to explore freight demand from a large variety of shippers and logistics service providers along this transnational west-east corridor, and set up rail freight service for these customers. The RETRACK service is aimed at both integrating the SCM requirements of customers and achieving commercial viability rapidly.
- c) European society and citizens: because the new rail freight services to be set up will result in initial annual savings in transport kilometres of about 12 million with consequent reductions in truck tonne kilometres, emissions, accidents and environmental damage. Also, the Train Control Centre developed in RETRACK will result in strongly improved cross-border interoperability for the services which will consequently lead to seamless services and enhanced transport efficiency for passengers as well as freight.. TCC Is not used by anyone, so there are no facts to support this statement.

The RETRACK demonstration project is partially funded by the EU under the 6<sup>th</sup> Framework Programme. The intention of the RETRACK project was to demonstrate, within the new market conditions, that private rail operators would be able to collaborate and co-operate in the development of new pan European rail freight services that would be competitive, reliable and attractive compared with the existing rail freight services provided by the national incumbents. These services would exploit the freedoms made available through the railway reform packages established by the EU to open up the rail market to competition between the incumbents and new rail operators and make, as a key strategic objective, rail freight operations more competitive with long and medium distance road

transport. The RETRACK pilot rail freight service has been operated since February 2010 and has continued until July 2012. It is intended to continue the service as an ongoing fully commercial option beyond the period of EC support.

## 1.2 Transport development and policy in Europe

Road freight transport in Europe has been on a sustained rise in terms of international freight market share. The share of road freight transport is also rising and even more dominant in domestic freight market (see figure 1) in EU27 countries. Many European roads are highly congested. In contrast parts of the rail networks are underused. Also compared with rail and waterways, road is less environmentally friendly. A (significant) modal-shift from road to rail is a key and long-lasting EU policy objective. Despite many measures from the EU and national governments in Member States, over the years the share of rail freight has declined. One of many important reasons derives from the fact that the national railways in Europe were traditionally government owned and operated and were not market focused in terms of service and general capabilities. Their operation was primarily aligned

according to national necessity, regional products and services and boundary.

In 1991 the first Directive (1991/440/EC) opened a long list of European legislation adopted with the aim of integrating the European railway system into a competitive single market, as well as to increase its efficiency and competitiveness. Since then a series of EC Directives and Railway Reform Packages (in particular the First and the Second) have made European rail freight operation, open and non-discriminatory access strictly on a competitive and commercial basis. In 1993, the Single European market cleared the way for free movement of goods, services, people and money. The Trans-European Networks (TEN-T) were defined in 1996. A “strategy for revitalising the Community’s railways” (1996) introduced market forces into rail, and supported the integration of national systems. In the 2001 White Paper, a modal shift policy was elaborated. This focused on intermodal services. In the review of this White Paper in 2006, the concept of co-modality was introduced. A year later, the Commission developed a Freight Transport Logistics Action Plan, where the role and responsibilities of shippers and third party logistics service providers were identified.

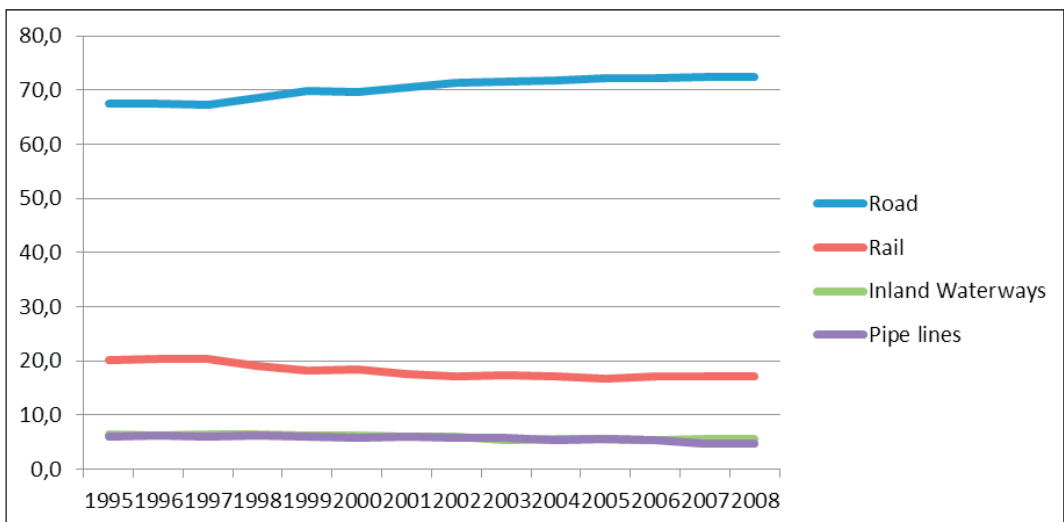


Figure 1: Modal share (in per cent) of freight transport performance in EU27 countries (DG Energy, 2010).



A new White Paper saw the light in 2011. In this paper, the focus on modal-shift for long distance rail freight is reconfirmed and very ambitious goals were set:

*Optimising the performance of multi-modal transport chains, including a greater use of more energy-efficient modes: 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors.*

In summary the European transport policy acknowledged that:

- separation of infrastructure management from railway operations,
- ensuring management independence,
- providing discrimination-free access to the rail infrastructure, and
- improving the financial structure through transparent reporting

are crucial preconditions for enforcing the competitive position of the rail freight sector and improving the sustainability of the transport system.

Under this open and non-discriminatory regime the incumbent and new rail freight operators are required to operate under a competitive European market environment. This regime also facilitates the development of cross-country pan-European rail freight services, which was not possible on an open and more practical basis before the Railway Reforms. With this in mind **The RETRACK project serves as a comprehensive test case for this open non-discriminatory access policy and market environment.**

### 1.3 Rail freight market development

There is an increasing requirement for rail freight to adapt to increasingly complex logistics networks. Presently these logistics networks and more importantly the needs of the customers are not being met adequately. This is demonstrated by the EU rail freight's loss of market share despite significant investment. Despite the reduction of rail freight market share, increasing pressure on the European road transport network presents a significant opportunity for European intermodal rail freight to grow, but to do so rail has to totally re-cast its business, operational and technical models.

The development of new rail freight services is inherently difficult. The large number of stakeholders (shippers, forwarders, rail agents, traction providers and infrastructure managers) involved in the development and execution of a new rail freight service makes any new intermodal offering a genuine challenge which should be orchestrated and implemented carefully.

Previous EU projects have successfully shown that rail transport can compete with road transport over distances of 600km and more. The logistics and market requirements analysis also identified a number of potential freight volumes suitable for the RETRACK service offering.

At the start of RETRACK, research was conducted in order to determine the major bottlenecks that hindered the development of rail freight on this corridor. A list of these bottlenecks is provided in the box below. In chapter 2 it will be described how these bottlenecks have been overcome.

A number of practices still hinder the private rail undertakings to compete efficiently in rail markets and this jeopardizes the goals of EC rail policy:

- In a few, yet important railway countries, the EU policy regarding organisational separation between the train operating companies and the infrastructure management has not been fully implemented. These integrated national railway companies continue to receive non-market conform support from their respective governments
- Lack of independence of infrastructure managers from incumbents
- Infrastructure charges may be discriminatory or favouring dominant railway undertakings
- Lack of fully independent regulatory authorities working to a common model
- Limited and variable arrangements for regulation of infrastructure managers
- Limited arrangements for regulation of rolling stock providers
- Lack of equal level playing ground for the incumbent rail operators and the newcomers, which preserves the dominant positions of national railway companies
- High level of infrastructure charges and/or predatory pricing by some railway undertakings
- Slow and expensive procedures regarding appeals for charging and capacity allocation
- Lack of robust independent appeals bodies
- Skewed and non-transparent rules for infrastructure pricing and for granting discount rates
- Appropriate insurance for external railway undertakings is expensive
- Lack of routine access to competent train drivers with complications on language capabilities
- Lengthy and non-harmonized certification process for rolling stock
- Lengthy and non-harmonized licensing procedures
- Lack of independent safety certification organisations
- Constraints on obtaining safety certificates for foreign railway undertakings
- Constraints on infrastructure access for foreign railway undertakings
- Disparate calculation principles and levels of infrastructure charges applying to different stretches of trans-European rail corridors.

**Figure 2: Bottlenecks for the development of the RETRACK service.**

Until now, relatively few segments of rail transport benefitted from the railway liberalisation, as described in the previous paragraph. However, the transport by rail of inland maritime containers and certain niches of the bulk transport market have flourished, thanks, in part, to the rise of new, private railway undertakings. The increase of road transport costs, congestion and the raising awareness with respect to sustainability also contributed to an increased interest for rail transport from the side of some shippers.

Of all rail market segments, the market for single wagonload (SWL) has shown the greatest and most recent decline. The single wagon market has had to deal with a number of specific challenges. The productivity of the rolling stock employed is low and there is an increasing shortage of wagons. Low productivity is related with the fact that many wagons used for SWL are nearing end of life. High investment in new equipment is needed in order to meet productivity and environmental requirements. The number of service points and rail connections with factories has been reduced. The cost level and -structure of single wagonload transport is another



bottleneck for its development; 30 to 40 % of the total transport costs are related to the local rail collection and delivery operations. This is the largest share in overall operational costs. Restructuring measures by incumbents have rationalised the single wagon-load market since the beginning of this century, but in the meantime road transport has taken over an increasing share of this segment. From the beginning of RETRACK, single wagon transport was entirely the domain of the incumbent railway companies.

In fact, until relatively recently, all international rail freight services in Europe were handled by the incumbent national rail operators primarily for the national railways with limited international activity. The RETRACK service is, in contrast, a wholly privately operated (initially part-funded by EU FP6) pan-European rail freight operation. The transit times of previously operated rail freight services were not ambitious and were generally matched or bettered by road transport. The ability to offer a service based on reduced transit times, higher flexibility and with prevailing cargo prices has developed into a key plank in the development of the RETRACK pilot demonstration.

# 2

## **The RETRACK corridor**

## 2 The RETRACK corridor

### 2.1 Geographic description and economic potential

The rail corridor Rotterdam-Constanza is a new concept in Trans-European freight transport and logistics. The corridor is shown in figure 3.

At the western leg of this corridor, the port of Rotterdam is the most important node, which connects the North Sea with a massive demand from trade and industry. The port enjoyed a growth for decades. This growth has manifested itself in two ways. First, the handling of cargo has shown very positive figures: the total volume passed through the port grew from 322 million tonnes in year 2000 to 435 million tonnes by the year 2011. Container movements in particular have increased by 85% from 6 million TEU (container units of 20 feet) in 2002 to more than 11 million TEU in 2010. Second,

the Rotterdam port is physically expanding by means of the Maasvlakte 2 area in order to meet the ever growing demand from the industry sectors. With the construction of Maasvlakte 2, the port and industrial area will increase by 20%. The capacity to handle containers will triple.

A similar trend is taking place on the eastern side of the corridor, the port of Constanza, the main seaport of Romania. Since 1990 the EU has played an important role in trading with Romania. In the period 2000-2005, the international trade with Romania has grown from 24.4 billion euro to 52.3 billion euro, achieving an increase of 115 per cent. Corresponding to the strong growth of Romanian international trade, the traffic in Constanza port has doubled between the years 2000 and 2005. This growth is mainly due to the development of container



Figure 3: Rail Corridor Rotterdam-Constanza.



transport. A modern container terminal that has been open since the end of 2003 has supported this development.

