User-friendly access to information about last-mile infrastructure for rail freight

Executive summary

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Project Partners:

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UIC - Union Internationale Des Chemins De Fer, Paris (FR)

UIRR - Union Internationale des sociétés de transport combiné Rail-Route
(BE, subcontractor)

Triona AB (SE, subcontractor)

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Background and objectives

In order to cope with rising challenges of customers' demands and competition with road, rail freight transport providers must be able to provide reliable and transparent transport solutions at short notice. This is particularly challenging for last-mile operations. The lack of an easy and quick access to information about last-mile infrastructure for rail freight has become a significant barrier to the efficient planning of rail freight services, in particular across borders.

Against this background, HaCon and UIC, supported by UIRR, Triona and IT Kreativa, were mandated by DG MOVE to develop an EU-wide web-based portal with GIS functionalities, capable of presenting all relevant data for different kinds of last-mile infrastructure in a transparent way. The respective study "User-friendly access to information on last-mile infrastructure for rail freight" was started in January 2015 and concluded in March 2016.

The main objectives of this study were

- Capturing of user needs regarding relevant information criteria and features of a web application;

- Identification of existing data sources on last-mile infrastructure and evaluation of their usability in terms of technical and legal aspects;

- Elaboration of a technical specification for a web-based application and database;

- Development of the portal and performing operation on pilot level;

- Feeding the portal with last-mile infrastructure data from three selected regions in Europe;

- Recommendations for an operation concept (management structure, business model) for a permanent portal operation after the pilot phase.

"Last-mile infrastructure" - Definition and occurrence in Europe

In contrast to the general usage of the term "last-mile" in the logistic world, this study does not capture the entire transport chain (where the last-mile is often performed on road), but concentrates on the last (or first) rail part. This comprises the loading facility itself as well as all infrastructures necessary to connect the loading facility to the (mainline) rail network. As Figure 1 visualises, the latter refers to a "transfer station", where the train run goes over to shunting operation and to the connecting rail line between the transfer station and the loading facility.

Figure 1:   Last-mile infrastructure for rail freight
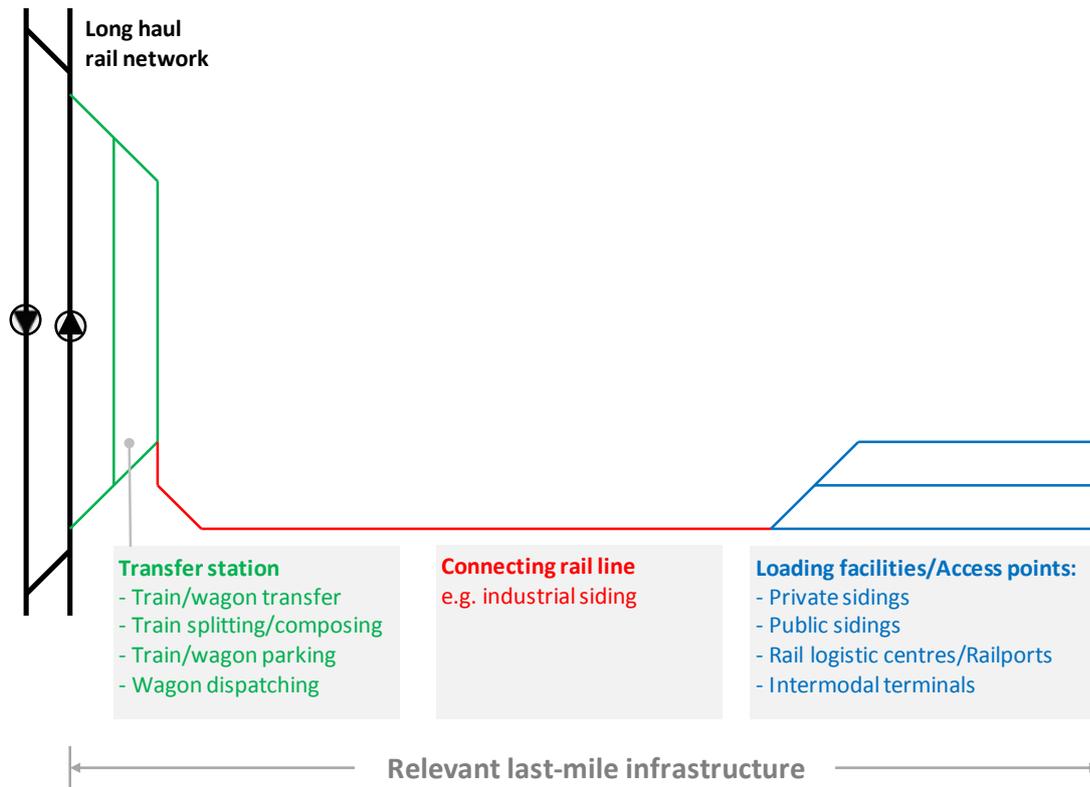
It is important to understand that "last-mile Infrastructure" comprises a large variety of different infrastructure configurations with respective modes of operation. It is therefore necessary to define relevant clusters of last-mile infrastructure, which facilitate overview and allow addressing dedicated users/operators with specific information demands.

