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RETRACK

REorganization of Transport networks by advanced RAIl freight Concepts

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TABLE OF CONTENTS

1	Introduction	5
1.1	Differences between national, EU & international opportunities & barriers to inter- operability:	5
1.2	Focus of attention	6
1.3	Train path acquisition process (schedule/ ad hoc and cancellation)	6
1.3.1	Germany	8
1.3.2	Austria:	8
1.3.3	Spot trains:	9
1.4	Train management	9
1.4.1	Road: 9	9
1.4.2	Railway:	9
1.4.3	Communication with customers: method 1	10
1.4.4	Communication with customer: method 2	10
1.5	Train 'track & trace' for technical and cargo	11
1.5.1	Tracking and Tracing for the technical status:	11
1.5.2	Tracking and Tracing for the cargo:	11
1.6	Cargo documentation	12
1.6.1	Innovation:	12
	Advantage:	14
	Disadvantage	14
2	Infrastructure management issues – commercial	14
2.1	Application billing process	14
2.2	Contract management for compliance	15
2.3	Infrastructure communications	15
2.4	Train planning and notification in the event of cancellation	16
2.4.1	General way of processing for ordering an international train path is described as follows:	16
2.4.2	General way of process for cancellation the international train path:	16
2.5	Findings on the infrastructure management issues	16
3	Train operator/ manager issues	17
3.1	Route availability	17
3.2	Terminal access and contracted performance/terminal protocols and information flows	17
3.3	Rolling stock and traction availability are required/ planned under contract or spot position	17
3.4	Specialist cargo requirements (rolling stock/operator certification/ incident response etc.)	18
3.5	Performance monitoring for on-time performance and off schedule performance	18
4	Interoperability issues	18
5	Opportunities	20
6	Summary and Conclusion	21

TABLES

Table 1 A model for a demonstration train operating from Central Germany to Romania	8
Table 2 Summary of the interoperability issues on RETRACK corridor	23

FIGURES

Figure 1 Communication with customers: method 1	10
Figure 2 Communication with customers: method 2	11
Figure 3 An example of CIM Waybill	13

Interoperability matrix by country on RETRACK corridor, opportunities and barriers

1 Introduction

The objective of this deliverable is to conduct a state of review on the interoperability barriers and opportunities. It reports the differences between national, EU and international opportunities and barriers to interoperability. The deliverable was supported by previous works performed in Work Package 2 and 3 of RETRACK and relevant deliverables of REORIENT project. It also reflects the experience of the cargo interests and the train operators in key issues relating to the establishment of train paths and the whole commercial and operational process surrounding the development of a new multi-lateral train service. The report primarily focuses on the following technical lay-out of track, signalling and usage regulations along the RETRACK corridor:

- Planning, obtaining and rescheduling of train paths;
- Billing and payment;
- Systems for planning, monitoring the ongoing traffic possibilities for real time positioning;
- Logistics aspects driving a train;
- Nationally conflicting rules and regulations;
- Homologation and certification;
- Personnel requirements;
- Cargo regulations and documentation;
- Communications during train-run.

1.1 Differences between national, EU & international opportunities & barriers to inter- operability:

The structure of European railway transport is not homogeneous. To provide international cargo traffic on rail, there is a necessity either for some further regulations that will be adopted fully, some deregulation where existing measures do not reflect a changing market dynamic together with the more widespread adoption of measures already encapsulated within the railway reform packages. International terms and conditions for the transport of cargo by rail are fixed from *Union Internationale des Chemins de Fer* (UIC) – the international rail transport body - as the least common denominator.

The move towards inter-operability driven by the railway reform measures and other directives should provide a level playing field for rail and make it a more competitive option for the movement of freight across and within national borders. The stark and uncomfortable reality is that the progress towards the declared aims of inter-operability is mixed. The required measures have not been understood, introduced and implemented to a common level with the consequence that the achievement of a homogeneous fully interoperable railway is still a distant aspiration. The level of compliance with the required measures varies. The fact that the EC has issued warnings to a number of member states for their failure to comply is strong evidence of the magnitude of the problem.

Most of European railway companies are members of the UIC or use the regulations specified by the UIC. Both technical specifications and legal regulations are fixed in UIC

regulations (for details please visit UIC chapters and sub- sections 1-9 on web site <http://www.uic.asso.fr/etf/codex/codex-resultat.php?enligne=1>).

For the RETRACK project the RIV/ AVV and the COTIF (convention concerning International Carriage by Rail of the 9th of May 1980 in the version of the Protocol of Modification of June 1999) regulations are to be applied. Within RIV/ AVV regulations the technical specifications of cargo wagons are defined. The COTIF regulations specify the commercial conditions and are well understood by the participants in the RETRACK project.

1.2 Focus of attention

The focus of attention is primarily on the operating techniques/ methods & systems, infrastructure management and operational processes, legislation at EU and national and bi-lateral levels, commercial and personnel related issues.

The members of the RETRACK project consortium do not act as the operator of infrastructure. Infrastructure capacity will be purchased by the RETRACK operators as needed for running the RETRACK demonstrator and any subsequent full scale commercially operated trains after the demonstrator period is completed.

Customers of the infrastructure operators cannot currently directly influence the mode of infrastructure operations but can specify their requirements in terms of train path demands for routes, timings and schedules. They also have the facility to appeal to the national regulators in the event of any identified discrimination by the incumbent train operator and the infrastructure manager. It should be noted that these may be the same entity in some countries. Every country of the RETRACK corridor has its own Network Statement which specifies both technical and commercial terms and conditions for using the rail infrastructure. The organizer of international train services has to take the different national regulations into consideration while planning the restrictive specifications of a through-train.

