

Implementation Of The Technical Interoperability For TAF TSI Subsystem In Freight Operation

Peter Ihnat^{1,*}

¹Železničná spoločnosť Cargo Slovakia, 040 01 Košice, Slovakia

Abstract. The article describes the cooperation between freight railway undertaking and carriers with regard to implementation of the TAF TSI into operation. It suggests for interfaces between railway undertaking/carrier which are important for success application of the TAF TSI and defines limitations which must be eliminated during the implementation of the TAF TSI into operation. Technical specification of interoperability for the telematics applications for freight is one of the subsystems of railway interoperability of which implementation into operation is mandatory in accordance with Directive of the European parliament (62/2006 and 328/2012).

1 Introduction

Interoperability of the rail sector is a European initiative designed to improve the competitive position of the rail sector towards other forms of transport. It does this through a regulatory framework that assuring the technical harmonisation and standardisation of Europe's railways.

The rail interoperability consist of a number of technical specifications for different kinds of the rails subsystems:[1,2]

Subsystems of the Structural areas:

- a) Infrastructure – consist of the track, points, engineering structures (bridges, tunnels, etc.), associated station infrastructure (platforms, zones of access, including the needs of persons with reduced mobility, etc.), safety and protective equipment,
- b) Energy – consist of the electrification system, including overhead lines and on-board parts of the electric consumptions measuring equipment,
- c) Control-command and signalling – consist of the all equipment necessary to ensure safety and to command control movements of trains authorised to travel on the network, [3]
- d) Rolling stock – defined structure, command and control system for all train equipment, current-collection devices traction and energy conversion units, braking, coupling and running gear (bogies, axles, etc.) and suspension, doors, man/machine interfaces (driver, on-board staff and passengers, including the needs of person with reduced mobility), passive or active safety devices and requisites for the health of passengers and on-board staff.

a) Subsystems of the Functional areas:

- b) e. Traffic operation and management – consist of the procedures and related equipment enabling a

coherent operation of the different structural subsystems, both during normal and degraded operation, including in particular training and train driving, traffic planning and management,

- c) f. Maintenance – defined the procedures, associated equipment, logistic centres for maintenance work and reserves allowing the mandatory corrective and preventive maintenance to ensure the interoperability of the rail system and guarantee the performance required,
- d) g. Telematics applications for passenger services, including systems providing passengers with information before and during the journey, reservation and payment systems, luggage management and management of conditions between trains and with other modes of transport [4]
- e) h. Telematics applications for freight services (for detailed description see article 1.1).

The first series of TSI's on trans-European high - speed rail system were drawn up by AEIF (European Association for Railway Interoperability) in 2002 and most of them were subsequently revised in 2008. AEIF was acted as the joint representative body defined in the directive, bringing together representatives of the infrastructure managers, railway companies and industry (the AEIF was replaced by ERA in 2004). The second series of TSI's for European conventional rail system was published between 2006 and 2011. All of these TSI's were drawn up accordance with Council Directive 96/48/EC on the interoperability of the trans-European high - speed rail system and Council Directive 2001/16/EC on the interoperability of the European conventional rail system. A little difference between high-speed rail system and conventional rail system flow into consolidation these two directives of one Council

* Corresponding author: ihnat.peter@zscargo.sk

Directive 2008/57/EC on the interoperability of the rail system within the Community. [5]

As already foreseen in the interoperability Directives currently in force, this legal framework is begin further developed by correcting errors and close open points in TSI's, and extending the geographical scope of the TSI's to the whole European Union's rail system.

On this basis, the Agency (ERA – European Rail Agency) is currently revising the following TSI's: [6]

- Operation and traffic management (OPE),
- Freights wagons (WAG),
- Locomotives and passenger rolling stock (LOC and PAS),
- Control – command and signalling (CCS),
- Telematics applications for passenger services (TAP),
- Telematics applications for freight services (TAF),
- Accessibility for persons with reduced mobility (PRM),
- Safety in railway tunnels (SRT),
- Infrastructure (INF),
- Energy (ENE).