In-between Rotterdam and Constanza there are important and diverse economic regions. In Flanders in Belgium, the ports of Antwerp, Gent and Zeebrugge are closely related to the RETRACK-corridor. In the south-eastern part of the Netherlands and in eastern Belgium there are a number of logistics hot-spots. These are focused on the main industrial and economic Ruhr region in West Germany. The inland navigation and rail infrastructure in this region is well developed and connected to the RETRACK corridor. More to the south the economic gravity points around Stuttgart and Munich attract and generate a lot of transport demand. Further east, the cities of Vienna and Budapest are the main economic centres in Austria and Hungary along the corridor.

The demand for a new rail service is composed of the demand from potential users that already make use of existing rail services in the corridor or which currently use alternative transport modes, in particular road and short sea transport. The potential demand for a RETRACK service has been determined at the beginning of the project, based on transport statistics and existing transport models. The RETRACK potential is constructed from four sources, namely:

- A shift from existing long distance rail transport (rail on rail competition)
- A shift from long distance road transport (direct modal shift to rail)
- A shift from maritime transport (short sea) between North-Sea and Black-Sea (direct modal; shift to rail)
- EU imports/exports from TRACECA (Transport Corridor Europe-Caucasus-Asia) countries plus Turkey

A top down modelling approach demonstrated that a RETRACK rail freight service could attract cargo from the following modes:

- Existing long distance rail transport: The East-West and West-East target volume is almost 2 million tons. Realistic volume to be attracted by RETRACK is about 3-10%, corresponding to 56.000-187.000 ton per year.
- Long distance road transport: The East-West and West-East target volume is 4.7 million tons. Realistic volume to be attracted by RETRACK is about 1.5-5%, corresponding to 70.000-234.000 ton per year.
- Maritime transport North Sea – Black Sea: The maritime transport volume between North Sea and Black Sea ports equals 2.6 million tons. Realistic volume to be attracted by RETRACK is about 1-5%, corresponding to 26.000-100.000 ton per year.
- Import/export from TRACECA countries: Transport between European RETRACK countries (NL, DE, AT, HU, RO) and TRACECA/Turkey equals almost 15 million tons, mainly road or rail transport between Turkey and EU (7,5 million) and import from Kazakhstan (6.8 million). Realistic volume to be attracted by RETRACK is about 0.5-2%, corresponding to 38.000-150.000 ton per year.

The total RETRACK potential from these four target markets adds up to between 212,000 to 824,000 tons per year, based on a conservative estimate. This was estimated to be sufficient to start a rail freight service in the corridor with a frequency of 2-8 trips per week.

The bottom up approach was based on 21 interviews with potential users of the rail freight service and gave insight in the characteristics, needs, requirements and the potential within the four market segments, being dry and liquid bulk, specialized products, maritime containers and swap bodies.

Bottom-up analysis supported the conclusions from the top-down modelling approach that there was enough potential for a new rail freight service along the corridor if the following crucial customer requirements were met:

- The rail transport costs may have to be lower than road transport to compensate for a (perceived) weaker performance on some other performance indicators; in some market segments the cost difference may be up to 10-15% to attract new customers. In practice the need to discount transport tariffs did not materialize and existing price levels were maintained. The top down approach reveals that these cost advantages are realistic on several long distance door-to-door connections in the corridor if the number of stops is limited. By introducing additional stops, the cost difference becomes smaller, which might be in conflict with requirements of a specific group of potential users. On the other hand, including additional stops can also generate more traffic volume. The rail transit time has to be competitive with road transport but above all reliable. The top-down modelling approach reveals that transit time is similar on distances of 600 to 800 km and shorter on longer distances, though this also depends on the number of stops. In intermodal rail transport there is often a lack of technical and administrative interoperability and coordination, which increases the risk of delays. Road transport is in general more reliable, responsive and readily available. Though road congestion has an impact on reliability, delay due to congestion is often quite predictable. Any new rail service should therefore focus on interoperability issues and coordination between countries to minimize technical and documentation related delays at border crossings.
- The new rail freight service should offer a safe and secure way of transportation, reducing the risk of accidents, theft and damage. Security and incidents are of particular interest for transport of chemicals and dangerous goods, whereas damage and theft is more relevant for transport

of containers and swap bodies. In general, safety is a strong point of rail freight transport compared to road transport. Transport security is an area where improvements have to be made.

- Potential customers want to create flexibility in logistics processes, able to meet changes in demand. In general, road transport is very flexible, whereas rail freight transport offers limited flexibility, at present, in reserving capacity on a train. However, this does not have to pose limitations to shippers in using rail transport. If it is not possible to reserve additional rail capacity, road transport can be used in addition to rail transport to provide this flexibility and marginal capacity, but at the risk of loss of the whole transport to road on a more permanent basis if the rail service performance is marginal.

Both top-down (macro/statistics) and bottom-up (micro/interviews with potential users) analysis supported the conclusion that there was sufficient potential for a frequent rail freight service in the RETRACK corridor, which means that a substantial volume can be shifted towards rail.

## 2.2 Technical and safety aspects

### Terminals and Cargo Handling

Terminals play a vitally important role in the operation of an efficient, cost effective and integrated transport chain. A competitive door-to-door intermodal transport service cannot be achieved without adequate terminal infrastructure.

Intermodal transport requires extra handling effort and time compared to uni-modal transport. With this in mind the RETRACK offering required that the transfer be cost- and time efficient and effective. This was particularly important in a European context where road transport is dominant.

Given the briefing above, the RETRACK consortium conducted a comprehensive review of transshipment techniques available on the open market in a bid to make the RETRACK service as competitive as possible.



A reliable service from a terminal is important and as such the right transshipment technique is required. Increasingly non-ISO cargo units such as swap bodies are being used in Europe. This is an additional issue that must be considered when adopting a particular terminal transshipment technique.

Efficient terminal operation can be achieved through the integrated efforts of three main actors: the terminal operators themselves, the rail operators and the road transport operators. The terminal operator must be a part of an integrated transport chain, not just a cargo transfer station. A single standardised optimal terminal design, layout and configuration cannot be suggested as there are many effective options to transfer cargo. For instance, effective utilisation of siding tracks can dramatically improve the performance on the rail side, but implies additional costs, which vary according to the handling technologies adopted.

In reality intermodal traffic was not a major source of traffic activity since the start-up of live operations under the RETRACK project. Much more business was secured for conventional wagonload and wagon group traffic on a “main run” corridor between two major nodes for traffic aggregation and dispersal.

### Staff Requirements

The cross border nature of the RETRACK offering inherently provides two major barriers that must be overcome. The lack of a uniform international railway language and the absence of an international driving license for train drivers currently reduce the efficiency of cross border rail traffic. A full scale implementation across the whole corridor has not yet been fully achieved. ERTMS/ETCS is the new European standard for seamless cross border train control, train protection and train safety. It is potentially capable of solving most problems associated with the two major barriers identified above. The system has become the new European standard for railway signalling. The implementation of the system is mandatory for new lines in the Community and the implementation is rapidly picking up momentum in the countries along the RETRACK corridor. See also the next figure.

The full-scale implementation across the whole RETRACK corridor has not yet been fully achieved. The situation is also complicated by the issue of the satellite lines linking to the main corridor which may not be fitted out with ERTMS at the same time as the main lines.

RETRACK therefore aimed to develop a uniform certification for train drivers operating locomotives and trains on the railway systems along the RETRACK

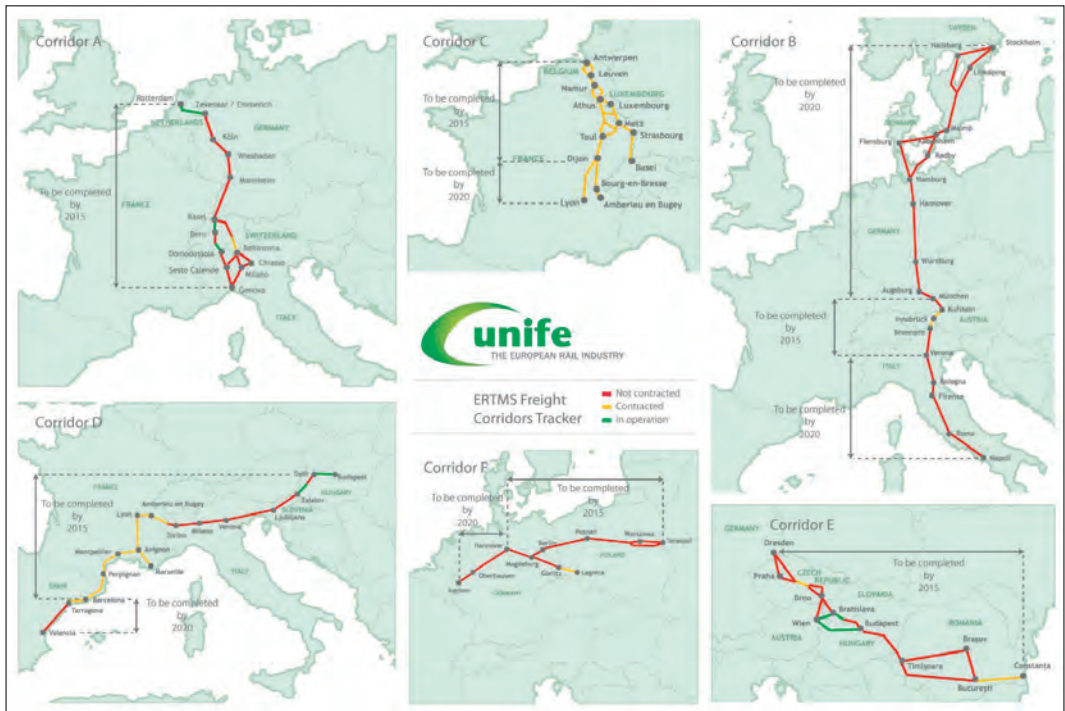


Figure 4: ERTMS on freight corridors (UNIFE).

corridor. This was achieved through the assembly of a train driver certificate based on the current EU legal framework, the ERTMS/ETCS system, the RETRACK safety system and RETRACK logistical requirements.

### Safety and Security

Rail transport faces increasing security fears, not least from terrorist organisations. As a consequence, any new rail freight offering, such as RETRACK, must be aware this increasing threat.

Key to the mitigation of terrorist threat is early detection. This is achieved through effective communication between public authorities. Particularly those in EU states which the new service operates.

Customs and border protection requirements are constantly evolving. Traditional fiscal roles continue (such as the collection of excise duties), but there is increasing emphasis on the identification of threats to local and national security – a first line of defence against possible insurgent attacks.

The priorities have moved from monitoring cross-border cargo and reducing international shipments of contraband, to screening for explosives, arms, dirty bombs, stowaways and weapons of mass destruction.

Identifying such threats is increasingly more difficult, with the risk of devices being hidden inside a vehicle or concealed in the cargo. The challenge is rapid detection without disrupting the daily flow of goods.

The issues of cargo tampering, people and contraband smuggling and terrorism need to be assessed and solutions evaluated based on a realistic freight risk assessment associated to « transport mode » and local threat scenarios. Tracking of cargoes, sensors to notify the operators of intrusion and performance of cargo control and protection must be evaluated to ensure security without harming transport chain activities fluidity, productivity and cost-effectiveness.

The RETRACK project has identified two service constraints relating to safety and security:

*Lack of independent safety certification organisations*

This reduces the ability of entirely new railway entities (which may include existing railway undertakings) to deliver new service offers that can compete with the incumbents. This is a serious constraint and could be deemed to be anti-competitive. The process to become a new railway undertaking varies at national levels and is not user friendly. A new entrant has to satisfy stringent technical and operational competence criteria, finance and insurance thresholds which imply and require a significant entry fee to achieve compliance and acceptance. This in turn reduces the number of likely candidates able to fund such a process. In addition the complexity and time barriers to achieving acceptance for technical aspects (vehicles, traction, servicing and maintenance) is a deterrent. This is not to argue that the entry requirements should be diluted to encourage new entrants but the present arrangements appear slanted towards the incumbents. The privatization of safety certification rather than sole reliance on the incumbent railway and associated agencies is a partial step in this but again implies that this is now an inhibiting commercial attribute to be complied with as part of the entry level process.