- Private sidings are privately owned and operated rail infrastructure, connecting loading facilities to the public rail network. Within this study, private sidings mainly refer to industry sites (manufacturing of goods).

- Public sidings used to be an access to rail freight "for everybody" in former days. Meanwhile, they have lost most of their relevance. They consist of publicly accessible team tracks with or without loading ramps and are incorporated into conventional rail production systems (normally single wagon load).

- Intermodal terminals are designed for the transhipment of standardised loading units (containers, swap bodies, trailers) between at least two modes. In most cases they are publicly accessible, but some of them are privately operated. Within this study, only terminals with rail connection (rail/road or rail/road/water) are considered.

- Rail logistic centres ("Railports") are loading facilities both for conventional and intermodal transhipment. Beyond pure transhipment, Rail logistic centres also provide additional services like storage, consignment, or road pre-/end-haulage. Rail logistic centres are also known as "Railports", which actually is a brand name of DB Cargo.

In addition, areas that combine several of these access points have been included into the analysis and into the portal application. This applies for freight villages and sea/inland ports.

The four described types of last-mile infrastructure cover all access points to rail freight. They have been used not only to define users' requirements to the information portal, but also as a main structure of the portal´s database and for the management concept ("care takers").

By status of autumn 2015, about 22,120 of these access points to rail freight existed in Europe (EU-28 + Switzerland + Norway). The vast majority of these pieces of last-mile infrastructure was allotted to Private sidings (~ 15,600), followed by Stations with public sidings (~ 5,600), Intermodal terminals (~ 730, only terminals with rail access) and Rail logistic centres (~ 190).

User needs

In the first instance, the envisaged portal addresses users and providers of rail freight transport who need the last-mile information to plan and to optimise their services. Furthermore, operators and managers of last-mile infrastructure are of relevance, since the portal might be also used to promote facilities and associated services. Additionally, politicians, consultants etc. could make use of the information for planning purposes. Consequently, the following stakeholder groups are considered to comprise the requirement profile for the portal: railway operators, shippers (industry), forwarders, intermodal operators, (rail) infrastructure managers, intermodal terminal operators, railport / rail logistics centre operators, owners/ operators of private sidings, wagon providers and other parties like government, spatial planning administration, consultants or economic promotion agencies.

Specific user needs regarding information content and portal features have been collected in three steps: first, three workshops were performed in Paris, Budapest and Lugo between March and April 2015, incorporating all stakeholder groups listed above. In a second stage, the results of these workshops were validated by means of an online questionnaire. Finally, interviews with selected stakeholders and also with operators of existing online portals have been used to discuss specific aspects.

As a basis for all these three steps, a "long list" of more than 120 information attributes had been prepared. These information attributes covered aspects like location (address, contact data), type and size of the facility, rail infrastructure (layout and equipment), transhipment equipment, type of loading unit / cargo transhipment, storage capabilities, shunting and other services. All these issues were evaluated and ranked by the stakeholders. Concerning possible features of a portal application, a second respective "long list" was provided and discussed.

The results of this three-step-survey show that the planned portal will facilitate an easy and quick identification of possible rail freight loading facilities associated with a limited set of core information relevant for a commercial decision to use the facility. In summary the portal will provide quick answers to the following questions:

- What access points are available (locations)?

- Who manages the access point (contact person)?

- What are the operating times of the facility?

- What are the core technical parameters and equipment?

- What kinds of services are provided at a particular point?

The results also show that almost each information item has been considered as important by a certain group. This means that no attribute should be generally ignored and excluded from the portal.

