ACTION PLAN FOR FOSTERING COORDINATED MULTIMODAL FREIGHT TRANSPORT THROUGHT ICT SYSTEMS - ROSTOCK

DELIVERABLE D.T3.2.5

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1. Executive summary

This document includes the action plan fostering coordinated multimodal freight transport through ICT systems in the node of Rostock Port.

Chapter 2 defines strategic goals and a wish list of Rostock Port based on the jointly developed strategy within COMODALCE project (WPT1). Furthermore, main results of the deduced pilot action at the Port of Rostock are presented which changed due to external restrictions from a physical installation of a train scanning facility to a study for identifying suitable locations during project implementation.

Chapter 3 builds up on the gained knowledge and the project activities. In a first step required actions for company vision's implementation are defined in a time horizon until 2030. In a second step these actions are detailed, e.g. in time line, identification of financial resources, definition of responsible actors and KPIs. The action of very high priority is 'the establishment of an IT-operations control system for the intermodal terminal operator' at the Port of Rostock. It is the central element for an automatic detection of multimodal freight units as well as tracking, tracing and monitoring of freight units. The other two planned actions 'installation and integration of a train scanning solution' and 'development of an external user interface in form of a terminal information and handling system' complement and extend the functionality of the IT-operations control system.

Chapter 4 draws conclusions and illustrates the expected results and impacts of the action plan implementation.

2. The strategy and the pilot action

In 2020 Rostock Port set following strategic goals:

Medium term (5 years):

1. Goal no. 1: Replacement of paper work with up-to-date IT tools
2. Goal no. 2: Enhancement of data transfer between involved stakeholders to ensure permanent data flow and status reports along the logistic chain

Long term (10 years):

1. Goal no. 3: Increase the degree of automation of data exchange as most as possible
2. Goal no. 4: Connection of all logistic service providers engaged in the logistic chains in a comprehensive terminal information and handling system

Perspectives	Goal	Measurement
1. Environmental and safety perspective	Decrease of paper work and employee mistakes	Automated IT based standard procedure
2. Internal processes perspectives	A strict focus on deeper IT-integration of processes is necessary. Even a rethinking of the staff is needed here.	Number of new software components installed; training of staff to use new technologies
3. Innovation and growth perspective	n/a	n/a

4. Customer / Partner perspective	Discussion with stakeholders and partner how to implement new technologies and IT-components; Cooperation with them in implementing components and interfaces	Comparison of processes before and after the implementation of the project in order to rate the success of the IT-development
5. Financial perspective	Funds from the European Union based on their goal to foster cooperation as well as better connect regions; own financial resources in addition to funds as bank loans or from the cash flow	Numbers of IT-components fully implemented and financed with what financial sources

VISION:

Our vision is to enable automatic detection of multimodal freight units entering the terminal on rail to ensure proper tracking and tracing as well as monitoring of the condition of the transport equipment along the entire logistic chain.

Wish list of ICT measures:

Based on the strategic goals a "detailed wish list of ICT measures to be tested in the pilot actions (WPT2)" was deduced.

Wish list of ICT measures			
Title	**Short description**	**Link to the strategic goal**	**Link to the pilot action**
1.	Automatic detection of freight units transported on multimodal trains	goal no. 1	Yes, when the train pass the scanning gate, all units transported on that train will be detected and the information connected to it transferred into the terminal management system
2.	Condition monitoring of transport units	goal no.1	Yes, as the scanning facility will take pictures from each unit which are stored in a data base to document e.g. unit data's, damages
3.	Data transfer between logistic service provider	goal no.2	Yes; information about the respective unit will be exchanged via interfaces with transport operators,

			ferry- and handling companies

Pilot Action

As consequence of the strategic goals and deduced wish list of ICT measures a pilot action should be implemented in the framework of the Interreg project COMODALCE.

The pilot action for Rostock Port was planned in form of the installation of a scanning gate for trains.

Unfortunately, the pilot action in form of a scanning facility had to be cancelled. After extensive internal and external discussions, the actual fixed location did not get approval by the rail network operator (DB Netz) which would be a precondition for the investment. Alternatively, an engineering office was contracted to analyse all relevant regulations and requirements needed for the installation and to define a suitable location for the scanning facility/rail gate.

Within the study potential locations of a scanning system for intermodal trains were identified and their feasibility against the requirements of railway law were checked and evaluated.

