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Telematic Application for Freight of Technical Specification for interoperability as a means of revitalisation European Railways

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TELEMATIC APPLICATION FOR FREIGHT OF TSI

TAF TSI has foreseen recognisable changes within the European market and it improves the service for customers. IM(m) and RU(n) are in a network business competing against stand-alone businesses (e.g. trucks) with simpler business processes and supporting IT requirements. Therefore the TAF TSI is focused on the definition of minimum criteria (necessary conditions) to help reducing handling costs. The scope of TSI Telematic covers the whole information area between IM(m) - IM(m), RU(n) - RU(n), RU(n) - IM(m) and vice versa and also covers the information flow between a Rail Service Integrator (Lead RU(k)) and the various Service Providers in the railway arena.

PODSYSTEM TSI - APLIKACJE TELEMATYCZNE DLA PRZEWOZÓW TOWAROWYCH

TAF TSI uwzględniły przewidywane zmiany na europejskim rynku i ich wpływ na poprawę usług dla klientów. IM(m) i RU(n) są w sieciowym biznesie konkurującym z autonomicznymi biznesami (np. samochodami) uproszczonymi procesami biznesowymi wspieranymi przez wymagane IT. Dlatego TAF TSI na zdefiniowaniu minimalnych kryteriów (niezbędnych warunków) by pomóc w redukowaniu kosztów eksploatacyjnych. Zakresem telematycznych TSI został objęty obszar między IM(m) -IM(p), RU(n) – RU(k), RU(n) – IM(m) i odwrotnie oraz także przepływy informacji między Integratorem Usług Kolejowych (LRU(k)) a innymi dostawcami usług na arenie kolejowej.

1. INTRODUCTION

The European Rail Industry (e.g. individual Railway Undertakings (RU(n)), individual Infrastructure Managers (IM(m)), private wagon owners and terminal operators) is undergoing significant changes due to liberalisation, open access, purchase/sales contracts, replacement of RIV regulations and Freight Quality Charter (Fig.1).

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This and strong market pressure require significant changes in co-operative processes and collaborative data exchange in order to increase rail's competitiveness versus other modes of transport.

It was the task of TAF TSI to define and describe these processes and the related messages flow commonly with all partners of the European Rail Industry.

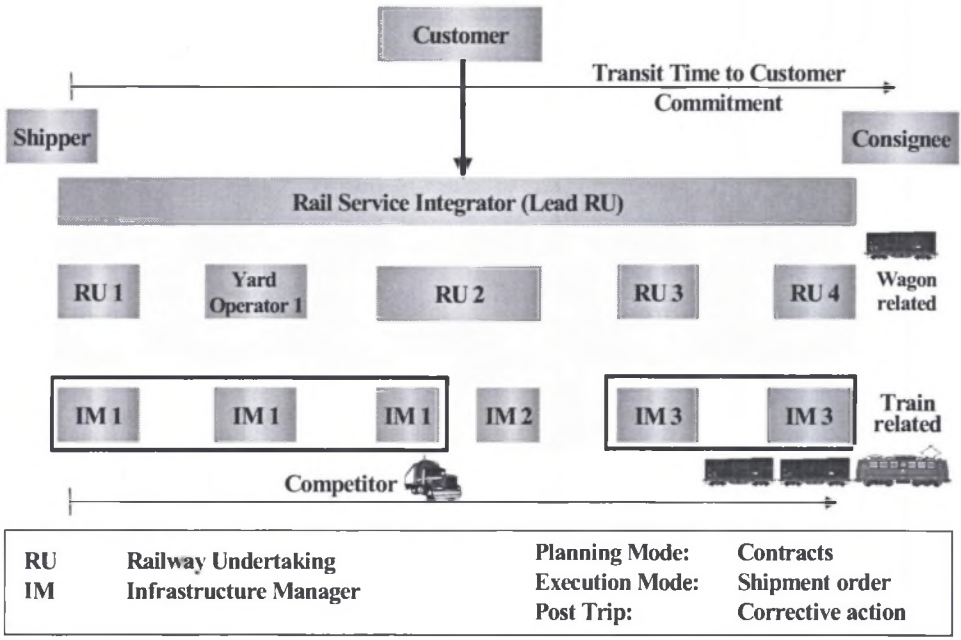

Fig.1. Example for co-operation within the European Rail Industry

2. SCOPE OF TSI TELEMATIC APPLICATIONS FOR FREIGHT

The scope of TSI Telematic Applications for Freight (Fig.2) covers the information flow required for interoperability[3] within the "Yellow" area (**Inside TSI** Area ...) between IM(m)[4] - IM(p), RU(n)[5] - RU(k), RU(n) - IM(m) and vice versa.