Data sources and pilot regions

A main issue for the last-mile information portal is the provision of complete, accurate and up-to-date data. In this respect, the following questions have been investigated:

- Which data sources exist in correspondence to the requested types of infrastructure in Europe?

- What kind of information is provided by the identified data sources?

- Are these data sources available to be exploited and how? In this context technical, legal and commercial aspects need to be clarified.

In order to answer these questions, more than 40 existing web-based portals, which may serve as data suppliers for the last-mile portal, have been analysed. In addition, other data sources were identified that also provide useful information, even though the data might not be available in electronic form. Examples for such additional data sources are the Network Statements of the rail infrastructure managers or data provided directly e.g. from terminal operators, railport managers or managers of other loading facilities.

The majority of the investigated data sources provide information about intermodal terminals, often within Europe-wide web portals (e.g. AGORA, SGKV). The overall data availability for this type of last-mile infrastructure can be regarded as sufficient, both concerning the identification of facilities and the specification of their characteristics (infrastructure layout, transhipment equipment etc.).

Information on stations with public sidings is available mostly through country-specific websites of infrastructure managers or rail freight operators (e.g. DB Netz, SBB Cargo, Trafikverket). In some cases, these data might be enriched by information from the Network Statements.

Most data of Rail logistic centres are provided by DB Schenker (now: DB Cargo) as the owner and operator of many "Railports" in Europe. Occasionally, a clear separation from intermodal terminals (that also provide additional services) and from forwarders with rail access (that are captured as private sidings) is not possible.

Private sidings are the most problematic type of last-mile infrastructure with respect to data availability. This is most unsatisfying, as private sidings represent not only the lion´s share of all access points, but also the vast majority of rail freight volume in Europe. The few exploitable data sources are mostly assigned to regional level (e.g. portal "Gleisanschluss Brandenburg" or terms of use for infrastructure in ports). In single cases, additional surveys are available (e.g. by chambers of commerce), which however are performed uniquely and thus not updated.

In order to verify the usability of these data sources, the most important promoters/providers of existing web-portals have been approached for interviews on the following topics:

- General aspects/ experience (e.g. motivation for the portal, development status, portal usage);

- Data ownership, availability and conditions;

- Data updates and

- Interest in supporting a European last-mile portal.

It turned out that most interviewed portal promoters would generally agree to connect their portal with the European last-mile portal, but the willingness to transfer/update the complete database to another portal is rather limited. However, for the feeding of the pilot portal, agreements have been reached with some most relevant portals and other data providers. Technically, no standard interfaces are facilitated.

In the short term, this procedure of merging data from several origins is the only realistic way to keep the envisaged deadlines for implementation. Generally however, the data feeding concept of the portal should take account of related European framework and data exchange standards, as defined within TAF/TAP-TSI regulation. Data from TAF-TSI common components like CRD (Central Reference Data) and RINF (European Register of Infrastructure) should be exploited as far as possible. Additionally, data stocks of national safety authorities should be considered.

The European Register of Infrastructure will ultimately become available as a separate web application, populated with extensive data encompassing the EU railway network. Therefore, the opportunity will arise to link information systems for the rail network and for the last mile.

However, it should be borne in mind that RINF only contains data about sections of lines, rather than individual tracks, and about operational points but with no internal details. Such level of detail is suitable for the legal purposes of RINF, which are conformity records and rolling stock compatibility checks, but not for other usages such as pathfinding. Moreover, the RINF and CRD databases provide only data for a limited number of information items. It has been also perceived that reliable and regular input data flows to RINF and CRD have been established for lines and stations but need to be clarified for other transhipment points such as terminals or private sidings. Consequently, the data that is currently available is considered as limited in terms of facilities included and associated contents.

Nevertheless, the maintenance of multiple geographic information systems is not sustainable in the long run, unless the cost, delays and quality issues associated with data links and data transfers are kept under tight control. For this to happen, information systems must share a common, consistent topological model. For example, such a model is under development with UIC (RailTopoModel, IRS30100, to be released in spring 2016). The corresponding data exchange formats will allow data exchange with RINF, among others.

For the pilot application, three regions have been selected for a more comprehensive data input which are Sweden, West-Hungary/ East-Austria (greater Vienna area) and the Balkan region. The data gathering made use of the identified portals and data sources as far as appropriate and furthermore involved regional subcontractors such as Triona (for Sweden) and IT Kreativa (for the Balkan region).