*Constraints on obtaining safety certificates for foreign railway undertakings*

There are concerns that the process whereby a compliant railway undertaking based in one country seeks access to use or transit another country's national infrastructure system on a routine basis for new international or domestic services is constrained by the process which grants safety certificates. This is a further dimension limiting competitive rail on rail activities and affording protection to the incumbent. It also dilutes the longer term potential for enhanced rail competition on road freight services. The rail sector by comparison to the road and aviation sector appears to be unwilling or unable to remove the delays the present varying national models implies. A common clear playing field is

required with minimal delays and implied bureaucracy. The EC may need to exert pressure to secure the achievement of this goal.

## 2.3 Interoperability

As described previously, the cross border nature of the RETRACK project presented many problems as well as opportunities. With this in mind a review of the barriers to successful interoperability was conducted and reported, where the differences between national, EU and international interoperability became apparent.

The move towards interoperability has been driven by the railway reform measures and other directives. Interoperability should assist in providing a level playing field for rail and make it a more competitive option for the movement of freight across and within national borders.

In reality progress towards the declared aims of interoperability is mixed. The required measures have not been understood, introduced or implemented to a common level with the consequence that the achievement of a homogeneous fully interoperable railway is still a distant aspiration.

The establishment of a new rail freight service crossing multiple frontiers (geographic, national, organisational etc.) was a complex task requiring the simultaneous alignment of many technical, operational and commercial factors to ensure success. The reality is that some of the processes, systems and methods for securing train paths have proved to be weak, complex and not user friendly. These processes will need to be made much more acceptable to potential operators if the goal of securing more international trains and competitive services is to be realised. The present arrangements are inadequate.

The operation of new train services using orthodox traction and rolling stock, all of which is certificated and compliant with internationally agreed standards presents fewer problems for potential operators and cargo interests who have knowledge

of the workings of the railway. The problem arises for those shippers and cargo interests without this in-depth knowledge and the barrier this creates to secure interest in the use of rail services. These may be perceived as being difficult to access thereby, impeding the rate of transfer.

RETRACK has shown that the rail product and service offer has to be much more closely aligned in terms of quality, service levels, reliability and accessibility together with the sort of product norms provided by the road transport sector particularly in relation to condition monitoring, track and trace, documentation accuracy and an interventionist management position in the event of disruption.

## 2.4 Legislative and institutional issues

So far, some Member States have adopted all the harmonized EU railway legislation and opened their networks for domestic as well as international traffic, while others have made far less progress. Throughout the years, the Member States transpose the EU legislations, making the necessary formal legislative and administrative changes in their national rules. This is also the case for the Eastern countries on the RETRACK corridor, whose time-schedule for implementation has been relatively short and resources more limited.

Nevertheless, it is clear that the same EU legislation has often been differently transposed among the Member States, both in terms of the aspects addressed and in the degree of impacts. One of the most occurring issues is the differentiated infrastructure charges and charging principles on different stretches of a trans-European rail corridor. The cause for this differentiation seems to lie mainly on the dominate position of the incumbent railway undertakings of several EU Member States. This situation is often combined with a lack of transparency, due to the ownership structure of their organisations and/or the possible existence of informal relationships between stakeholders, including national governments and the regulatory authorities.

On the RETRACK corridor, incumbents have a dominant position in Austria, Hungary, Romania and Germany. In particular, the incumbents tend to set constraints for private and foreign railway undertakings on accessing the railway infrastructures (both slots and terminals). Procedures take longer for non-incumbents and the national rules are not specific or transparent enough, which yields possibilities for ad-hoc interpretation in favour of incumbents. Supplementary national rules are applied, for instance financial obligations, which can hardly be complied with by private railway undertakings due to their limited finances. Cultural obstacles also remain to exist. A substantial amount of effort still has to be done with respect to harmonization and integration in order to provide a contestable rail freight market in Europe.

# 3

## **ICT Training needs and developments**

# 3 ICT Training needs and developments

## 3.1 The demands on and development of an integrated ICT system

The RETRACK project analysed the state of the art with respect to ICT systems as well as the communication and interconnection requirements of the RETRACK railway operators.

The IT challenges relate mainly to the complete order process, that is, from purchasing/invoicing to delivery. The planning & rescheduling of resources, international tracking & tracing, optimization of the used rolling stock and improved asset management are also IT challenges that needed to be solved. RETRACK addressed this by developing IT infrastructure for RETRACK partners.

This was achieved through a series of interviews with operators operating along the RETRACK corridor. Despite varying, but well-established

standards for infrastructure, it should be noted that an overall standard for the order and cash process does not yet exist as part of an integrated system.

Interviews showed that the existing IT infrastructure among RETRACK operators was weak. This starting point was not helpful in achieving the project goal - the development of the Customer Information Center (CIC) and Train Control Center (TCC).

However, the project succeeded in developing the advanced SOPTIM Railway Management System (RMS) and Customer Information Center (CIC) software tools. These have an extensive and very useful functionality, if used in the right environment. Typically this environment involves trains of fixed composition, with containers, swap bodies and trailers.

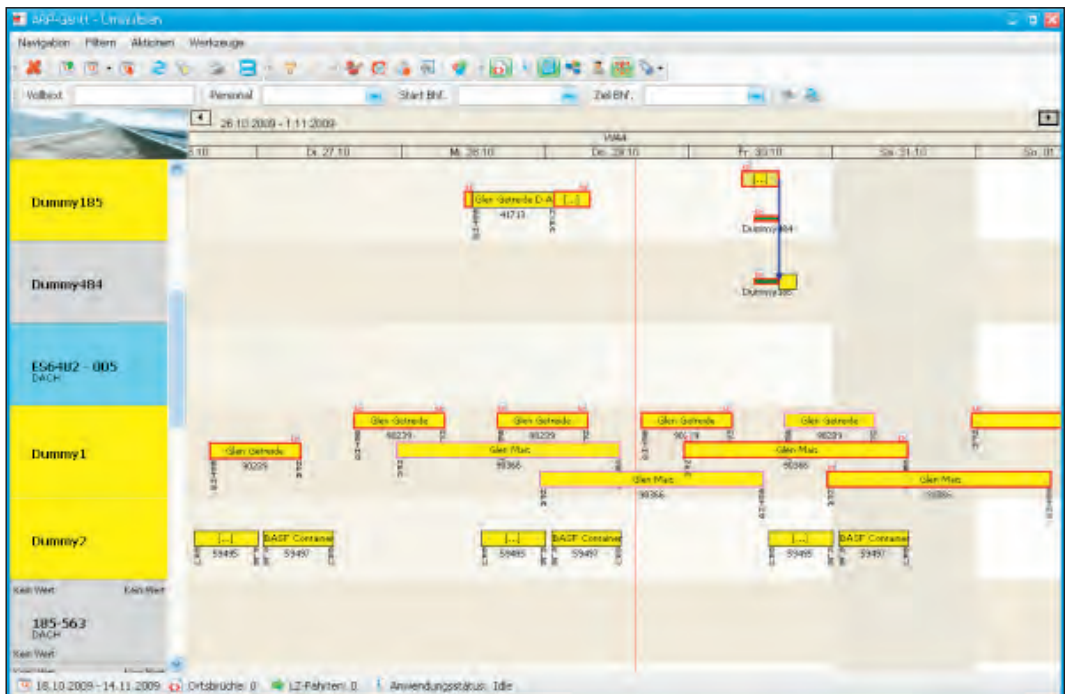


Figure 5: Screen shot of the SOPTIM RMS system.



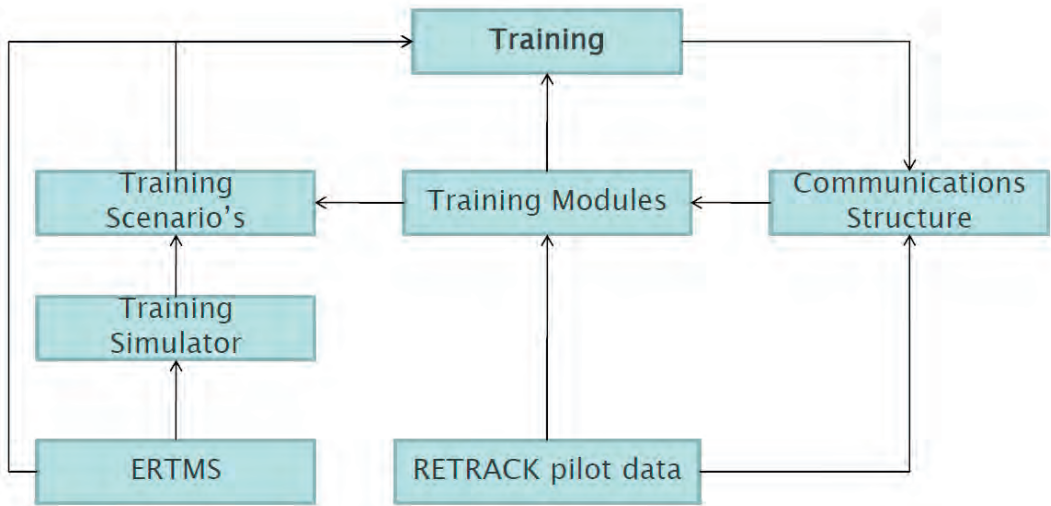


Figure 6: Graphical presentation of the methodology.

The SOPTIM RMS system developed for RETRACK addresses the complexities faced by new entrants, in particular if a railway undertaking acts as the lead customer in a single contract and acts as supplier in another.

Compared to the initially envisioned situation at the start of RETRACK, the actual RETRACK trains serve(d) a very different market (single wagon and groupage via on demand - less regular or irregular services). The number of RETRACK trains is small enough for the planners and customers to rely on relatively simple software tools and conventional communication devices. The sophisticated SOPTIM tools are therefore not deemed necessary and therefore not used in RETRACK, yet.

It is worth noting however, that in RETRACK, Transpetrol, as they move from a forwarding agent toward a railway undertaking, have had continued discussions about the use of the system. Should Transpetrol choose not to buy the system, the development of TAF/TSI will require a compliant, inexpensive and flexible ICT system to enable SME railway undertakings to continue to compete in the deregulated rail freight market, and the SOPTIM RMS

system, once developed to the final TAF/TSI standard is expected to be capable of addressing these needs.

### 3.2 Training and simulation

The RETRACK consortium has developed a training methodology for operations staff in cross border services both for the RETRACK pilot and for future RETRACK developments.

More specifically the objectives of this methodology were:

- To develop a training program and -modules using ERTMS and Simulation tools;
- To design a comprehensive training tool;
- To train locomotive drivers, dispatchers and other stakeholders in using the developed simulation tools and handbooks.

The target audience for the training included train drivers, dispatchers/ traffic management and academics. Information from the RETRACK Pilot and knowledge about ERTMS have been used in the training. A graphical presentation of the methodology is shown in Figure 6.

By implementing the methodology the following outputs have been achieved:

- Functional ERTMS Training with Handbook;
- Training simulator to facilitate sharing of knowledge about ERTMS;
- Scenario's for the training simulator based on the RETRACK pilot;
- Training modules for simulation training based on the RETRACK pilot;
- Training Handbook;
- Teaching material for academic and analytical programs in the context of rail operations and procedures as well as logistics;
- Proposal for a common coded language to facilitate communication between TCC, train drivers and dispatchers.