The dependence between TSI's is described on the figure 1.

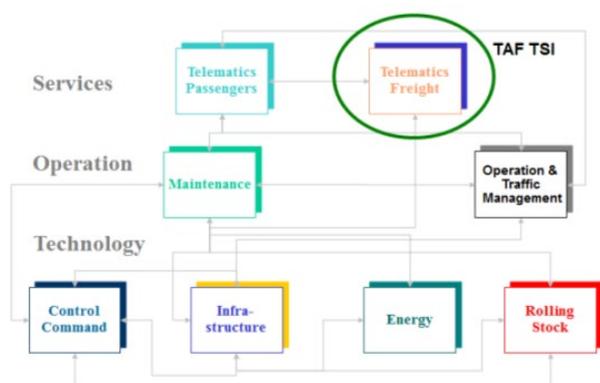


Fig. 1. TSI's structure

1.1 Telematics applications for freight (TAF)

The TAF TSI is a one of the most important technical specifications of the interoperability for creation the integrated rail system for freight within Community. The implementation of these TSI's is mandatory for all of the member states of EU. [7,8]

TAF TSI defined procedures, messages and content of these messages, which must be transmitted between subjects involved in the transport chain (railway undertakings, infrastructure managers, logistic bodies, customers, keepers, etc.). All of the relevant messages are split into next groups: [9]

- Consignment note data (the consignment note has to be send by the customer to the Lead RU. It must

show all the information needed to carry a consignment from the consignor to the consignee,

- Wagon orders (the wagon order I primarily a subset of consignment note information. It must be forwarded to the RUs involved in the transport chain,
- Path request (defines the requested, accepted and actual data to be stored concerning the path of a train and the characteristics of the train for each segment of that path,
- Train preparation (consist of the Train Composition, Train Accepted, Train Not Suitable, Train Ready, Train Position, Train at Start and Train Running Information messages),
- Train running forecast (specifies the messages which must be exchanged during the normal running of a train without any interruption – Train Running Forecast and Train Running Information messages),
- Service disruption information,
- Train location (specifies the tracing possibility to get information about train location),
- Shipment ETI/ETA (the ETI (Estimated Time of Interchange) /ETA (Estimated Time of Arrival) calculation is based on the information from the infrastructure managers in charge, which sends, within the Train Running Forecast message, the TETA (Train Estimated Time of Arrival for defined reporting points.)
- Wagon movement (specifies the package of the messages which must be stored and electronically accessible – Wagon Release Notice, Wagon Departure Notice, etc....),
- Interchange reporting (describes the messages attached to the transfer of responsibility for a wagon between two railway undertakings, which occurs at interchange points),
- Data exchange for quality improvement (a measurement process in an essential post trip process to support quality improvements. Defined the messages which must be transmitted between LRU's, RU's and IM's),
- The main reference data (contain the Infrastructure Data and Rolling Stock Data which are most important for the operation of freight trains),
- Various reference files and databases (for the operation of freight trains on the network must be available an accessible also additional data, which are locally and centrally stored),
- Electronic transmission of documents (presents the communication network to be used for data exchange),
- Networking and communication,

The figure 2 reflected a share of single groups on to whole TAF TSI.

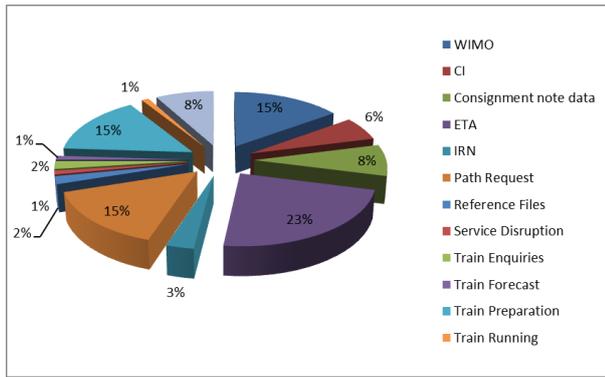


Fig. 2. Share of the TAF TSI

2 Restrictions of the implementation the TAF TSI into operation

The TAF TSI describes only baseline rail processes, which are important for realisation of the transport between two or more railway stations. This view limits to a great extent a successfully implementation within European rail network. [10]

The main problem is that into the transport process entry most of the railway and non-railway subjects with or without operational information systems, that it makes a process considerably complicated (see figure 3).