The pilot portal – design, features and data stock

Based on the identified user requirements and the evaluated data management concepts, a detailed functional and technical specification document was developed. The guiding principle for all aspects dealing with the portal design was to ensure that the application is usable in an intuitive way and ensures an optimum accessibility to all relevant information items. Moreover, the portal's system performance should facilitate short reaction times for all user actions, considering usage of different browsers and mass system usage.

The portal was developed and filled with data according to the technical specification. The pilot version of the GIS portal was officially launched on the occasion of a stakeholder seminar in Vienna on 19 October 2015. Since then the application, the database and the data model have been continuously further developed in order to

- Ensure robustness of the application,

- Implement additional functionalities,

- Optimise performance for all types of commonly used browsers and to

- Complement the data stock.

The current version of the portal can be reached under "railfreightlocations.eu". When accessing this web page, the start screen opens with the map in the centre; search and filter features are located on the left, the list display and the legend on the right (see Figure 2).

Figure 2:   Overview on the last-mile infrastructure portal railfreightlocations.eu
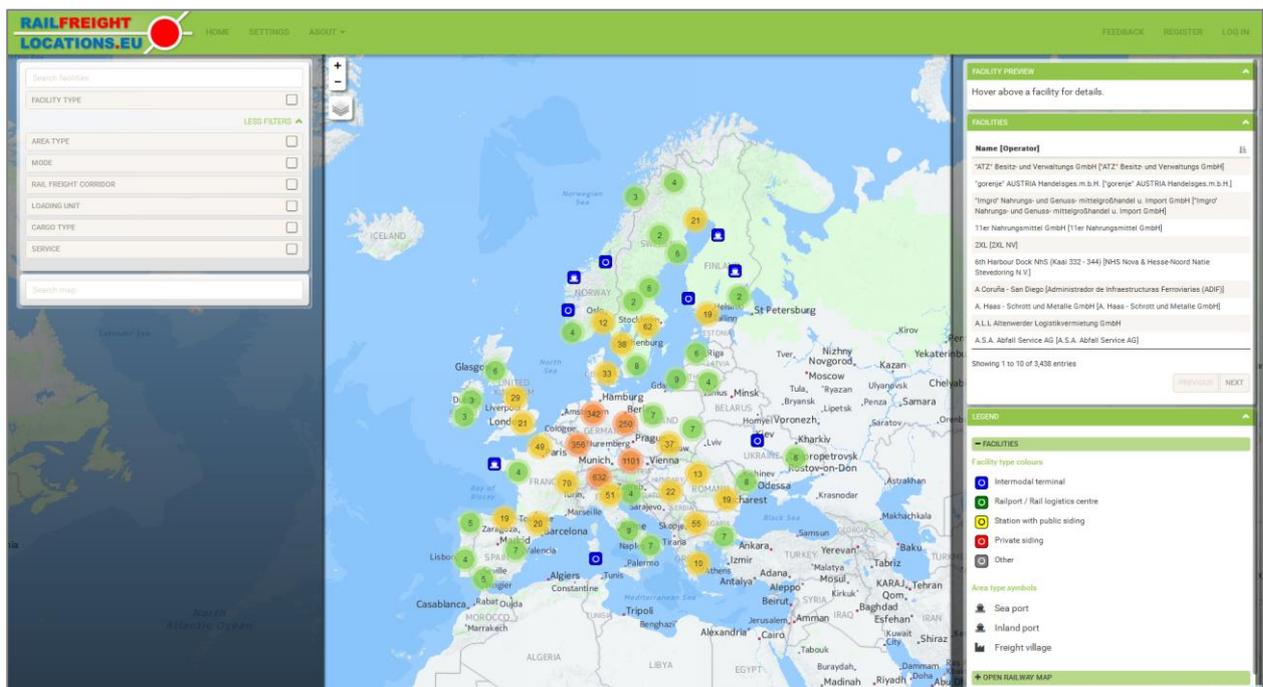
By narrowing the search criteria, zooming of the map or direct picking from the list, dedicated access points to rail freight may be selected. By clicking on the symbol in the map or by navigating to the list´s entry, detailed information about the respective last-mile facility will be displayed (see Figure 3).