TAF TSI did not cover the information flow between customer and RU(n), for this is an area of individual business to differentiate from competitors. Nevertheless the TAF TSI ensures that the data required by RU(n) to interface with customers is available and of high quality. Planning and post trip processes were excluded, but the interfaces to these processes or to existing projects were taken into account.

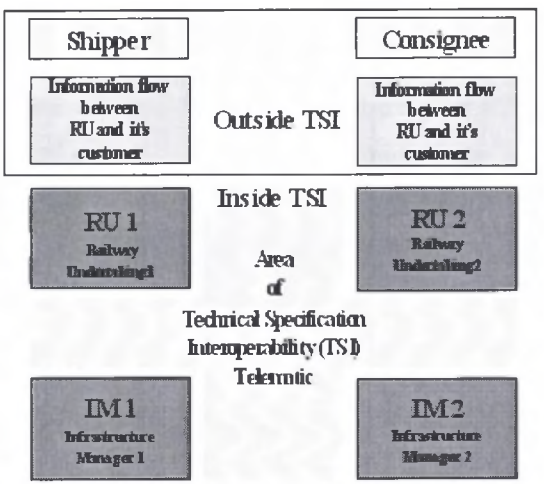

Fig.2. Area of Telematic Applications for Freight of the TSI

[3] Interoperability means efficient interchange of information at all times best adapted, with regard to quality and quantity, to changing requirements so that the transport process may remain as economically viable as possible and that freight transport on rail maintains its hold on the market against the intense competition it has to face. Espcially, it means interoperability between modes of transport, in particular between conventional rail transport and combined rail transport

[4] Infrastructure Manager (IM): means any body or undertaking that is responsible, in particular, for establishing and maintaining railway infrastructure. This may also include the management of infrastructure control and safety systems. The functions of the infrastructure manager on a network or part of a network may be allocated to different bodies or undertakings;

[5] Railway Undertaking (RU) is defined as any public or private undertaking, licensed according to applicable Community legislation, the principal business of which is to provide services for the transport of goods and/or passengers by rail with a requirement that the undertaking must ensure traction; this also includes undertakings which provide traction only.

3. EXISTING PROJECTS AND INITIATIVES

During the writing of the TAF TSI:

- "non EU-projects" as well as "non-CEN standards" were taken into account, but due to the EC regulations they were not explicitly mentioned.

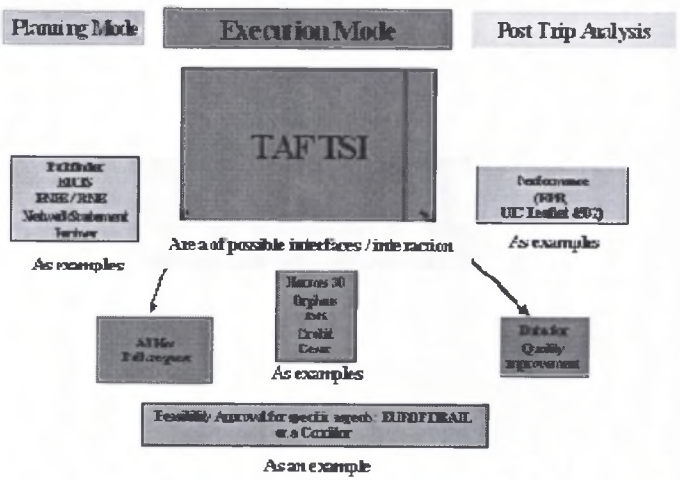

Fig.3. Overview of Rail Industry systems in planning, execution and post trip mode

- Projects (Fig.3), which started during the writing of the TAF TSI like Crobit, EUROPTI-RAILS, were taken into account and checked, whether they are in line with the TAF TSI. As the TAF TSI is in general stable since July 2003, the projects or initiatives, which started after that date should have taken into account the requirements of the TAF TSI.

- Existing projects (Fig.3) were analysed. They influenced the system design behind the TAF TSI. Examples: Pathfinder, RNE Network statement, Hermes, ORFEUS, ISR, Cesar or the Optirail study II as the "Functional Requirement Specification" for EUROPTIRAIL.

4. CHARACTERISTICS OF THE TELEMATIC APPLICATIONS FOR FREIGHT SUBSYSTEM

The Trans-European conventional rail system, to which Directive 2001/16/EC[6] applies and of which the Telematic Applications Subsystem is a part, is an integrated system whose consistency must be verified. This consistency must be checked in particular with regard to the specifications of the subsystem, its interfaces vis-à-vis the systems in which it is integrated, as well as the operating and maintenance rules.