The functional training included lectures into general ERTMS and advanced ERTMS knowledge (SRS 2.3.0 D).

The training simulator developed for the purposes of the training allowed the simulation of different situations along the RETRACK corridor. For instance shunting operations with multiple trains at Passau have been simulated. A screen shot of the output of the simulation model is shown in Figure 7.

The training simulator contains different levels:

- 5 Operational Train Simulators (Opsimu's);
- 4 country interlocking / RBC's containing 4 dedicated pc's and 8 screens;
- 40 automatic trains on the pilot corridor;

- Integrated messaging system (Code of Language);
- Possibility to run in automatic mode or manual mode with the Opsimu's and traffic management.

As part of the RETRACK training, a handbook has been developed that includes teaching and training materials equipped with a simulation package to train rail professionals in how to use innovative means in managing rail freight systems effectively.

This is an easy-to-read manual that discusses:

- Rail freight systems in Europe;
- Teaching and training methods suitable for rail education;
- Training method employed for the purposes of the handbook;
- Code of Language that facilitates communication in running freight trains;
- Curriculum for training rail professional to use the code of language developed;
- Teaching modules for rail professionals including subject areas such as: Conventional Rail Corridors, ERTMS, Rail Freight Network Operations, etc.;
- Guidelines for quality assurance and collection of feedback;
- Avenues for further work.

Teaching material for academic and analytical programmes in rail operations, procedures and logistics has also been developed. This material is available on request.

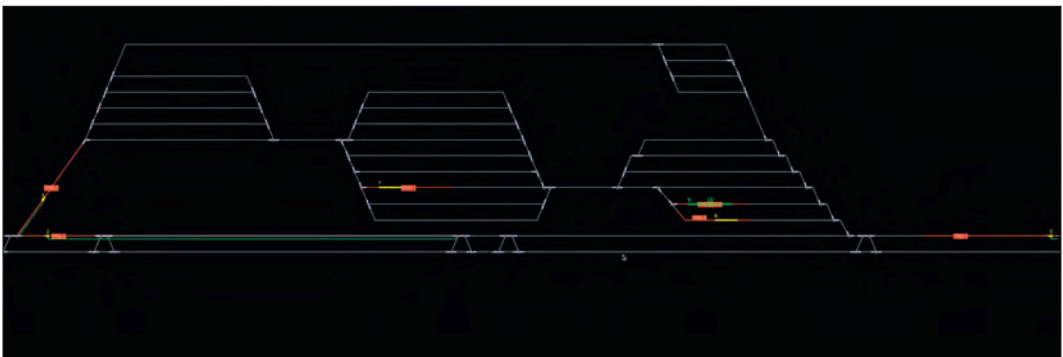


Figure 7: A screen shot of the training simulator in Passau.



### 3.3 Code of language

A common language for the communication between staff involved in rail freight operations across borders does not exist. With this in mind the RETRACK project developed a standardized code of language to be used by dispatchers, drivers and traffic managers during daily operation.

The EU train driver license is the leading topic in the 3rd Railway Package and is seen as a major barrier for interoperability of the railway system and therefore a major barrier toward achieving a seamless service. Under the coming EU Train Driver License, train drivers must be able to use the messages and communication method specified in the 'Operations' TSI. Drivers must be able to communicate according to level 3 of the table on page L 315/77 of the Directive 2007/59/EC.

The code consisted of 8 categories covering: staff, incidents, location, orders, velocity, train, network and delays. Subsets of these categories allow the efficient communication between many key personnel. This would serve as small step in improving the overall efficiency and effectiveness of European rail freight operations. Details of the code are described in the Deliverable 5.3 (Training Materials). A sample of category 1 code is shown in table 1 below.

Category 1	Staff
<b>Code:</b>	
S1	1.1 Train Driver (Train)
S2	1.2 Dispatcher (Track Side)
S3	1.3 Traffic manager (Track Side)
S4	1.4 Yard manager
S5	1.5 Engine Driver (main)
S6	1.6 Shunting Personnel (Track Side)
S7	1.7 Police (External)
S8	1.8 Fire Brigade (External)
S9	1.9 Medical Services (External)

Table 1: Sample code of language (staff).

# 4

## **The RETRACK pilot**

# 4 The RETRACK pilot

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## 4.1 Approach and partners involved

The RETRACK pilot rail freight service has been operated since February 2010. The key initial commercial and operational partners of the RETRACK pilot rail freight service were:

- European Bulls (Netherlands) (no longer involved)
- Transpetrol GmbH (TP) (Germany) (joined later);
- Rail4Chem (Germany); (no longer involved)
- LTE (Austria);
- CER (Hungary)

The Romanian partner Servtrans became inactive in the project. Rail4Chem left the consortium when it was bought by Veolia. European Bulls was wound down as an organisation. This shows the volatility of small companies and the changing composition of the rail transport market. The following key commercial and operational partners remained involved in the pilot rail freight operations: Transpetrol, LTE and CER.



Figure 8: RETRACK service.

The original RETRACK pilot demonstration was scheduled to run between January 2008 and December 2010, although actual services ran much later. Europe faced a serious recession during 2008/2009 and consequently it was not the best time to start and develop a new rail freight service.

As RETRACK was moving towards launching services, demand was falling in response to the international economic recession and significant investment and effort in time marketing the service was rendered useless. As traffic volumes declined, existing train service providers cut back on provision and competition hardened. The timing for a wholly new entrant was not promising.

The pilot was delayed and eventually commenced in February 2010 with low priced grain cargos as core load.

Transpetrol led the commercial and operational planning of the services. Transpetrol intends to become a major rail freight player in the emergent liberalized market beyond the traditional role of its parent company VTG as a wagon supplier and forwarder. It was responsible for train management and operations including the customer relations, pricing, in transit monitoring, the resolution of any disruption and delay response, arrangement of train crews and shunting. The collection and distribution of wagons to/from Köln (Cologne) was carried out by a railway undertaking controlled by Transpetrol. This provides a greater measure of flexibility and control than provided by previous subcontractors.

## 4.2 Clients and services

The RETRACK pilot service started with one grain cargo train rotation per week for a small customer base running from the East to the West of Europe. These trains have provided a flexible but consistent source of revenue and volume, allowing salespeople to solicit higher value traffic. Over the months the service frequency improved gradually to a higher level in terms of frequency towards the final three rotations per week. The customer number has increased significantly, while the cargo types (hazardous and liquid tanker, automobile) and direction

(from West to East) have changed positively as well. This was possible via a flexible, pragmatic and adaptive customer oriented service, for example the single wagonload service (SWL). The final traffic scenario is different from what was envisaged in the early phases of the project. The development of SWL traffic, particularly hazardous and liquid tanker, has secured premium revenue and demonstrated that SWL traffic can be carried profitably which is contra to many industry views. This success has been achieved with a limited marketing of the RETRACK service. This also suggests that if RETRACK would engage in more aggressive marketing, more customers with more high value cargo could be attracted. We may conclude that there is market volume that could be attracted to rail on the basis of a pragmatic and reliable service together with attractive rates for wagon groups and individual wagons. RETRACK represents a service and business model that has proven itself in the context of available traffic, service times and route options. Responding to the market demand, the train has been operated at levels of traffic ranging from very low levels of traffic and short trains (a single wagon) to full length trains with weight restrictions. The business model demonstrates adaptability to varying loads. The establishment of a satellite (or hub-and-spoke)

concept enabled RETRACK to add additional nodes to its network. This also demonstrates pragmatism, adaptability and flexibility in terms of commercial and operational response.

Over the first two years of the RETRACK train service, scores on several indicators indicated progress. The number of regular customers had increased and several shipments for one-time customers were continued in the second year.

During the RETRACK pilot the strategy has been to concentrate the service on the main corridor, assembling goods in the hubs in Cologne and Gyor and serving the customers via feeder and distribution lines from these hubs.

The geographical market was later expanded. While the number of origins for freight dispatching was reduced from 15 to 14, the number of destinations grew from 13 to 17. This expansion was most noticeable in the eastern part of the corridor, where the volumes transported via the distribution network showed the largest growth.

All transport indicators showed an impressive growth from the first year (Feb 2010 – Feb 2011) to the second year (Mar 2011-Feb 2012):

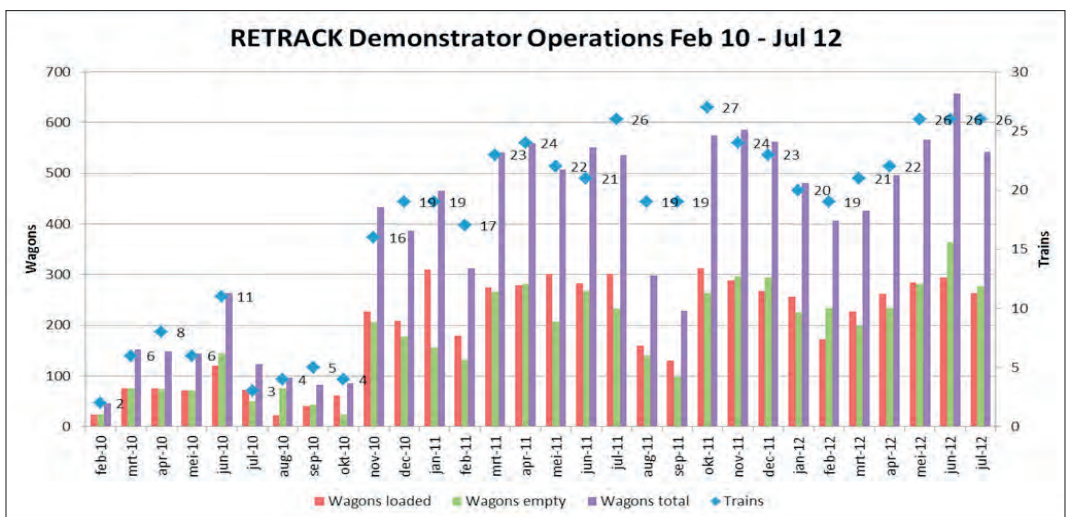


Figure 9: RETRACK pilot rail freight service progress, Feb 2010 - July 2012

- Train departures (115%)
- Freight volumes (81%)
- Transport (tkm) on feeder lines (60%)
- Transport (tkm) on distribution lines (111%)
- Total transport (tkm) on feeder and distribution (80%)
- Transport (tkm), feeder and distribution, Cologne (71%)
- Transport (tkm), feeder and distribution, eastern hubs (85%)

Figure 9 provides a useful overview of operations between February 2010 and July 2012. On average a train consists of approximately 23 wagons. This train length does not have a negative impact on the service.

Stable volumes, if not growth, are likely in future, assuming a continuation of current demand levels for existing commodities of car parts, chemicals and grain.

### 4.3 Operational integration and technical bottlenecks

The start of the RETRACK pilot was constrained by a lengthy and complex period during which the respective roles and responsibilities of the operational and commercial partners were unclear and doubts were raised about the likely success of the RETRACK pilot. Unlike the maritime sector the rail freight business does not have an established track record of commercial and operational consortium arrangements involving capacity, cost and revenue sharing models. Until the emergence of a strong, non-traction based leader (Transpetrol), key partners were reluctant to adopt clearly structured and defined roles that would ensure that competitors were able to co-operate.

Next to these issues, the RETRACK service was faced with the common railway-operational and technical issues, which boil down to a general lack of standardisation of many technical and non-technical systems. An important technical barrier, traversing multiple power supply systems was bypassed by using modern, but relatively costly multi-voltage locomotives. This helped to mitigate the time lost in border crossing procedures. The increasing service frequency was another factor that helped to improve the productivity of resources like rolling stock.