The following points are relevant for the RETRACK Corridor:

- Different maximum train length;
- Different maximum weight of trains (depending on topographical and technical issues);
- Different possible maximum loading gauges along the corridor. This can pose a potential problem in the event of diversions being required;
- Different axle loads;
- Different signalling systems and different voltages are important issues. It may require at least one loco change in transit or the use of multi-system locos. Speed limits and heavy re-construction activities due to bad track conditions may also be mentioned.

1.3 Train path acquisition process (schedule/ ad hoc and cancellation)

The following sequence of events describes the activities undertaken to secure a train path for the RETRACK demonstrator on the routing that was current at the time of the initial

application in 2008. TRANSPETROL requested for rail path allocation for the RETRACK corridor by:

First: The European one-stop-shop (RNE – Rail Net Europe Germany in Frankfurt, http://www.railneteuropa.com/cont/aboutus_oss.aspx)

Second: Every national railway undertaking has ordered directly from its own national infrastructure company for its part of the corridor the required national train path.

Every country has its own terms of conditions from the infrastructure companies (q.v. national network statements) where any key differences need to be recognised and accommodated. The options to secure a train path are as follows:

- Bilateral commercial contracts between national railway operating and infrastructure companies are the legal basis of offering train paths.
- RETRACK consortium has the opportunity to order border crossing train paths contacting a RNE one-stop-shop (OSS) which organizes the train path construction.
- The RNE one-stop-shop initiates the harmonised time table construction in the different countries
- Parallel to this the Railway undertaking confirmed and orders the train path by the national infrastructure company

TRANSPETROL sent out the international order for the complete corridor to the RNE OSS in Vienna and was compliant on the cut-off time for path applications. A confirmation was received by mail that they will transfer the orders to the particular infrastructure companies. It was wrongly assumed that the train path construction process was in progress but after approximately three months information was received that no RETRACK train path was actually constructed. This was a catalogue of misdirected enquiries and long delays before action was initiated by the OSS and thus, gave cause for concern.

After the information about the delay was received from RNE, the partners of the RETRACK consortium (railway undertakings) received from TRANSPETROL the actual RETRACK schedule to order the train path by their own national infrastructure companies as a default option. This is a major finding and gives cause for concern that this mechanism which has been widely trailed as being an innovation to support new rail freight initiatives has performed indifferently.

There is no responsibility at RNE for any follow up actions. Once the train path order is placed, it is assumed that everything works fine. If the chain is interrupted or delayed, *no action is initiated to start corrective actions.*

Table 1 is an example of previous models of WP 8 ‘the demonstrator train’ operating from Central Germany to Romania. It was this model of operations that formed the basis of the application for train paths described above.

Table 1 A model for a demonstration train operating from Central Germany to Romania

	Ludwigshafen	590 km	Passau	300 km	Vienna	80 km	Hegyeshalom	400 km	Curtici	80 km	Timisoara	340 km	Craiova	120 km	Pitesti
Monday	03:00 dep.		14:00 arr. 14:30 dep.		20:00 arr. 21:30 arr.		19:30 arr. 19:30 dep.		10:00 arr. 12:00 dep.		06:30 dep.				
Tuesday			10:00 arr. 10:30 dep.		00:00 dep. 05:00 dep.		02:30 arr. 03:00 dep.		11:00 arr. 12:00 dep.		14:30 arr. 18:30 dep. 21:30 arr.				
Wednesday	03:00 dep.		14:00 arr. 14:30 dep.		20:00 arr. 21:30 arr.		19:30 arr. 19:30 dep.		10:00 arr. 12:00 dep.		06:30 dep.		02:00 arr. 03:00 dep.		06:00 arr. 12:00 dep.
Thursday			10:00 arr. 10:30 dep.		00:00 dep. 05:00 dep.		02:30 arr. 03:00 dep.		10:00 arr. 11:00 arr. 12:00 dep. 12:00 dep.		06:30 dep. 14:30 arr. 18:30 dep.				
Friday	03:00 dep.		14:00 arr. 14:30 dep.		20:00 arr. 21:30 arr.		19:30 arr. 19:30 dep.						02:00 arr. 03:00 dep.		06:00 arr. 12:00 dep.
Saturday			10:00 arr. 10:30 dep.		00:00 dep. 05:00 dep.		02:30 arr. 03:00 dep.		10:00 arr. 11:00 arr. 12:00 dep. 12:00 dep.		06:30 dep. 14:30 arr. 18:30 dep.				
Sunday													02:00 arr. 03:00 dep.		06:00 arr. 12:00 dep.
Legend time schedule in black north to south corridor time schedule in blue south to north corridor dep. = Departure arr. = Arrival															

The following details are examples of network statements and detail the constraints governing the operation of train paths and their management in real time:

1.3.1 Germany

Penalty free: The cancellation should be made 48 hours before starting time

Penalty: After 48 hours the customer has to pay a penalty¹

1.3.2 Austria:

Penalty free:

The cancellation should be made 24 hours before starting time

Penalty:

After 24 hours the customer has to pay penalty²

¹Source: http://www.db.de/site/bahn/de/geschaefte/infrastruktur_schiene/netz/netzzugang/snb2008/snb_2009.html

²Source: <http://www.railnetustria.at/de/OneStopShop/Schienenennetznutzungsbedingungen/index.jsp>

There is a real commercial need to be fully alive and aware of the consequences of cancellation as a result of the differentials in cut off times. The information on the cut off times for other railway administrations is unclear.