The subsystem Telematic Applications for Freight is defined by Annex II of the Directive 2001/16/EC[5], section 2.5 (b) that includes in particular:

- Applications for freight services (real-time monitoring of freight and trains),
- Marshalling and allocation systems, whereby under allocation systems is understood train composition,
- Reservation systems, whereby here is understood the train path reservation,
- Management of connections with other modes of transport and production of electronic accompanying documents.

Settlements systems for customers are not in the scope of this TSI, nor are such systems for payment and invoicing between various participants of transport process such as railway undertakings or infrastructure managers. The system design behind the data exchange, however, provides the information needed as a basis for settlements resulting from the transport services.

The long term planning of the timetables is out with the scope of this Telematic Applications TSI. Nevertheless at some points there will be reference to the outcome of the long term planning in so far as there is a relationship to the execution mode.

5. OVERVIEW OF THE SUBSYSTEM DESCRIPTION

This TSI takes into account the present participant of railway transport process and the various possible Service Providers of the future involved in freight transport as they are for (this list is not exhaustive):

- Wagons
- Locomotives
- Drivers
- Switching and Hump shunting
- Slot selling
- Shipment management
- Train composition
- Train Operation
- Train monitoring
- Train controlling
- Shipment monitoring
- Inspections & Repair of Wagon and / or Locomotive
- Customs clearance
- Operating Intermodal Terminals
- Haulage management

[6] Directive 2001/16/EC of The European Parliament and of The Council of 19 March 2001 on interoperability of trans-European conventional rail system

Some specific service providers are defined explicitly in the directive 2001/14/EC[7] and 2001/16/EC[5].

In relation to the communication scenarios between infrastructure managers and applicants[8] in the execution mode of a transport, only the IM(m) and the RU(n) have to be considered and not all types of applicants, which may be relevant for the planning mode. In the execution mode a defined IM(m) – RU(n) relationship is always given, for which the electronic data (messages) exchange and the data storage is specified in this TSI. The definition of an applicant[7] and the resulting path allocation possibilities remain uninfluenced.

As above mentioned various services have to be provided for a freight transport. For example, the provision of wagons. This service can be related to a fleet manager. If this service for a transport is one of the services offered by the RU(n), the RU(n) acts also as Fleet manager. A fleet manager can manage his own wagons and/or wagons from another wagon owner (another service provider for freight wagons). The needs for this kind of service provider are taken into account independently of whether the legal entity of the fleet manager is an RU(n) or not. If the service is offered by an RU(n), the RU(n) acts as the service provider for that service.

When taking into account the needs of a customer, one of the services is to organise and manage the transport line according to the commitment to the customer. This service is provided by the Lead Railway Undertaking (Lead RU(n) or LRU(n)). The LRU(n) is the single point of contact for the customer. If more than one railway undertaking is involved in the transport chain, the LRU(n) is also responsible for the co-ordination with the other railway undertakings.

This service can also be undertaken by a forwarder or by any other entity. The concrete involvement of an RU(n) as LRU(n) can differ from one type of transport flow to another. In the Intermodal business the managing of capacity in block trains and the preparing of waybills is done by an Intermodal service integrator, which could be customer for the LRU(n) afterwards.

The main point, however, is that the RU(n) and the IM(m) and all other Service Providers (in the sense as defined above) must work together, either through co-operation and/or open access, to deliver seamless services to the customer.

[7] Directive 2001/14/EC of 26 February 2001, on the allocation of railway infrastructure capacity and levying for the use of railway infrastructure and safety certification - Official Journal of the European Communities L 75/29 - 15.3.2001

[8] Applicant: means a licensed railway undertaking and/or an international grouping of railway undertakings, and, in Member States which provide for such a possibility, other persons and/or legal entities with public service or commercial interest in procuring infrastructure capacity, such as public authorities under Regulation (EEC) No 1191/69 and shippers, freight forwarders and combined transport operators, for the operation of railway services on their respective territories;

6. PROCESSES

The TSI for the railway freight transport industry is limited according to Directive 2001/16/EC[5] to IM(m) and RU(n) / LRU(n) with reference to their direct customers.