Figure 3:   Example for detailed information of a last-mile facility

This detailed information provides a satellite picture of the site and data referring to the following subjects:

- Basis data: type of last-mile infrastructure, address, contact data, opening times etc.;

- Infrastructure/Equipment: Number and type of transhipment devices, track configuration (type, number, usable length of track, electrification, min. track radius, permitted axle load);

- Loading units/Cargo types: Intermodal loading unit types, commodities, dangerous cargo;

- Services: Maintenance/repair for locomotives, wagons and loading units, parking of wagons and locomotives, storage facilities, pre-/end haulage etc.;

- Links to other websites that may provide additional data. This particularly refers to "dynamic" information like schedules or prices. Such dynamic data is generally not included in the last-mile portal.

By status of March 2016 the pilot portal contains more than 3,700 last-mile infrastructure facilities. This means that for about 17% of all access points to rail freight in Europe, at least basic information is available. The focus of the included data was on the selected three pilot regions and supplemented data for further countries. In summary it can be concluded that the data coverage regarding intermodal terminals is almost complete whereas the data availability for other types, in particular for private sidings, remains a challenge.

Recommendations for a permanent portal operation

In order to transfer the pilot portal into permanent operation, an operating model is proposed with the following parts:

- A management concept, identifying the parties expected to take part in the permanent portal operation and defining their roles/tasks as well as their contractual connections. The principle idea is a two-pillar-structure with the main management levels "Portal Operator" (overall responsible for portal operation) and "Care Taker" (in charge of data gathering, updating and validation);

- Requirement/qualification profiles for selecting suitable companies for the main levels of the management concept;

- A (non-exclusive) pre-selection of organisations to take over the permanent portal operation;

- A business model outlining main tasks and associated costs, as well as different possible scenarios for revenue generation;

- A Roadmap towards permanent portal operation, consisting of two implementation phases: permanent operation making use of a "professional" version of the portal, which is able to generate revenues from the market, and a "transfer operation", converting the pilot portal into the "professional" version. This procedure needs additional features, particularly with respect to data management, as well as completion of the data stock.

Regarding the business model the following recommendations have been given:

- The portal could be linked with the Customer Information Platforms (CIPs) of the Rail Freight Corridors (RFC). The CIP is a tool which is intended to be implemented by the RFCs to provide customer information, including technical details and access conditions of freight terminals along the corridors. In this case, it is recommended that RailNetEurope (RNE) ensures the coordination of a common approach for all RFCs and a link between the CIPs and the LMI portal. This would be a first step towards a single interface providing information and other services to rail freight operators and customers in Europe;

- For individual users, the portal should be generally free of charge; all other alternatives would lead to critical lack of acceptance;

- RINF and CRD (TAF TSI) should be used as data sources and data harmonisation should be ensured.

- Revenues should not be based on only one origin, but preferably on multiple sources in order to avoid complete drop-out of cash flow, if one source of revenues should fail;

- A certain degree of public funding would most likely guarantee long-term reliability of cash flow. This would be justified, since the portal will provide services and benefits for the public and could therefore (at least partially) also be paid by the public.

The components of the described management concept provide a tool-box for the Commission to initiate the next steps to achieve permanent portal operation. Main items addressed are:

- A general decision to continue the operation of the portal should be taken by the Commission (DG MOVE). In case this decision is positive, the Commission would have to consider providing a budget that would allow the pilot portal to be kept alive during the transfer period and for it to be made accessible to the public.

- A follow-up study could be initiated to perform all necessary developments and data collection towards a "professional" version that is needed for a permanent portal.

- Simultaneously, a Portal Operator should be selected. In the pre-selection process three organisations have been identified: European Railway Agency (ERA; now: European Union Agency for Railways), RailNetEurope (RNE) and the International Union for Road-Rail Combined Transport (UIRR). All these entities have expressed their general or potential (i.e. subject to management approval, availability of resources, etc.) willingness to undertake this task. By signing a contract with the assigned Portal Operator, the main task of the European Commission within the roadmap towards a permanent portal would be concluded.

- Transfer of responsibilities to the assigned Portal Operator and set up all required organisational and management structures. This firstly refers to the selection of Care Takers and conclusion of respective service contract. The same applies for other subcontractors, as far as needed. In cooperation with the Care Takers, the Portal Operator will select appropriate data collectors for specific tasks.

Portal website: railfreightlocations.eu