1.3.3 Spot trains:

Railway undertakings have the possibility to arrange spot trains (ad-hoc). For arranging spot trains every partner (this is valid for the RU's as well as for the infrastructure authorities, although the order of spot trains is in general no problem today) needs to recognise the rules governing the individual national infrastructure managers along the whole corridor operating with differing lead-times.

1.4 Train management

The question to be asked on the train management in transit for technical and cargo condition monitoring is whether the existing methods or new systems will be applied? Can a competitive system be introduced that will level up the rail sector's competitive stance

1.4.1 Road:

Truck companies have the possibility to get a status about the location and condition of the shipment at virtually any time via the driver. This capability is marketed to good effect by the road transport operators and has given a competitive edge that a rail operator generally finds it difficult to replicate. The trucker accompanies the shipment thus the driver is able to give information about and respond to the condition of the shipment (e.g. temperature, humidity). Most truck drivers have mobile phones and the most of the trucks are connected with GPS with implanted technology for surveillance and security. The customer has the possibility to interrogate and receive the status about the shipment during the whole transport chain in real time. Any revisions in status, security and delay or diversion in transit can be secured quickly and cost effectively.

1.4.2 Railway:

The load unit is unaccompanied during most of the rail transport chain. The loco driver can give a status report about the block train at any time but not normally about the single wagon or cargo unit unless there is a severe technical issue such as a de-railment, hot axle box or spillage. The infrastructure managers know through the train control/signalling system the location of the train and intentions on schedule and routing.

The loco driver can always inform the status of each individual wagon, because his wagon list must reflect the actual train at any time. The problem is that the customer/railway partner must know which train (and wagon) carries specific loads or consignments and to be able to contact the correct loco driver. The ability to secure this status information without recourse to the driver or the infrastructure manager would be an even greater advantage. To solve this problem could be a major competitive advantage of a small private operator or consortium against the state-owned railways.

Different systems for controlling of the load unit exist and some of the systems are established and deployed:

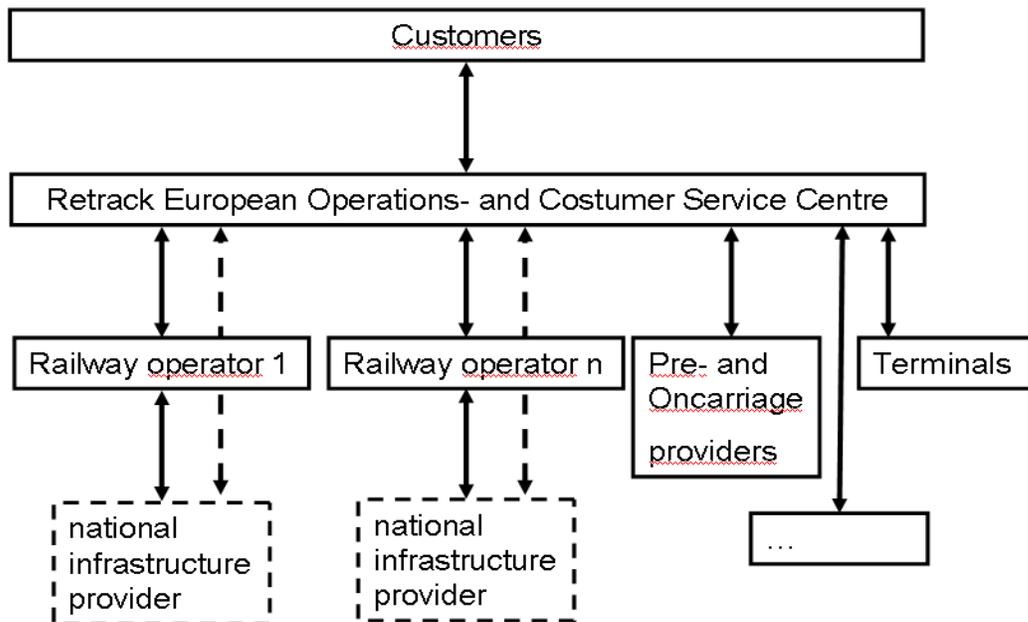
- GPS equipped wagons and containers
- Permanent monitoring of train services via interfaces between the national infrastructure companies and the railway undertakings. The Railway Undertakings (RUs) normally attempt to keep the customers informed. The shipper/customer is not routinely able to identify location and condition status independently unlike some road based services.

As an innovation within the RETRACK Project we have two possibilities for the method of communication with the customer:

1.4.3 Communication with customers: method 1

RETRACK targets the consortium. The customer has only one contact partner (“the Operator”) for communication and receiving of information (like Tracking and Tracing, pricing, additional services) (communication with customer: method 1 in figure 1). This requires a very competent and proactive level of response to shippers and presupposes the routine availability of current accurate real time information on the location of both train and cargo to be able to satisfy shipper’s enquiries. It also establishes a requirement to be able to respond to shippers in the event of disruption of train schedules and sequences. The Operator is responsible for the technical and commercial utilisation of the individual trains and does act as clearing office in case of conflict between customer interest and operational requirement (i.e. should the train departure be postponed for one belated shipment/intermodal unit?).