In the execution mode, the activity of an LRU(n), regarding a consignment, starts with the receipt of the consignment note from its customer and, for example, for wagon loads with the release time of the wagons. The LRU(n) creates a preliminary trip plan (based on experience and/or contract) for the transport journey. If the LRU(n) intends to have the wagon load in a train under Open Access mode (the LRU(n) operates the train for the complete journey), the preliminary trip plan is per se the final one. If the LRU(n) intends to put the wagon load in a train which involves the co-operation of other RU(n), he first has to find out which RU(n) he should address and at what time an interchange between two successive RU(n+1) can occur. The LRU(n) then prepares the preliminary wagon orders individually for each RU(n) as subsets of the full consignment note.

The addressed RU(n) check the availability of the resources for the operation of the wagons and the availability of the train path. The responses from the various RU(n) enable the LRU(n) to refine the trip plan or to start the interrogation anew – perhaps even with other RU(n) - until the trip plan finally fits customer requirements.

The RU(n)/LRU(n) must in general have, at minimum, the capability of:

- DEFINING Services in terms of Price and Transit times, Wagon supply (where applicable), wagon/intermodal unit information (location, status and the wagon/intermodal unit related estimated time of arrival (ETA), where consignment can be loaded on empty wagons, containers etc.,
- DELIVERING The service that has been defined in a reliable, seamless manner through the use of common business processes and linked systems. There must be a capability for RU(n), IM(m) and other Service Providers and stakeholders such as Customs to exchange information electronically.
- MEASURING The quality of the service delivered compared to what was defined. i.e. Billing accuracy against price quoted, actual transit times against commitments, wagon ordered against supplied, ETA(n) against actual arrival times
- OPERATING In a productive manner in terms of Utilization: Train, Infrastructure and Fleet capacity through the use of Business Processes, Systems and Data Exchange required to support wagon/intermodal unit and Train Scheduling

The RU(n)/LRU(n) as an applicant must also provide (through contracts with IM(m)) the required train path and must operate the train within their journey section. For the train path they may use already booked paths (in planning mode) or they have to request an ad hoc train path from the infrastructure manager (IM(m)) relevant for the journey section(m) over which the RU(n) operates the train. The following figure 4 - with B, D and E as handover points between IM(m) and C and E as interchange points between RU(n).

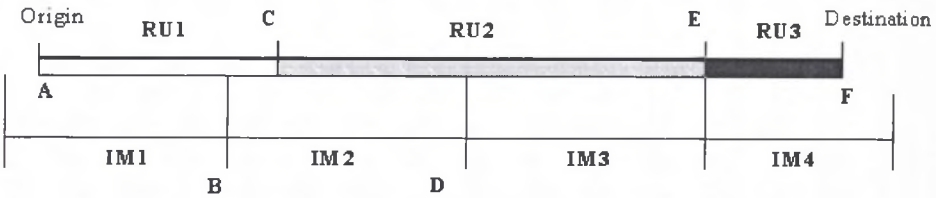

Fig.4. Example for train path request scenario

- RU(1) has to request a train path A-B from IM(1) and B-C from IM(2)
- RU(2) has to request a train path C-D from IM(2) and D-E from IM(3)
- RU(3) has to request a train path E-F from IM(4)

The communication during the train running between RU(n) and IM(m) must always be based on train and path number, whereby the IM(m) communicates with the RU(n), who has booked the train path on his infrastructure. This means for the example above:

- For the journey section A-B, IM(1) communicates with RU(1)
- For the journey section B-C, IM(2) communicates with RU(1)
- For the journey section C-D, IM(2) communicates with RU(2)
- For the journey section D-E, IM(3) communicates with RU(2)
- For the journey section E-F, IM(4) communicates with RU(3)

If an RU(n) provides the complete journey A – F (Open Access by RU(n), no other RU(k) are involved), then each IM(m) involved communicates directly with this RU(n) only. This "open access" by the RU(n) can be realised by booking the train path via "One Stop Shop" or in sections with each IM(m) directly. The TSI takes account both cases.

This function refers to Article 23(1) of the Directive 2001/14/EC[6]. The dialogue process excludes obtaining the licence for an RU(n) providing services in accordance with Directive 2001/13/EC[9], the certification according to Directive 2001/14/EC[6] and access rights according to Directive 91/440/EC[10].

For a customer the most important information is always the estimated time of arrival (ETA) for his shipment. From the information exchange between LRU(n) and IM(m), in case of Open Access, ETA can be calculated. In the case of co-operation mode with various RU(n), the ETA and also the estimated times of interchange (ETI(n)) can be determined from the message exchange between RU(n) and IM(m) and provided to the LRU(k) by the RU(n).

Also determined from the information exchange between IM(m) and RU(n), the LRU(k) knows for example:

- when the wagons departed from or arrived at a yard or at defined locations or
- when the responsibility for the wagons was transferred from one RU(n) to the next RU(n+1) in the transport chain.