Train length has normally been less than the 750m maximum allowed on the main operational axis. Very heavy trains have been routinely operated between Köln and Rotterdam as required and without major difficulties. Maximum train length is a function of infrastructure capacity and an operational limitation that all rail freight operators must comply with.

One of the remaining issues is driver related. Different languages and lack of cross border driver skills and international competence recognition still reduce interoperability.

Despite the earlier mentioned preferential treatment of incumbents, the pilot could comfortably secure acceptable train paths.



**5**

**Future corridor  
extension and  
knowledge  
development**

# 5 Future corridor extension and knowledge development

## 5.1 Introduction

The main objective of the RETRACK project has been to pilot a service between the North Sea and Black Sea, however it would be short-sighted of the consortium not to consider the wider potential of the RETRACK project within Europe and beyond where the RETRACK model could be usefully deployed or adopted.

In order to exploit the full potential of the RETRACK corridor, a network of feeder and distribution lines is required. The hubs in Cologne and Gyor are the main connection points, being part of a hub and spoke network, offering connections with other pan-European corridors. In paragraph 5.2 the connection and extension possibilities are described.

In addition, consideration should be given to shifting global trade patterns and projected economic growth. This is why RETRACK explored the potential to connect with China over land bridges. The EC asked RETRACK to do this in the final stages of the project. In paragraph 5.3 these land bridges and

the research carried out in RETRACK are described. The great amount of rail freight information that has been collected within RETRACK and other rail freight projects is now accessible via a dedicated tool, the RETRACK Knowledge Base. Paragraph 5.4 introduces this tool.

## 5.2 Connection and extension possibilities

Extension of the RETRACK service is a challenge for the project and the period after. First of all this is to be done by capturing new customers to use the existing service, but in addition there is a challenge to expand the services to South East Europe and North East Europe. The idea is to use a hub in Hungary to link existing and new services. To implement expansions there is a need for increased cooperation with complementary rail service providers.

### Rail network South East Europe

A planned next extension is a rail freight service connecting the Westbound RETRACK service with

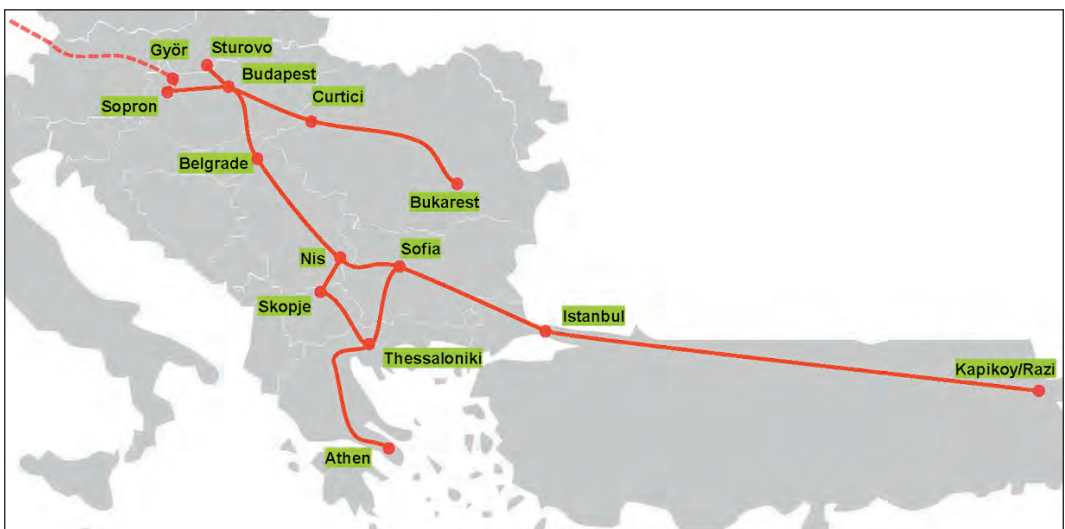


Figure 10: Operational concept for South East Europe service extension of RETRACK.

services operating in South East Europe (SEE) from a hub in Hungary (Győr, Sopron or Budapest). The service offered will be adapted to bulk products (agricultural and other) and new logistic concepts using only classic railway owned wagons offering trains at a daily frequency. Planned destinations to be served from this new service are 1) Bucharest; 2) Skopje; 3) Sofia, Thessaloniki and Athens and 4) Istanbul and further to Kapikoy/Razi. A map illustrating the SEE extensions is shown in figure 10.

To offer a successful service, RETRACK rail operators will work together with South East European operators like DB Schenker Rail, Express, Interfracht and Proodos in cooperation with national incumbents. The role of Transpetrol will be to act as a rail forwarder and coordinator between RETRACK and the Rail network South East Europe (SEE) operators.

### Rail network North Europe

Another possible extension studied is a network connecting the Northern parts of Europe to the RETRACK network. A preliminary illustration of the network indicates that a hub in Lodz may be used to assemble freight from (among others) Wrocław, Szczecin, Gdansk, Poznan, Sokolka, Lublin, Slavkov and Katowice. This network will be connected to the existing RETRACK network in Sopron or another hub in Hungary via Sturovo, see figure 11.

The North East network is planned for wagon groups using all wagon types and all commodity types. An estimated lead time from Sturovo to Plock is 3 days.

In the North East Europe Rail network concept Transpetrol will operate as a rail forwarder, coordinator

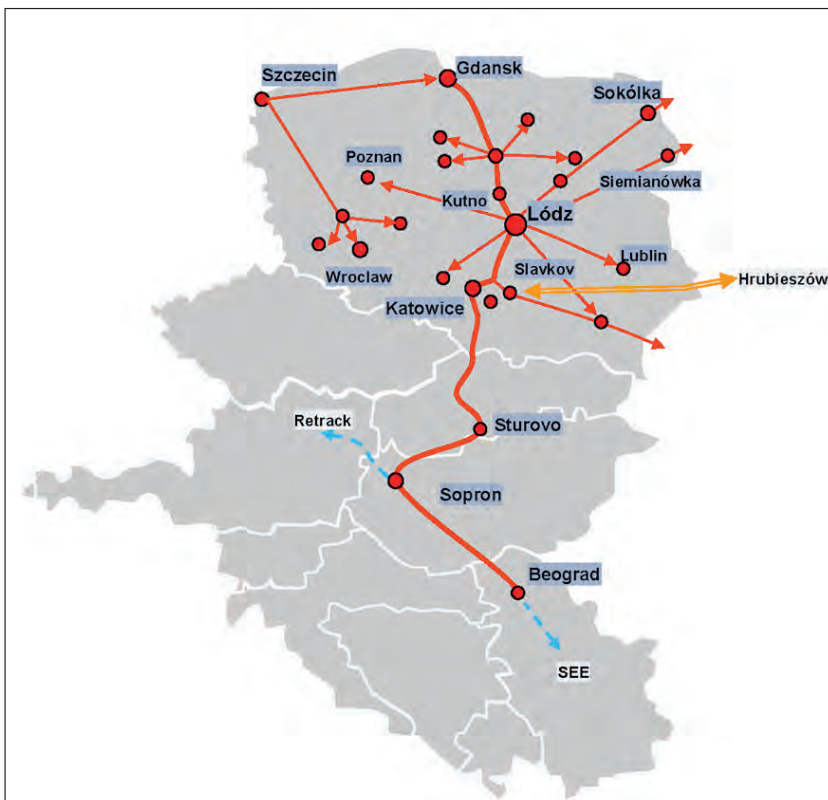


Figure 11: Operational concept for North Europe service extension of RETRACK.

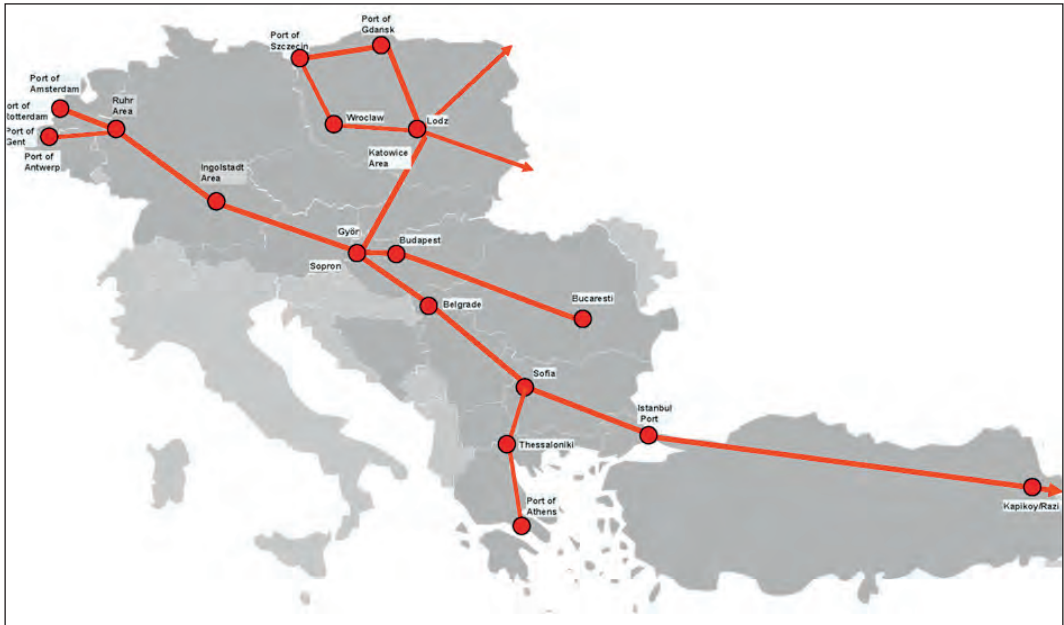


Figure 12: Operational concept for a RETRACK Rail network including a North Europe (NE) and South East Europe (SEE) rail service extension.

between the Rail network South East Europe (SEE) and North East Europe (NE) and as operator in Poland. Operators in North Europe rail network will be Transpetrol in cooperation with national incumbents and private railways in Poland.

Combined rail network

A future RETRACK rail network is an extension of the initial service with the two rail networks developed to serve the markets in South East Europe (SEE) and North Europe (NE), see figure 12.

Compared to today's service the expansion to new markets will bring enormous challenges to the management of train operation. It requires information exchange between rail operators, between rail operators and Transpetrol as focal organiser of the service; between customers, rail operators and focal rail operator etc. An option to handle these challenges is to implement the SOPTIM Rail Management System (RMS) and the SOPTIM Customer Information Center (CIC) systems that were developed in the RETRACK project

The RETRACK service has already demonstrated its ability to expand in a flexible way by adding new feeder and distribution lines from the existing hubs in Cologne and Győr. The new plans will allow RETRACK rail operators to enter new markets in cooperation with national incumbents.

### 5.3 Eurasian extension

Three rail corridors were investigated; the Trans-Siberian corridor, the Central –Kazakhstan corridor and the TRACECA rail corridor. These corridors are depicted in figure 13.

The existing maritime connections between Eastern Asia and Europe are efficient and very reliable, yet time-consuming. This creates logistic challenges, in particular limited responsiveness to suddenly changing logistic demands. Next to that, some of the expected increase in trade between these regions could be partially shifted to land corridors and in particular to railways, since this mode offers potential savings in terms of time, cost and environmental friendliness. The proposed Chinese plan to

develop Western China gives transport by rail extra advantages. However, as long as rail transport does not overcome the main obstacles it faces, which are numerous in the region, it will not be possible to take advantage of its full potential. There are multiple projects and plans to modernise infrastructure and optimize operations, however.

The connection with Northern Europe, Duisburg – Moscow is perceived as the most efficient and already functioning connection. Bratislava, Bucharest and Budapest were identified as the connection points of the Southern part of RETRACK with its respective corridors.