Figure 1 Communication with customers: method 1

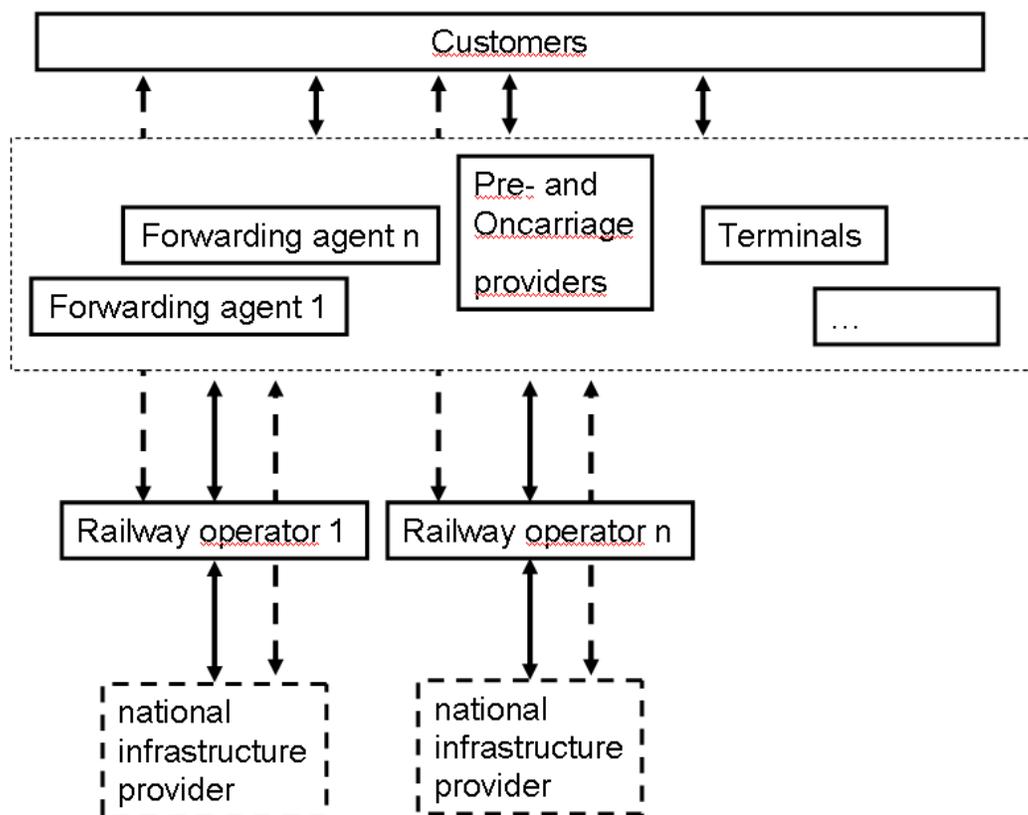


1.4.4 Communication with customer: method 2

The customer has more than one contact partner within the RETRACK consortium for communication and the customer received the information from more than one partner (Tracking and Tracing) (communication with customer: method 1 in figure 2). This could be time consuming, distracting and lead to excessive duplication of effort. This method does not meet today’s market standards. It also does not meet customer expectations, who require a

clear, quick and easy satisfaction of their information needs. Furthermore, this model does leave room for misunderstandings on the operative level and hence impede the service quality.

Figure 2 Communication with customers: method 2



So (figure 1) for the communication with customers the method 1 is a better option.

1.5 Train 'track & trace' for technical and cargo

1.5.1 Tracking and Tracing for the technical status:

IT- Systems exist for remote diagnostics to be undertaken on the state-of-the-art locos. The operator can login into the locomotive's IT-system to check out the functionality and status of the loco. If the loco is not in the expected physical location or technical situation the user can plan a repair or timely replacement of the loco. The location information could be used as a proxy for shippers' enquiries.

1.5.2 Tracking and Tracing for the cargo:

One system is that the customer selects events for the cargo/ train (for example, the shipment is on the wagon, wagon has arrived border etc.). The driver of the loco is

responsible for the train and has the liability to send out short messages via mobile phone to the operations monitor who can then inform the customer about the status and the possibility moves away from the planned schedule, route and estimated time of arrival. This is a less structured or formal mechanism for reporting than systems which are automatically monitoring the train's technical and commercial condition in transit. The need for some form of whole journey monitoring including pre/end haulage and terminal operations is something to be developed.

1.6 Cargo documentation

International Waybill (CIM-Waybill)

The closing and fulfilment of the international cargo contract and also the liability of railway companies are controlled within the Convention Internationale concernant le transport des Marchandises par chemin de fer = CIM regulations³.

The regulations are responsible amongst other things for the border crossing routines, the calculation for the freight and the simplification for the international railway business within Europe. For the international transport of goods usually CIM waybills (an example is in figure 3) are necessary. Otherwise it is necessary to close special detailed contracts between all involved parties to handle the transports without the CIM waybill. The CIM option offers an established template for the whole operation with clearly defined roles and liability allocation.

1.6.1 Innovation:

It would be an innovation for all RETRACK partners to secure an agreement for the creation of the cargo waybill with electronic data on an Internet platform with adequate safeguards for access and security. Another option is to move away from the use of the CIM Waybill. An example of the workflow required to achieve this is detailed below:

Between the partners we can develop a contract for the RETRACK train for the following key points:

- Fixing of prices, responsibility/ liability (incl. settlement of handing over the cargo and documentation) and delivery time;
- Determination of information concerning cargo details (handling/securing in transit/commodity etc);
- Any specialist cargo requirements (reefer/Hazardous cargo etc).