[9] DIRECTIVE 2001/13/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2001 amending Council Directive 95/18/EC on the licensing of railway undertakings

[10] Directive 91/440/EEC of 29 July 1991 on the development of the Community's railways

Determined not only from the data exchange between IM(m) and RU(n) , but also from the data exchange between RU(n) and LRU(k), various statistics may be produced:

- for - in the medium term – planning the production process in greater detail and
- for - in the long term - carrying out strategic planning exercises and capacity studies (e.g. network analyses, definition of siding and marshalling yards, rolling stock planning), but above all
- for improving the quality of the transport service and productivity.

The handling of empty wagons takes on particular relevance when considering interoperable wagons. In principle there is no difference in the handling of loaded or empty wagons. The transport of empty wagons is also based on wagon orders, whereby the fleet manager for these empty wagons must be considered as a customer.

7. VIEW OF TAF IMPLEMENTATION STRATEGY IN EU

EC want to adopt the TSI Telematic Application by EC Regulation. Therefore the representative bodies from the railway sector acting on a European level as defined in Art. 3.2 of Regulation 881/2004/EC should establish a Strategic European Deployment Plan (SEDP) for the TSI for Conventional Rail Telematic Applications for Freight (TAF TSI) according to the criteria specified in Chapter 7 of the TAF TSI.

The Strategic European Deployment Plan must by delivered to Commision befor 2nd of Dec. 2004, and SEPD should be available not later then one year after publication of the Regulation.

CER and AEIF TSI TAF WG prepared one of view of deployment strategy. SEPD paper describe how rail industry (IM`s, RU`s and other companies) must work together at the EU lever to deliver the SEPD and TSI TAF, and define necessary steps to develop the plan.

Because TSI TAF define business processes SEDP must allow the same philosophy : Customer requirement – strategy – processe – IT application. It is mean the TAF TSI takes business processes and defines the required information exchange to improve rail industry market share by increasing efficiency, service quality and reducing freight handling costs.

SEPD General remarks

- The main purpose of the SEDP is to describe the commonly agreed implementation and migration plan of all mandatory requirements of the TAF TSI.
- An appropriate Strategic European Deployment Plan is key for the TAF TSI implementation and realisation of the benefits.
- This plan is the instrument to co-ordinate, synchronise and prioritise the necessary steps within the European rail industry, focussing the limited resources and budgets in line with the business requirements.
- In addition, all existing projects / initiatives and systems will be integrated where they support the mandatory TAF TSI requirements.
- All other projects / initiatives and additional functionality will be taken into account. They will continue with their efforts in parallel.
- The commonly accepted SEDP secures the investments of the individual stakeholders during the implementation phase.

SEPD - the steps

Step 0 **Preparation of the SEDP Project**

- To meet the required deadline the launch of a SEDP project based on this paper before the end of 2005 is mandatory. A Preparation Task Force built from the already existing TSI Deployment Strategy Committee and open to all stakeholders in the European rail industry will manage this task.

Step 1 **Assessment and Framework Plan**

- Formal set-up of the SEDP project organisation
- Create framework plan with logical steps (1. Draft of the SEDP)
- Send draft framework plan to the RUs and IMs to check against their systems and processes

Step 2 **Impact analysis of the individual environment on the Framework plan**

Step 3 **Consolidation and finalisation, issue of the common agreed SEDP**

Step 4: **Parallel to Step 3: Preparation of the TAF TSI Deployment Organisation and the organisation to operate the common components.**

More information about SEPD will be presented during TST Conference.

8. GENERAL REMARKS

An information system is only as good as the data are reliable. Therefore the data, especially the primary respectively the pre-populated one, which plays a decisive role in the forwarding of a consignment, a wagon or a container must be accurate and captured economically which means that the data (specially reference data) should be entered into the system only once.

In the Intermodal transport business at various points (called Gateways) a wagon is not only connected to another train, but also the Intermodal unit may be moved from one wagon to another. As a consequence it is not sufficient to work with only a trip plan for wagons and therefore a trip plan for the Intermodal Units must also be drawn up by the Intermodal service integrator, if this Intermodal service integrator is a RU(n).

The TSI for Telematic Applications Subsystem defines the required information, which has to be exchanged between the different partners involved in a transport chain, and permits a standard mandatory data exchange process to be installed.

The successful implementation of the TAF TSI will depend on the synchronisation by RUs and IMs of existing and future systems and processes. This integration will be facilitated by the TAF TSI Common Interface.

BIBLIOGRAPHY

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