The TransSib routes via Mongolia and Manchuria are well-functioning connections. For the other corridors there is sufficient rail infrastructure, but the level of maintenance is low and the capacity for routine operations is limited. Central Asian countries and Russia are making the first steps towards

railway sector reforms, which will be needed before logistic companies are able to provide new rail freight services. All these countries are actively involved in different international and bilateral agreements, which provide a legal basis and an operational framework for e cooperation in the region.

The TransSib – Manchurian, TransSib – Kazakh and the Central corridor route and TRACECA – Turkmenbashi route were identified as having potential for the RETRACK – China connection.

A model-based analysis of the 4 rail corridors was conducted in order to assess the current (2010) and future (2020) attractiveness of these corridors for the delivery of cargo by rail from Europe to China. Rail corridors were further compared with a maritime transport alternative. The outcome was that in 2010 the TransSib-Manchurian and TransSib-Kazakh routes were the most attractive options to connect Europe with Western China, with the

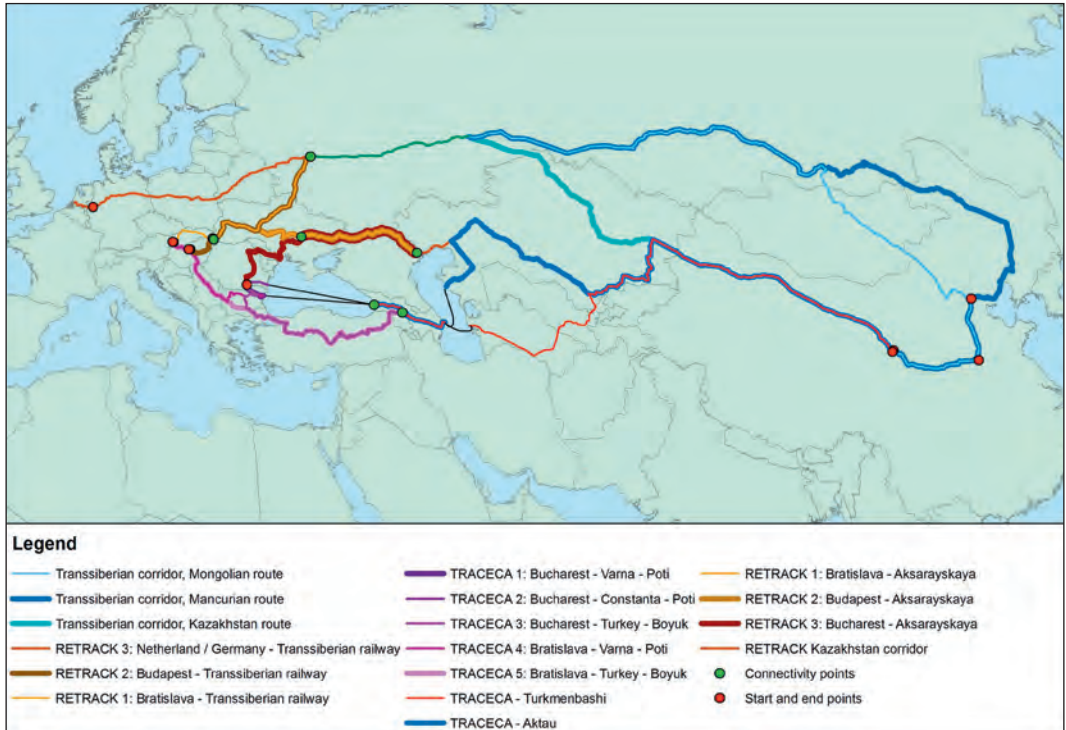


Figure 13: Connection between Europe and China over road bridges.

TranSib-Kazakh route slightly more attractive. The TRACECA and Central corridors are not a viable option. By 2020, both Trans-Sib routes still remain the most attractive rail land bridges. The most important expectation for 2020 is that the Central corridor will be technically and institutionally improved and also become a good transport option, not far behind the leading corridors.

A comparison of the connection between the Northern and Southern parts of RETRACK and Western China was also made. For the Northern part, the TranSib-Manchurian route is the main route, even for the inner China rail transports. If the planned infrastructure modernisation projects are successfully implemented in Kazakhstan, then the TransSib – Kazakh route will be a significantly more attractive and competitive option for this connection.

With regard to the Southern RETRACK connection with China, the TransSib-Kazakh route is the most efficient current option. If political consensus is reached and the corridor initiative supported, then the Central corridor can become one of the most attractive options for the connection of Southern Europe with Western China. With regards to the TRACECA corridor, considerable improvements in infrastructure, rolling stock, as well as in operations have to be achieved in order to make this corridor competitive with the previously described corridors in the long term.

#### 5.4 The RETRACK Knowledge Base

A great amount of data and other information about rail freight has been collected and processed within RETRACK, as well as in other R&D projects and integrated projects in the EU and its Member States. In order to make this information accessible and to translate information into knowledge, a Web-oriented system ([retrack.demis.nl](http://retrack.demis.nl)) has been developed: the RETRACK Knowledge Base. This system is closely linked to the European Transport Information System ETIS+. Data on infrastructure,

freight flows, transport modes etc. from ETIS+ can be uploaded from the RETRACK Knowledge Base. Links with other systems are foreseen, among others with TENTec, Gisco and models such as TRANS-TOOLS.

The Knowledge Base is expandable to future corridors. Information on the RE-ORIENT corridor has already been included in the Knowledge Base, whereas the development of Green Corridors allows an integration of relevant data and information.

The RETRACK Knowledge Base consists of the following elements:

- Web portal and contents management system;
- A public and a restricted access document repository and search system;
- Table data: data viewer with tables, maps and charts and data editor;
- Geo data: network data viewer with infrastructure and topology;
- Support data exchange with external systems;
- It allows editing of documents, tabular data and network topology and data.

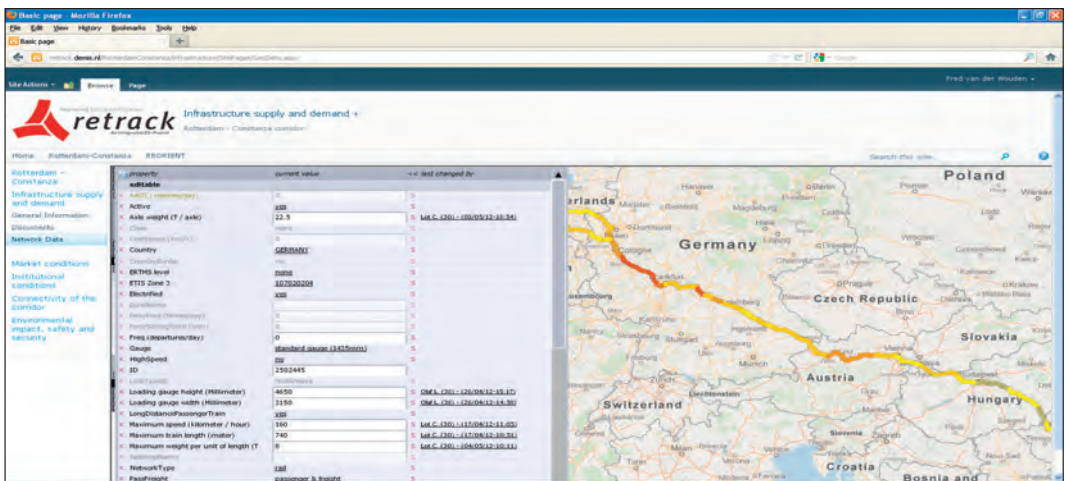
The Knowledge Base is organised along five main topics:

1. *Infrastructure supply and demand* - rail network link and node data, corridor definitions of the RETRACK main and alternative corridor network, rail technical data, such as maximum train weight, maximum speed, loading gauge height and width and ATC system
2. *Market conditions* - corridor market players, documents on business models and market players, tabled indicator data on intermodal services, modal shares, O-D flows and transport costs in corridor, links to various useful sites and portals
3. *Institutional conditions* - elaborate documentation: legislation on rail liberalisation at EU and national level and policy documents on transport and logistics
4. *Connectivity of the corridor* - corridor studies, network data on RETRACK and alternative international rail corridors

5. Environmental impact, safety and security - table data indicators on emissions of CO<sub>2</sub>, NO<sub>x</sub>, particles and SO<sub>x</sub>, documentation from TREMOVE, STREAM etc.

The RETRACK Knowledge Base can be accessed via the following link: demis.retrack.nl.

Figure 14 gives an impression of the RETRACK Knowledge Base.



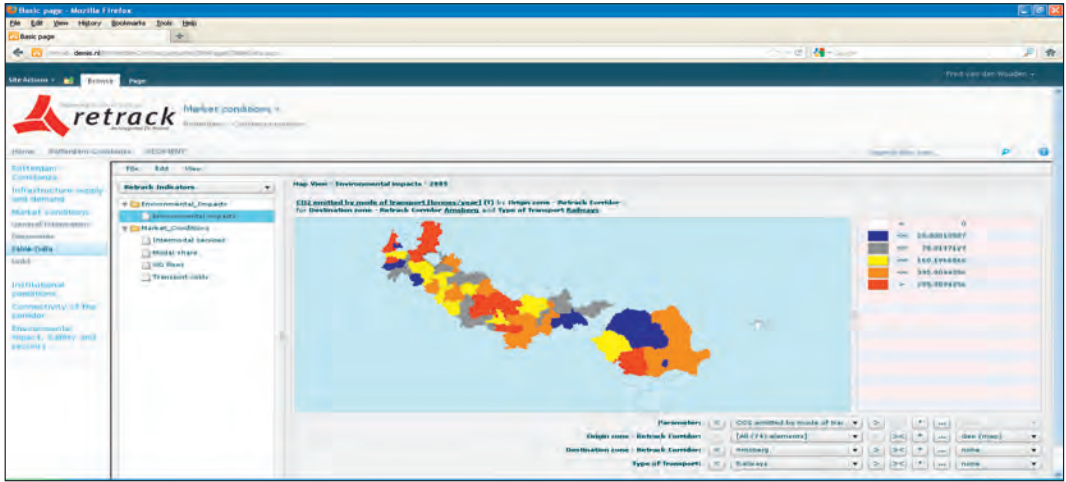


Figure 14: RETRACK Knowledge Base impressions.



# 6

## **Project impact**

# 6 Project impact

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## 6.1 Business implications and potentials

### Introduction

**The business objective of the RETRACK project was to implement pan-European privately operated rail freight services (to achieve the EU key objective: modal shift rail) between Rotterdam, The Netherlands and Constanza, Romania, passing Germany, Austria and Hungary. In the pilot demonstration phase and afterwards in the commercialisation of this service this objective was achieved.**

RETRACK has realised efficient and commercially viable single wagonload services in markets where the incumbent suppliers were unable or unwilling to offer such services. They argue that such services are too expensive and that (because of that) the customer base is lacking. It seems that with the appropriate business model, such services can be realised, at least in a relatively small network. In a large service network, as the incumbents have to serve, the investment level and overhead costs may prohibit the replication of this business model. This explains why the incumbents tend to see initiatives like RETRACK as cherry-picking.

The RETRACK service has demonstrated that private rail operators are able to collaborate and co-operate in the development of new pan-European cross country services that would be competitive, reliable and attractive compared with the existing rail freight services provided by incumbents or other new entrants operating on national railways. This service has exploited the freedoms made available through the railway reform packages and directives established by the EU to open up the rail market to competition between the incumbents and new rail operators.