³Source: http://www.otif.org/pdf_external/e/RU-CIM-1999-e.PDF

Figure 3 An example of CIM Waybill

10 Lettre de voiture CIM Frachtbrief CIM		Lettre wagon CUV Wagenbrief CUV		40		41		42		43	
1 Expéditeur (nom, adresse) – Absender (Name, Anschrift)		2		7 Déclarations de l'expéditeur Erklärungen des Absenders		3		4 Référence expéditeur – Absender Referenz		44	
Signature Unterschrift		E-Mail		3		5 Annexes – Beilagen				45	
N° TVA MWSZ-Nr.		Tel.		3		6				46	
4 Destinataire (nom, adresse, pays) Empfänger (Name, Anschrift, Land)		5		6		15 Prise en charge Überschmie		16		17	
N° TVA MWSZ-Nr.		E-Mail		16		Lieu – Ort		18 Wagon N° – Wagen Nr.		19 Parcours – Strecke par – durch	
10 Lieu de livraison Ablieferungsort		11		12		20 Paiement des frais Zahlung der Kosten		y compris – einschließlich		jusqu'à – bis	
Gare – Bahnhof		Pays – Land		14		21 Franco de port Franko Fracht		<input type="checkbox"/>		22 Incoterms	
13 Conditions commerciales – Kommerzielle Bedingungen						23 Transport exceptionnel Aussergewöhnliche Sendung		oui – ja <input type="checkbox"/>		24 RID oui – ja <input type="checkbox"/>	
14 Informations pour le destinataire – Vermerke für den Empfänger						25 NIM Code		25 Mise		26 Déclaration de valeur Wert des Gutes	
25 Désignation de la marchandise Bezeichnung des Gutes						26		27		28	
						29 Indications douanières Zollamtliche Vermerke		30		31	
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Advantage:

The partners are more flexible and they don't need to fill out the CIM Waybill form and the partners can use existing cargo documents for example a Bill of Lading. This advantage (in terms of speed of production of cargo documentation and improved accuracy of data entry) could be used for marketing purposes.

Disadvantage

Possible mix of CIM & RETRACK documentation may confuse shippers /customers.

The creation of the cargo waybill for RETRACK is clearly an advantage. But this will require the operators to accept a variety of electronic documents from customers, as long as they contain the information needed to perform the task. These documents may be produced by the customers IT people and take care of their needs as well as for the needs of the railway company. The documents can be processed and exchanged electronically remotely and an automated track and trace routine can be achieved. Thus it will be a clear benefit to the customers. It must be noted that this advantage may not be achieved, if the CIM waybill is the only freight document, like currently forced by the incumbent railways.

2 Infrastructure management issues – commercial

2.1 Application billing process

The ordering for European train paths on an international level is possible but the billing has to be on a national level. The national railway undertakings receive the invoice for the train path directly from the responsible national infrastructure company. The railway undertaking may have closed contracts with the own national infrastructure company and in many cases it is ordering train paths in large numbers. The lack of transparency on these issues is a cause for concern and potential referral to the rail regulators may be needed if discrimination is identified.

It is a risk to cancel the use of CIM waybills totally, because a (Former state owned) railway company may be asked to perform some part of a journey and most likely they will insist on getting a CIM form to capture all data needed to fill in their system. Usually the CIM form is mandatory for billing among railways, because it contains information including the official station number and billing departments that are not famous for their flexibility and willingness to dig for data.

Due to different regulations within the different network statements it is necessary to cancel the national parts of train paths as early as possible and before the first cancellation period on the whole corridor will be expired. The cancellation has to be examined in a written way and has to be confirmed from the infrastructure company. The reason for on-time cancellation is the wish to avoid paying additional cancellation fees. The lack of a common cancellation lead time is an issue that needs to be addressed to avoid penalties being levied by default.

2.2 Contract management for compliance

The contracts will be established and possibly disputed by other service bids in each country on national basis – the national network statements (discussed in section 1.2). The railway operating company has to prove its licence and safety certificates before closing the contract. For the creation of network statements there exists a common European guideline about the obligatory contents. There are variances in the format and content of network statements that need to be addressed to ensure a level playing field exists for existing and new market entrants. This is a limit to interoperability.

2.3 Infrastructure communications

The trans-boundary disposition between neighbored national infrastructure companies works usually on a bi-lateral basis. For example, the German infrastructure company (DB Netz) works together with the Austrian infrastructure company (ÖBB) and not directly with the Hungarian company but Austria and Hungary work together etc. International train paths are discussed and settled in an international conference by all European infrastructure companies. RNE (Rail Net Europe) is a further grouping for the ordering of international train paths. The RNE have a branch in every European country for this purpose. In Germany the branch is in Frankfurt, in Austria it is in Vienna etc.

Path Enquiry Workflow:

Regarding the beginning of the Workflow train path acquisition the process in section 1.3 can be visited again. A brief steps are described below about the path enquiry workflow.

After the train order process additional inquiries from the German infrastructure company were received TRANSPETROL supplied the required information and then received a train path offer for the German part of the corridor.

The train path offer from the infrastructure company was reviewed but the offer for the train path was not compliant with our request and the offer for the train path was refused.

Three weeks later a further offer for the train path was received and the offer was as per our request but only up to the German/ Austria border (Passau).

The infrastructure company in Austria sent out their additional questions to the RNE in Vienna but due to the lack of contact with their counterpart staff in Germany, TRANSPETROL did not receive these enquiries from the Austrian infrastructure manager.

The workflow was very slow in Austria, Hungary and Romania but all partners remained in contact with their own national infrastructure companies. By the end of October 2008 an offer for the complete RETRACK corridor had not been received.

Due to the emergence of a new “anchor customer” in Benelux, the order of the RETRACK train path from Ludwigshafen/ Germany up to Pitesti/ Romania was withdrawn.