TAF TSI not allowance the electronic data exchange (EDI) between rail and non-rail subjects (railway undertaking and intermodal terminal, railway undertaking and road carrier, etc.), so in case of intermodal transport will be problematic to inform railways undertaking, consignee, consignors and other subjects involved in the transport chain about the transport by the road, river, sea. [5]

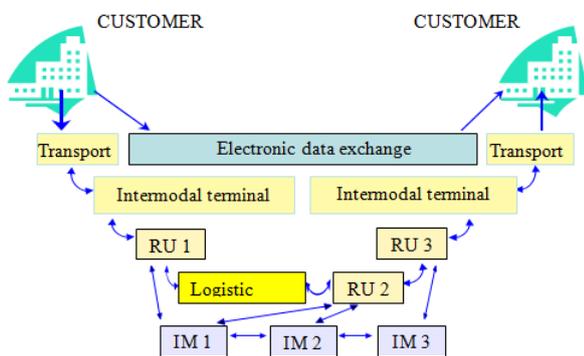


Fig. 3. Freight railway process map

The second problem of the implementation of the TAF TSI is, that no all railway subjects to own information system, which covered operational process described in regulation and related documents on information interoperability within European rail network. Because of this situation is much information into the information system typing manually by the RU's staff, what is a potentially place of the errors creation. TAF TSI defined Consignment note data as first of all actions of the rail transport, but consignment note data must to precede wagon order send from consignee to

RU, or to LRU. (this type of message and EDI process are not described in TAF TSI). In case of various RU's may be various structures of the wagon order messages, which must be used by the consignors.

In the figure 4 point 2 and 3 are illustrated the main areas of the cooperation between RU's and carriers (consignor and consignee) in context of the TAF TSI. [4]

The main problem of this cooperation been described in previous text is EDI. In case of absence information systems on the customer sides, must be information collected RU's by the own staff. But it is not correctly, because the costs of data collection and responsibility of the data quality are bared by the RU's. Next problem of this, are limited possibilities to transmitting the information about the transport between RU's and carriers. [9]

The same restrictions are created in case of cooperation between two RU's without reciprocally EDI.

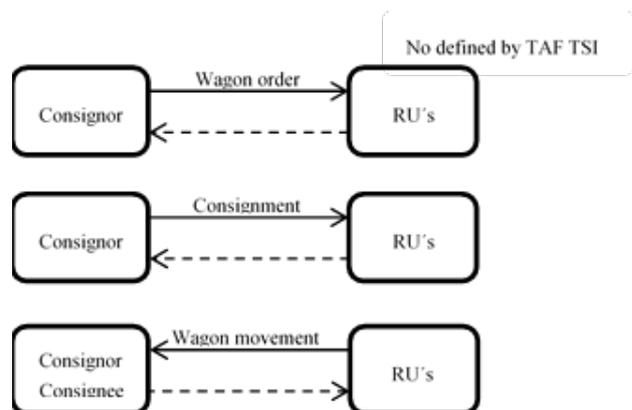


Fig. 4. Cooperation between RU's and carriers

3 Conclusion

The progress made thanks to the EU regulatory framework for railway interoperability will encourage the further development of the internal rail market, helping new business to emerge, cutting entry costs and, ultimately, improving the competitiveness of rail compared with other modes of transport.

But without regulatory framework which force to subject implementing own information systems in context of TAF TSI, won't be possible to encourage the further development of the internal rail market.

The one of the arrangements towards to successful implementation of the TAF TSI into operation, can be price policy of the access onto rail track charge. The new price policy would by make provision for total access onto rail track charge for the subjects with EDI and subject without EDI.

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