Through its development and implementation the RETRACK service is contributing to remove the remaining barriers to the implementation of EU non-discriminatory open access freight transport policy. We note here that the reality of the regulatory regime and its effectiveness in countries like Germany and Austria is still debatable.

### Conditions for success

Success is possible under certain conditions, which either already exist, or need to be amended or put in place. In all cases, it is important that the actors involved use the available options to the fullest extent.

The success of RETRACK is based on a market driven and proactive approach, which takes proper care of existing ever-changing customer requirements, in a comparable way as the road transport operators. In general those involved in rail freight need to address the whole business model (technical, operational, commercial and managerial), reduce costs, get asset utilization and control to a much higher level, use commercially available technology (equipment and ICT) rather than rely on industry bespoke items.

RETRACK could also benefit from the growing environmental awareness in the industry, which tends to favour rail transport over road transport, if its logistic performance is at least acceptable.

Given the strong position of incumbent rail operators, the EU may have to support new, similar services in other corridors by means of instruments like repayable working capital in future.

Caution should be given to ensure that proper product-market combinations are chosen. It is of course easier to implement a new service in a market where rail already has some foothold, than in markets in which the logistic requirements (naturally) favour road transport. In other words, the RETRACK

approach may work in some markets, but wholesale replication may not always be possible or feasible.

### Geographical expansion of the success

There are possibilities to extend the RETRACK service offer to destinations in other parts of Europe and Asia and some of the most interesting have previously been explored and detailed in this document. It was found that such expansion would be possible if the ongoing and planned infrastructure upgrading initiatives in many parts of Europe and Asia would materialize, in combination with a dedicated service offer and a more harmonized institutional and legal setting. The time horizon for these developments will certainly span a decade and probably more. It would be interesting to investigate if adoption of the RETRACK approach to much-- larger service networks is commercially feasible.

## 6.2 Modal shift impacts

The impact of the improvement of rail freight services has been determined in a quantitative way. It is assumed that the improvements achieved by RETRACK will also be realised in other rail services. This is a rather optimistic assumption.

The results of our analysis are as follows: The modal split measured in tons still favours road transport, with a share of almost 90 % of the total number of tons transported in 2005 and 88 % in 2030. The modal share of rail increases from 6.5 to 7.8 %.

The freight volumes were determined for the year 2030 per NSTR group and transport mode. Three project scenarios (reduction of border resistance, unreliability and higher level of service) have been distinguished. Parameters employed included hours lost in crossing borders, generalised transport costs and train speed. For each scenario the modal shift and environmental impacts have been determined. The overall impact of RETRACK is the highest for international freight flows.

The influence of border waiting times is very limited. The influence of (un)reliability may be bigger,



but it is extremely difficult to model reliability in a quantitative manner. The highest impact is caused by a combination of time and costs reduction, as calculated in the (increased) level-of-service-scenario. An increase of rail freight transport in Europe of approximately 5 % can be expected when costs decrease by 10 %, speed increases by 10 % and border waiting times decrease by 40 %.

## 6.3 Environmental and social effects

### Environmental impact

Rail transport is generally more environmentally friendly than road transport. In typical applications, this is only true if certain conditions are met, in particular with regard to wagonloading factors in two directions, train weight and length. Empty wagons and short trains perform less than full wagons and longer trains. Securing return loads and long trains depends on smart logistics. RETRACK is an example of smart logistics, as is common in road transport.

We have determined the environmental impact of RETRACK trains using the earlier mentioned macro models. Attention was given to emissions of greenhouse gases and pollutants. Use of RETRACK services will lead to a decrease of emissions of greenhouse gases and pollutants of 0.6-0.8 %. A lower border resistance alone will lead to a marginal impact on the ton kilometres of rail freight (0.15 %) and the emissions of pollutants and CO<sub>2</sub> are reduced by 0-0.05%.

It is important to stress that rail transport is by definition less competitive in the markets where road transport dominates using conventional methods,

technologies and systems. This can be explained by the type of goods transported and the logistic requirements of the goods transported. Shifting large amounts of goods from road to rail is therefore in many cases may not be feasible, but in some niche markets and circumstances it may certainly work, as the RETRACK service shows.

### **Societal impact**

When speaking about the societal impact, it is useful to distinguish between sector and societal impacts. For the transport sector itself, the RETRACK project offers additional service options, a richer pallet of intermodal services and a competitive SWL market offering. Improved flexibility for customers is an important benefit. It is however not easy to quantify.

The societal impact of RETRACK is related with the impact of these advanced services on traffic, transport and the environment. Since we concluded that these impacts were relatively small, we may also conclude that the societal impact of RETRACK is very limited.

# 7

## **Conclusions and recommendations**

# 7. Conclusions and recommendations

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## 7.1 Conclusions

- *Private rail operators are capable of providing a successful Pan-European rail freight service for single wagons and wagon groups*

The successful use of single wagonload (SWL) or wagon groups (WG) as demonstrated under the RETRACK project has shown that, correctly managed, operated and monitored rail can offer competitive services using these patterns of operation which conventional wisdom (and prevailing railway orthodoxy) has suggested can no longer be offered as a competitive and profitable product and service package. The ability to offer fast, reliable and cost competitive services reflecting the needs of the shippers and receivers without recourse to major price discounting has demonstrated that rail can successfully operate international services between hubs and with a growing responsive network of satellite feeders. Rail has been able to exploit its inherent energy efficiency credentials using modern multi-voltage traction and the weight capability of modern roiling stock, which gives a margin well above road freight.

The operators have proved to be capable of providing a successful cross border service model, although the build-up to the start of operations took much longer than anticipated. This partially reflected the lack of familiarity and experience amongst the partners operating under a new consortium structure built specifically around the RETRACK corridor.

- *Pan-European services like RETRACK, where private operators co-operate, need European support for the start-up phase*

The basic intention of the RETRACK service demonstrator was to design, develop and operate a new service on a multi-lateral corridor (originally

Rotterdam-Constanza) and to exploit the new commercial and operational freedoms endowed by the EC inspired railway reform packages. Starting any new service and particularly one with a high degree of complexity was a commercial risk for the parties involved. This involved basic market research, marketing, development of an operational model and working structure for cost, revenue and profit sharing and the commitment of resources to start up and sustain the new service. The available EC funds gave RETRACK working capital, allowing it to develop and expand the service, when income trailed behind cost. It would have been heroic to suggest that any new service of this complexity would have been able to demonstrate an operating surplus immediately from the start up given the bleak European economy since 2008/9.

The RETRACK service has in effect operated in a similar fashion to schemes proposed and funded in the Marco Polo programme whereby support is offered to start up operations until they attain the position of generating an operating surplus. The build-up of traffic from a very low level has allowed RETRACK to improve its operating ratio to the point where it is reaching or exceeding costs coverage.

Without the overt support of the EC to get the demonstrator into service, the business case for this type of project would have been seriously compromised given the scale of the funding required. It is possible that a case might have been acceptable for the Marco Polo scheme to support the start up, but the scale of the funding required may have been beyond the limits of that source of investment.

Whether the EC can continue to act equably as a source of funding for new rail and inter-modal projects without the accusation of interfering in markets or has the legitimacy to intervene as a consequence of market failure to build upon the freedoms endowed by the reform package will

need to be addressed. What the RETRACK project has demonstrated is that the rail sector is a more complex option compared to road freight when new services are being developed and implemented but that it can be done with the right mix of competent partners, appropriate simple structures in place for the management of the operation and the delivery of a routinely reliable service that can out-perform road services and existing rail services. It is incumbent on the rail sector to look to its cost base and productivity levels to ensure that it can continue to compete and introduce new services. Whether private finance would be sufficiently enthused by what RETRACK has achieved with EC support funding is open to debate. It does offer a model, but one which will have to be used carefully and sparingly to avoid accusations of modal bias.

- ***The corridor between Rotterdam and Constanta offers a sufficient base of relevant product flows to be shifted from road to rail, in two directions***

The market research studies that examined the potential traffic and commodity flows on the Rotterdam to Constanza corridor indicated there was adequate traffic for a new service to compete with existing rail services provided by incumbents and also with road freight on the same corridor. Estimates of between 0.4 and 0.8 million tonnes of originating freight were identified.

The initial market research suggested a wide range of potential traffic activity, which a new service could compete. The onset of the recession in 2008 and on-going Euro crisis was not the best of times to be launching a wholly new service pattern and method of operation. In reality the market research was well wide of the mark largely as a result of the rapidly deteriorating economic crisis and the realization that inter-modal flows were unlikely (certainly in the start-up phase) to be a major source of traffic and revenue given the well-established network of services provided by incumbents and specialist operators.



The base load traffic that allowed the service to be started was a major westbound flow of grain from Hungary to Benelux. This allowed other traffic and commodities to be solicited to boost volume, revenue and the customer base which expanded slowly to a stable figure of 10-12 major regular users. Specialist traffic, particularly tanker traffic, has been attracted to the service at a premium based on the rapid transit time and the weight advantage rail has been able to exploit.

The development of satellite services from the main axis of the RETRACK service have also provided a flexible response to shippers' requirements.

- ***Customers of RETRACK appreciate the services and quality offered***

The relatively small customer base has remained stable as the service developed and matured into a recognised entity. The ability to offer a faster transit than existing rail services linked to good levels of reliability underpinned the shipper satisfaction, which was achieved without recourse to deep price discounting. Some traffic has been secured from road on merit again built around the faster and routinely reliable service pattern particularly after the service frequency was enhanced to three rotations per week.

The emergence of SWL and wagon group traffic as key components in the development of the RETRACK project is noteworthy as this category of traffic has

been widely dismissed as being uneconomic and untenable in the face of all pervading road transport and evolving shipper requirements. The emergence of tanker traffic (chemicals) as a major traffic component, which has developed as a premium traffic category is noteworthy. Inter-modal traffic has by comparison been much less than expected with minimal flows. The ability to accept and move traffic on short notice and to adapt to changing traffic patterns has also played well with shippers.

The RETRACK service has been effectively marketed by TRANSPETROL with a very limited marketing/selling role being undertaken by the other project partners. The low level of marketing activity (largely based on established business contacts) might arguably have been expanded, but given the very limited resources allocated to the management and selling of the service may not have been either practical or desirable.

- ***RETRACK has supported the European Commissions' transport and economic policies***

The development of the RETRACK to the present level of activity (three rotations between Koln & Gyor) has succeeded in demonstrating the feasibility of operating a privately sponsored international freight service on a sustained basis. The project has built upon the freedoms that the railway reform packages brought about particularly in terms of new market entrants being able to secure access to the rail networks of several countries to provide and sustain a competitive and attractive new service. The other major rail competitors have not reacted or responded by any pricing pressure but RETRACK has effectively captured and retained traffic from other modes (water and road) during the demonstrator phase. RETRACK remains a small player in a very large and complex market for international transport services. The incumbent operators are still powerful and potentially predatory competition. RETRACK has not seriously threatened the core business of incumbents such as DB. They still have

overt market power and an array of means of exerting pressure including pricing. The presence and increasing power of the regulator in Germany should act as a barrier to this sort of activity. Equally the regulators along the line of route of the RETRACK service need to be as robust in their application of fair and equitable rules of engagement. The variations in competence and willingness to act in the case of incumbent actions needs to be addressed to ensure a level playing field within Europe.

- ***The RETRACK business model can be successfully applied elsewhere***

The business model that has supported the RETRACK project during the operational demonstrator phase is essentially very orthodox. The key to the success of the project was to implement a very small, but highly competent and disciplined approach to the organisation and operation of trains in the start-up phase and then to expand and enhance the service offer as volumes developed and the service became established.