When there is a final confirmation from the new “Anchor customer” a new RETRACK train path from Benelux to Romania will be ordered. If there is confirmation to start the service at short notice this will be arranged as a special train (spot train) to allow the demonstrator to operate.

2.4 Train planning and notification in the event of cancellation

Train planning and notification in the event of cancellation and/or the need for additional trains; Train path planning and bidding processes (options and outcomes); Reassignment of train paths and real time management of trains in transit; Train path swap or reapplication processes; Compliance with operator requirements (bids made/bids acceptable); Re-scheduling process in the event to disruption

2.4.1 General way of processing for ordering an international train path is described as follows:

- Settle the order by one one-stop shop along the corridor (see above)
- The complete organisation of the order and construction process should be done by RNE (one-stop shop)
- The principal of the international train path receives back the timetable for the train path offer from the RNE (one-stop shop) as a working basis for the planned operation

2.4.2 General way of process for cancellation the international train path:

For cancellation of the train every country has individual systems and solutions. In case the train can not run (e.g. delays) the train will be switched from the assigned slot (regular train path) to the next slot which is free. All partners should receive prompt information about the new situation via telephone, email etc.

In case of delays with more than 24 hours in Germany we have the situation that the train path will be cancelled automatically. The national railway undertaking has to order a new ad-hoc train path. The problem is that in every country we have different time frames for cancellation of train paths (see point: 2.1.)

Railway companies which have more than one train slot on one corridor could switch the trains between the slots easily. These railway companies can avoid the cancellation procedures. The incumbent national operators have this inherent advantage compared to new services such as RETRACK when ordering and operating large numbers of trains

2.5 Findings on the infrastructure management issues

The RETRACK experience suggests that RNE did not manage to arrange RETRACK's initial international train path request competently. The emergence of a new anchor customer in Benelux required that TRANSPETROL arranged the cancellation of the initial RETRACK train path order. There is now the situation of having to wait for the final confirmation to order the new RETRACK train path from Benelux to Romania. The comparison of these two processes may prove to be an interesting observation on the realities of accomplishing

something which is described as being seamless by the infrastructure operators. The limitations of the process as described are barriers to wider generic interoperability aspirations.

3 Train operator/ manager issues

3.1 Route availability

The dedicated RETRACK route is in a satisfactory technical condition. RETRACK does not have real alternatives to the proposed main route. In some areas RETRACK will have some options for diversions via alternative routes (e.g. due to construction works, changed train sequences or accidents). Re-routing and diverting would create additional costs and extend the overall time of the transport operation. Planned maintenance can be advised ahead of train operations and built into schedules. Unplanned maintenance or responses to disruption and train sequences will need to be dealt with in short time frames by the lead train operators and the commercial contact with the shippers/receivers.

A disadvantage is that the dedicated RETRACK route is a main traffic route and that trains may experience traffic congestion, particularly at border points and high train activity areas around major conurbations and industrial zones. Routine congestion and delay could be experienced on the main routes and also on the approaches to major terminals.

3.2 3.2 Terminal access and contracted performance/terminal protocols and information flows

According to the European Commission, public terminals must be accessible to every customer although this is still not wholly the case. There are suitable terms and conditions of use per terminal and the contracts must be closed about free slots, costs and unplanned access requirements in the event of a delay or change to the schedule. In addition to this access to terminals for loco or wagon servicing may be required on an ad-hoc basis in the event of technical difficulties.

3.3 Rolling stock and traction availability are required/ planned under contract or spot position

Generally it is difficult to secure suitable wagons and locos within a short time frame therefore preparation time is needed if additional capacity cover is required. Within the short term planning process we consider available vehicles and this includes possible spot hire options. For the longer term against known contract flows it is possible to acquire (lease or purchase) wagons and traction to cover these forward positions. The incumbent operators with larger numbers of trains and existing pools of rolling stock to draw upon have an inherent advantage when compared with new service providers.

However, due to the overall market situation, both traction & wagon resources have become readily available at comparatively reasonable prices for the later, even though specialised equipment (such as low floor 104' – wagons) can still be considered relatively sparse and thus expensive.

3.4 Specialist cargo requirements (rolling stock/operator certification/ incident response etc.)

The operational processes are linked to the type of commodities being carried and specific shipper requirements. For example it is important to know when a customer has cargoes for High Cube containers. Due to the dimensions of High Cube containers loaded on standard wagons there could be obstacles with compliance with the loading gauge on some parts of the RETRACK corridor (esp. sections in Hungary, Romania). Therefore special kind of wagons and licences would be necessary or transport of HC containers might be constrained in the corridor. Some countries have special requirements within transport regulations (e.g. special empty protecting wagons in trains with hazardous cargo such as fuel or certain chemicals). The need for non-revenue barrier vehicles may be required in such circumstances. The railway operator partners within RETRACK are familiar with these and will ensure compliance.

3.5 Performance monitoring for on-time performance and off schedule performance

The operator will be responsible for the continuous monitoring of the demonstrator and is also responsible for the distribution of information to the relevant parties in case of delays. In case of delays the train and infrastructure operators will work on minimizing of the effects. The plan of the demonstrator is created on the basis of buffering of certain delays. The target is to run the trains within the plan and to ensure that the operator reacts as soon as possible to any events that potentially threaten to delay services. As mentioned previously the ability to contact shippers and cargo interests in the event of any delay to the train services is a vital marketing issue. Shipper's expectations have been driven by the product and service offers of competing modes and rail simply cannot afford to ignore these if it intends to compete realistically.

The use of some form of penalty payment for delay with the attribution of the delay being clearly identified is an option developed by some railway administrations to ensure that the infrastructure operator and the train service operators are aware that they could be penalised financially for misdemeanours. This is a bureaucratic process and possibly too complicated for the RETRACK corridor option at this stage. Penalising customers for late delivery of cargo or incomplete or inaccurate documentation could create more problems than solutions.

4 Interoperability issues

The table 2 summarises the rail infrastructure and interoperability issues on the RETRACK corridor. The research found that from infrastructure and interoperability point of view the proposed RETRACK demonstration rail freight service along the corridor of Constantza in Romania to Rotterdam in the Netherlands through Hungary, Austria and Germany is achievable using existing infrastructure. There are some significant operational, organizational and commercial complications and barriers to overcome. For example, there is a lack of a high level of commonality along the corridor in relation to access, regulation, infrastructure condition and technical factors that may affect train performance such as train weight and length. Also a part of the corridor is composed of single line territory (in Hungary) and adverse gradients (in Romania) limiting capacity and performance. Some of these constraints are being addressed through investment in the rail infrastructure (new lines, reinforced electrification, additional passing loops etc) both in Hungary and Romania. In

particular, there is a major capacity enhancement around the port of Constantza to support the development of the new port capacity already in operation.

The railway network on RETRACK corridor is in general capable of accommodating additional international freight services. None of the five corridor countries has a dedicated freight-only network, although efforts are in place, for example in the Netherlands to bring capacity into play. The existing RETRACK corridor is shared by both passenger and freight services except the Betuwe line between Rotterdam and the German border. The allocation of train paths is an important issue, in particular in the intensively used networks in the Netherlands and Germany. The strategic allocation is made annually. Preparing and submitting an application on time to national infrastructure manager is vital in this regard. The option to apply for an international train path through RNE apart from individual national infrastructure managers is available to train operators to determine the best way of securing their requirements. This process is still evolving with operators electing to pursue either option or both to safeguard their interests.

The status of Network Management Statement (NMS) varies in the corridor countries. For example, it is a contractual document in the Netherlands whereas it is only a guide in the Romania. This is an area that the EC needs to address to secure a common level of understanding about the status of the NMS for new entrants and a wider cargo market. Generally the access to path is non-discriminatory i.e. open to all operators subject to fulfilment of certain pre-set criteria. There were national rail regulators in place with significant differences in the approaches to the regulatory task which needs harmonisation by the EC to facilitate further service development. Maintenance works are done through advice and notice of a reasonable period (generally three months). There are limitations on the maximum train length (620m in Romania with one locomotive) and maximum load per axle (22.5 tonnes) of freight train. There are also different electrified systems (15kv a.c. and 25kv a.c.) as well as train safety & control systems in place. The 25KV AC in the Netherlands is only available in BETEWE line. The rest of the network in NL is 1.5KV DC. Belgium has 3KV DC. But the locomotives are available to take all these variable electrical systems. Thus the RETRACK train operation will require multi-electrical system locomotives as they are all a.c. powered.

As an alternative option, diesel locos usually have less adhesion problems as electric locos. Their biggest advantage of diesel locos is that the main line loco can do shunting work as well, if needed. Second advantage is the different taxation of diesel fuel in the NL and Germany. So it may be cheaper to use a Dutch diesel engine than an electric engine consuming German energy. The maintenance costs of diesel engines are much higher. On the other hand, the multi-electric engines are more expensive to purchase.

Overall the use of diesel traction on long distances is not considered attractive for both commercial as well as technical reasons. Despite the use of US derived 1970s traction technology in some services in Europe there are real limitations in terms of installed power, adhesion, availability and emissions at the point of use which, despite siren voices advocating its wider deployment, must be seen as a backward step. It may provide a temporary lower point of entry for new service providers but for long haul international services the use of electric traction is preferred and advocated by the RETRACK traction providers. Reliance on a single liquid hydrocarbon fuel which is subject to price volatility (for example price hike in 2008) and availability issues this might be best avoided in terms of long term rail freight developments. The availability of multi-system electric traction with much greater installed power for acceleration and regenerative braking gives the edge to this technical option. Consequently RETRACK will employ multi-electric system locomotives for 90% of the mileage covered.

Other key barriers that impede the effectiveness and efficiency of any new rail service on the RETRACK corridor are traffic congestion (some due to the sub-optimal infrastructure-development of the national rail infrastructure authorities), topographic conditions, grandfather rights of incumbent railways as well as infrastructural bottlenecks (profile of tunnels and stations). Examples are:

- Lines to the German border; congestion in the Ruhr area and on both banks of the Rhine; where the resulting lower quality train paths do result in unattractive and cost-increasing long transit times;
- Topographic limitation between Aschaffenburg area and Nürnberg area as well as between Nürnberg and Regensburg impose limits in train weight;
- Linz – Vienna reconstruction and capacity limits; topographic conditions in the “Wienerwald” area do impose train weight limitation,
- Capacity limits on border stations.

5 Opportunities

Converting the railway infrastructures and total systems from a nationally focused position to European one where trains would run easily across borders (alike the freedom enjoyed by road or inland waterways transport) is achievable but no easy task. The rewards for doing so are significant economically, environmentally and socially and should place rail in a more competitive position in the marketplace. This should lead to higher absolute tonne-kilometres and revenue as well as share of the overall freight market share. The barriers to the concept of European or universal interoperability remain as a formidable challenge to both legislators and the direct stakeholders of railways within the EU. The aspiration of creating a railway that is harmonised or interoperable remains to be secured in Europe. There has been a great deal of foot dragging by some member states and the incumbent national railways over the adoption of the reform packages. Some railways (of the corridor) have advanced better and faster than others and this differential adoption process is now a problem. However, the overall progress is on the positive direction.