The evolution of the model ultimately adopted to operate the RETRACK demonstrator took an inordinately long time to evolve as the constituents of the project changed. This was a serious issue and demonstrated the lack of willingness and experience to collaborate in a consortium led operation. This nearly proved to be fatal for the project. It is a serious lesson that has been learned and needs to be recognised in any future developments.

The assumption of a lead commercial and operational management role by TRANSPETROL was key to the growing success of the train project. The combination of commercial and operational planning and monitoring within one lead organisation was significant. The resource base was small but well led and directed with established industry links that underpinned the project. Initially the single rotation per week did not use resources full time but the move to three rotations after the resolution of the



grain wagon defects implied a wholly different scale of involvement in terms of train planning (loads, wagons, train paths, train crew, commercial pricing and invoicing) but still using a small, but very competent team working within defined roles. The availability of EC funds to support the start-up phase and the low manpower involvement plus access to various incumbent sponsored IT systems proved to be an adequate basis to develop a new service model.

Traction provision was through one of the key partners (LTE) for the main line services. Train crew sourcing was undertaken by TRANSPETROL together with train path applications. The service was marketed by TRANSPETROL using known contacts and the resultant marketing effort was low profile. TRANSPETROL also undertook the responsibility for revenue accounting and individual train commercial monitoring.

The use of a “neutral party” to act as the administrator for revenue and cost accounting was a significant and robust role, that any future operation could usefully emulate.

RETRACK has demonstrated that it is possible to operate a new international freight train service with an increasing frequency with a very small core team to manage the operation and to minimise the associated costs and overheads. Because the personnel involved in RETRACK were effectively “lent” to the project the full detailed allocation of costs and overheads may be different from those of a wholly new stand alone start up operation. The key outcome is to define roles and to minimise the personnel involved with strategic and routine operational and commercial matters. Any on-going developments of the RETRACK model need to be austere and lean with a hunger and ambition to make the projects successful, competitive and attractive on merit compared to other modal options. The model used in the demonstration phase may not be completely transferrable in other locations but the essentials of a lean, well structured informed and competent

core team fully charged with the commercial and operational aspects of a new service remain valid.

In operational terms any new service will seek various competitive advantages (speed, reliability, cost competitiveness, security). RETRACK has demonstrated that even within a very orthodox framework it was possible to introduce and expand an international freight service in Europe during a major economic recession and succeed in establishing itself as a credible entity. Competence, flexibility and adaptability together with industry knowledge in terms of commercial perspectives, operations, crew scheduling, infrastructure issues (train path acquisition, notice of infrastructure work etc.) are essential. As such the new services are much more likely to be well received. The ability to offer a range of routine or “on request” satellite services to/from the main core route is something that has been developed as part of the RETRACK product and service offer. Close monitoring of the trains once on the move has also been valuable in the event of potential delays and disruption and is also a key part of the service structure. In this respect rail will need to move much closer to the sort of technical and operational model of the road freight sector and be closer to the requirements of shippers, receivers and cargo interests. RETRACK has demonstrated that this can be achieved by exploiting the freedoms the railway reforms have brought into being.

- ***The RETRACK approach has led to knowledge transfer between operating companies, R&D organisations and governments***

The evolution of the project from its inception has led to the development of new knowledge between the commercial/operating and R&D parties.

The project has supported a website that hosts a large number of public deliverables, many of which many are downloaded by users outside the consortium. It has detailed the evolution of the project from the outset albeit with a closed section for access by the partners reflecting commercial confidentiality.

A key development has been the emergence of a structured consortium type operation between TRANSPETROL, LTE & CER. The long gestation period of the project and successive movements between and amongst the partners did seriously delay the start-up of the project and ultimately the move into a commercially profitable scenario. The rail sector has learned from this experience and the RETRACK project has offered a model, which others might usefully review, emulate and implement.

In terms of R&D the evolution of RETRACK in a very conventional and orthodox format has been surprising given the findings from the initial market research and cargo flow estimation. The emergence of SWL and wagon group activity proved to be a major development with a particular emphasis on tanker traffic for a range of chemical and related products. This has proved to be a major strong point and plays well with rail's inherent weight and safety characteristics. Again it demonstrated a flexibility and capacity to accommodate traffic flows, which have largely been discounted under orthodox rules of engagement. The identification of a core route for the development of a new service was underpinned by the activities of several of the partners (academic and rail sector) as being a viable option for the demonstrator in terms of cargo that could be won to rail from competing modes with some rail on rail competition as well. This did translate into practice with cargo/commodity flows won from both road and water.

The RETRACK project has become known to governments and government linked agencies (regulators) although it does not have a high PR profile. The regulators in each country through which the train was intended to operate (and those through which it eventually did operate were briefed about the concept and they in turn briefed project representatives about the regulatory mechanisms being developed within each national domain. The presence of the regulators to constrain any predatory activities by the incumbent rail operators appears to have worked reasonably successfully to date.

The RETRACK Knowledge Base has been developed in order to transform information into knowledge on rail freight and to present it to relevant stakeholders in Europe.

## 7.2 Recommendations

- ***Funding needed***

New international rail freight projects require a significant tranche of working capital to allow the formulation of new services particularly if "Open Trains" are to be offered with multiple shippers/customers. Funding this type of project internally may be difficult for new market entrants with no record of trading or service delivery. New services are a risk unless backed by contracts on volume and revenue. Commercial finance may be risk averse and limit the scale and scope of new service options leading to market distortion. The national perspective of individual incumbents and a lack of willingness in the past together with organisational and skill base limitations together with the onerous rule bound nature of the railways acted as a constraint to service development as compared to other modes. This partially explains why rail has lost so much ground to the road freight sector. The freedoms to innovate in terms of new services still requires a significant front end funding requirement to satisfy legal and insurance issues.

- ***At least one partner should be 3PL, preferably as leading company***

The RETRACK project has clearly demonstrated the need for a lead partner with experience in the freight transport and forwarding sector and with good operational links. The model developed within RETRACK saw TRANSPETROL effectively driving the project and assuming the key lead role covering cargo solicitation, train planning, scheduling and path planning, resourcing train crews and train performance monitoring. In addition key commercial and accounting functions were undertaken by TRANSPETROL. This proved to be a wholly effective

structure with short and direct chains of command and communication with inherent flexibility. The methods used to orchestrate the service were very orthodox but were entirely adequate for the start up nature of the service.

TRANSPETROL was originally somewhat phased by the development of the project but enthusiasm for the project grew rapidly as it became clear that funding to develop an ambitious service offering was available to test out involvement in a complex start up/new service. As the project developed TRANSPETROL was able to build on its established presence in the rail market. The acquisition of a railway undertaking reinforced this position part way through the project. The other partners (LTE & CER) were more focused on operational issues through the provision of traction resources and in-country operations organisation in Hungary.

The service has been marketed at a fairly low level with this function largely directed by TRANSPETROL through existing channels of communication with markets. A credible market presence and level of expertise and experience within the orthodox rail sector proved useful but this aspect also needs to be challenged and finessed to release the full potential of the new scenario.

- ***Open access to terminals and infrastructure***

This is a clear requirement for any new service or it will be constrained by such limitations. There were concerns at the outset regarding the power of the major incumbents, particularly DB and OBB and that they might exercise behind the scenes operational and commercial pressures to constrain any new entrant services. These concerns remain but in reality they have had little overt impact on the development of RETRACK. There were concerns that access to terminals (particularly intermodal) would be constrained. Again this proved to be unfounded and of lower concern as the bulk of the RETRACK activity was more orthodox wagonload or wagon group based traffic.

Securing access to areas where locos could be serviced or parked whilst trains are being assembled or broken down was also a cause for concern. This also proved to be largely unfounded. What was a sticking point was the inability to secure a designated area for train operations in Hungary largely at the instigation of the incumbent operator. This may have reflected the less intrusive profile of the Rail Regulator in Hungary compared to The Netherlands and Germany.

- ***Clear agreement on cost and benefit sharing***

The eventual emergence of a consortium position between the three major partners with a clear position on cost and revenue/profit sharing to underpin the operation of the RETRACK service proved to be beneficial. This was operated by a neutral party and proved to be a useful mechanism for the development of the service. The rail industry appears to be less willing, certainly in the recent past, to develop multi-party positions on cost, revenue and profit sharing compared to other sectors (maritime, air and road) and the use of this device within RETRACK has proved to be a useful demonstration of how this can be made to work in practice. Without this sort of structure and mechanism in place there is a risk of endless confusion and conflict between the partners on these key commercial issues.

- ***Implementation of railway reform packages by Member States with specified time line and with specific and clear operational/commercial status***

The RETRACK project has taken advantage of the freedoms endowed by the package of railway reforms and demonstrated that new privately operated multi-party services can be successfully promoted and implemented. The packages inspired by the EC have not been uniformly applied or fully honoured. The Rail Regulation regime has been applied to differing degrees along the key line of route of RETRACK. It has been fully implemented and is monitored/policed in The Netherlands and to a

slightly lesser degree in Germany after a more troubled introduction and establishment. Concerns remain as to the effectiveness and impartiality of the Austrian regime, which was judged to be less robust at the start of the project. The Hungarian regime was badly affected by the complications of internal national political issues but does now appear to be re-emerging in a more positive and effective format. When involved the regulatory regime in Romania was still in a very early stage of development.

- ***Further integration of railway system is required in order to compete with road and inland navigation: code of language, licensing, inspection, etc.***

The case for much more formal and informal commercial, operational and technical integration at a strategic level is clear. There is a need for the rail freight sector to move from a massive focus on domestic flows to one which still values these but also to adopt a wider pan-European perspective and to exploit the freedoms of the reform packages. The move from national and state owned to international and owned and operated in a wide variety of business models should not be a deterrent to ongoing sharpening of performance including rail-on-rail competition and, more importantly, rail on road competition. Rail has major advantages in terms of speed, weight, security and operation within a controlled and planned environment. It has failed to turn these to full commercial advantage and become remote from developing markets, which have turned to road freight operators to service their requirements which appear to have been beyond the aspiration and capability of much of the orthodox rail sector across Europe.

Major initiatives on interoperability, ERTMS, corridors and major infrastructure investments need to be seen as a means to an end and not ends in themselves. Some of these have become removed from commercial realities. Rail remains a complex rule bound system and less commercially focused than the primary competition. To succeed it needs to assume a more aggressive and commercially focused stance to drive through and exploit the initiatives developed by the EC. Key issues such as common acceptance of vehicle certification, driver competence and language together with simplified and more electronically based technical and commercial documentation systems need a more urgent resolution if rail is to re-position itself within a rapidly developing and evolving market.

# References

This final deliverable of the RETRACK project has been based on the publications within RETRACK. Many of them can be found on the RETRACK website: [www.retrack.eu](http://www.retrack.eu).

However, some external sources have been used. These are listed below:

- Council Directive 91/440/EEC of 29 July 1991 on the development of the Community's railways.
- Commission White Paper of 30 July 1996: "A strategy for revitalising the Community's railways" COM(96) 421 final.
- DG Energy, EU energy and transport in figures: Pocketbook 2010.
- EC, The Maastricht Treaty, Provisions amending the treaty establishing the European Economic Community with a view to establishing the European Community, Maastricht, 7 February 1992.
- EC, White Paper: European transport policy for 2010: time to decide. 2001, Luxembourg: Office for the Official Publications of the European Communities.
- Communication from the Commission to the Council and the European Parliament - Keep Europe moving - Sustainable mobility for our continent - Mid-term review of the European Commission's 2001 Transport White paper [COM(2006)314].
- Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community guidelines for the development of the trans-European transport network.
- 2011 – WHITE PAPER 2011 Roadmap to a Single European Transport Area, Towards a competitive and resource efficient transport system.
- Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community.