The amount of effort to be invested to find out whether it is feasible to get a train path through a particular corridor needs to be significantly reduced. As soon as it is achieved that a customer gets an answer within a single day, not within several weeks, the potential for rail movements will grow. All standards, rules and regulations must be publicly available to all the existing and future infrastructure users. The standards, ruled and regulations need to be respected and will ultimately lead to more flexibility in the train path ordering and altering process. For example, if an alternate routing for oversized goods was public, an operator could do the feasibility study sitting at his/her own desk. But nowadays this takes four weeks per country before it is done by the infrastructure providers.

In the short term, the flexibility in the altering of the train path should be achievable. Also a group of wagons may be attached or detached, organized by the respective partner and coordinated by the operator. This will open up second choice opportunities in case the train cannot be utilized sufficiently on the total length of the corridor.

6 Summary and Conclusion

The establishment of a new rail freight service crossing multiple frontiers (geographic, national, organizational etc.) is a complex task requiring the simultaneous alignment of many technical, operational and commercial factors to ensure a reasonable chance of success. The reality in the RETRACK 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. They may be perceived as being difficult to access and this could deter the rate of transfer of cargo from road to rail.

The rail product and service offerings will have 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. The use of the IT systems proposed in other WPs moves RETRACK very positively in this direction. A lot more remains to be done at different levels to make rail a more competitive and attractive option to cargo interests if the generic requirements underpinning the railway reforms are to be realised.

The delays in the adoption of interoperability cover a raft of administrative, organizational, technical and commercial positions. The whole interoperability initiative has become a large complex administrative process which may explain some of the delays in adopting measures proposed. The need to resort to coercion and warnings by the EC on the failure to adopt interoperability measures by some member states supports this view. It may be necessary to place an agreed time limit on the adoption of the package of reform measures to reinforce the pace rather than rely on the willingness of the individual member states. Otherwise the railways will remain in a confused partially interoperable state which would be no better able to compete than previously.

In the RETRACK corridor, all concerned countries are either on 'advanced' or 'on schedule' on Rail Liberalisation Index 2007⁴ and, apart from Hungary, all have open access. So, Hungarian Railway needs to progress in this regard. Also, not all of the countries offer the option of ad hoc access to train path allocation (see table 2) which effectively puts rail operators at a disadvantage compared to road operators which enjoy almost limitless flexibility. Thus the progress in this area will put railways in an advanced position. Differing levels of ERTMS along the corridor means that the operator has to choose a locomotive that conforms to ERTMS level 2 which is required only in the Netherlands only on Betuwe line (the only freight transport dedicated line in Europe). Combined with differing electric systems the operators will have to use two different electric sources of locomotives which will

⁴ Kirchner, C., 2007. Rail Liberalisation Index 2007, IBM Global Business Services, Brussels, 17 October.

encourage them to use Diesel engine locomotive that has associated dis-benefits (such as negative effect on environment and higher operational cost). Thus special efforts are needed to harmonise the ERTMS and electric systems.

Table 2 Summary of the interoperability issues on RETRACK corridor

Interoperability Issues	NL	DE	AU	HU	RO	Comments
1991/440 Compliance	Yes	Yes	?	?	?	
2001/12 Compliance	YES	Partially	Partially	Partially	Partially	EC action against non-compliance was essential
2001/13 Compliance	Yes	Partially	Partially	Partially	Partially	EC action against non-compliance was essential
2001/14	Yes	Partially	Partially	Partially	Partially	EC action against non-compliance was essential
First Railway Package	Yes	Partially	Partially	Partially	Partially	EC action invoked
Second Railway Package	Yes	Partially	?	?	?	Partial adoption is problem for RETRACK
Third Railway Package	Yes	Partially	?	?	?	Partial adoption is problem for RETRACK
Interoperable Network	Yes	Yes	Yes	Partially	?	
Regulation	Yes	Yes	Yes, but National model	?	Not Developed	Hun RR is not in-situ
Certification	Yes	Yes	Yes, but National model	?	Not Developed	Hun/Ro position on certification unclear
Operation versus Infrastructure Split	Yes	Yes	Yes	Yes	Yes	Nation model in De/Au/Hun/Ro
Open Access	Yes	Yes	Yes	Partially	Yes	Open Access not consistent, constraints noted
TSI Acceptance	Yes	Yes	Yes	?	?	TSI recognised but not implemented
ERTMS	Betuwe	not RETRACK	Part RETRACK	Part RETRACK	Part RETRACK	Limited sectors for RETRACK operations
Safety Authority	Yes	Yes	Yes	?	?	Partial adoption of requirement

Interoperability Issues	NL	DE	AU	HU	RO	Comments
Track weights	22.5T	22.5T	22.5T	22.5T	22.5T	Variability is a constraint to RETRACK
Train length	650M	650M	650M	560M	560/400M	Variability is a constraint to RETRACK
Power Supply	15KV	15KV	15KV	25KV	25KV	Variability is a constraint to RETRACK
Crew certification	Yes	Yes	Yes	Yes	Yes	Partial acceptance, liability issues
Border formalities	No	No	No	No	No	Bilateral issues to be solved
Cross acceptance	Yes	?	?	No	No	Emergent position
Discriminatory access	N	?	?	?	?	Terminal and depot access limits
Path acquisition/allocation	Annual Timetable, Spot option available	Annual and interim with higher pay	Annual timetable, spot or short term options available	Annual Timetable	Annual timetable, average traffic program or spot basis	