Based on the following operational premises

- train service ends and begins in the drive-in/out group,
- the traction change takes place in the drive-in group (electric locomotive / shunting locomotive or shunting locomotive / electric locomotive),
- between the drive-in/out group and the intermodal tracks, the train movements take place exclusively as a shunting run, without using the route track,

five variants of potential locations for the scanning gate were identified.

The evaluation/assessment of the five variants led to following conclusions:

Variant 1	Variant 2	Variant 3 and 4	Variant 5
- technically feasible - not usable in practice, since track 609 can only be used as an access from the DB Cargo maintenance	- technically feasible - not usable in practice, since track 608 is the main track and can be used for shunting trips	- technically feasible - if cameras have to be arranged vertically on the supports of the portal, the control profile is restricted, so the location cannot be used - operationally, variants 3 and 4 have significant advantages, as all journeys in the 500 sidings including tracks 601 and 602 can be recorded	- technically feasible - all journeys in the direction of RTM are recorded, provided that it is specified that access to the intermodal tracks is exclusively via tracks 516 and 517

Only Variant 5 was recommended with the following accompanying conditions:

- The required standard light spaces can be implemented by a camera arrangement that must be adhered to the vertical supports of the portal.
- All services in and out of the intermodal system can be recorded, provided that the necessary shunting services are only made using tracks 516/517. This can be regulated operationally.
- Accessibility for maintenance, repair and fault work must be contractually agreed with DB Netz AG.

- Regulated building products should be used for such superstructures of the railway system. So-called signal bridges are a regulated construction product in the area of DB Netz AG.

Due to the fact that only one potential location could be identified for the implementation of a scanning gate for trains at the port area, Rostock Port is still discussing alternative technical solutions for train scanning. Beside the construction of a physical gate at the port area two other options are under consideration:

- A gate solution outside of the port area which would be constructed and operated by the net operator DB-Netz. In this case Rostock Port would have the possibility to buy corresponding data of trains/train units and would have to create an interface between DB-Netz IT-system and the port's own IT-system. This technique is already introduced at eight locations in Germany by DB-Netz.
- A pioneer project of a Spanish Start-Up offering a scanning solution with several cameras on different positions at the combined transport terminal. Experiences with it have already been made in other branches. It would have to be adopted to the port sector, especially to a combined transport terminal.

Taking the decision for one of the sketched alternatives of train scanning solutions and its implementation at Rostock Port will be an important step towards realization of port's vision above.

3. Identification of the actions

3.1. Mapping the actions

The table below summarises the actions to be taken (horizon: 2030).

ACTION/MEASURE	ESTIMATED COST	TIME HORIZON
Establishment of an IT-operations control system for the intermodal terminal operator	*150.000 euros*	*2024*
Installation and integration of a train-scanning-solution into the operations control system of the intermodal terminal operator	*200.000 euros up to 650.000 euros (depending on solution)*	*2025*
Development of an external user interface in form of a terminal information and handling system	*50.000 euros*	*2025*

3.2. Setting the actions

Action no. 1: *Establishment of an IT-operations control system for the intermodal terminal operator*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	*The IT-operation control system will be an extension of the port management system SKSS (so-called: Stellplatz Kontroll- und Sicherungssystem). It will be a specific software component which will aim at the optimization of operation processes and better usage of resources, e.g. in:* *train registration/detection as well as train composition, truck clearance, management of storage area of unaccompanied transport units.*
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	*1. Tender process* *2. Implementation phase (development of the software component)*
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	*Rostock Port (infrastructure provider)* *RTM (terminal operator)* *IT-developer/service provider*
Timeline *Indicate the time horizon for the implementation of the action*	*2024*
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	*150.000 euros*
Sources of financing[1] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	*National public funds (Eisenbahnbundesamt) and own financial resources*
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	*The software will optimize/automate cargo handling and storage procedures and make the terminal operations more efficient. Less waiting times of trucks and less transhipments of cargo at the terminal will reduce CO2 emissions.*
KPIs *Please identify the KPI to be used for measuring the action's impact*	*less waiting times for trucks at the gates and at the transhipment module; higher throughput of cargo units;* *less driving for positioning of cranes;* *higher freight handling capacity,*

[1] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

Action no. 2: *Installation and integration of a train-scanning-solution into the operations control system of the intermodal terminal operator*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	*A train scanning facility which register automatically and digitally in- and out-going trains at the terminal should be installed and integrated into the IT-system. Each single train unit should be registered by several characteristics (photos, ID-No., etc.)*
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	*1. decision making process regarding the existing solutions/options of construction* *2. planning phase of the scanning gate (specifications, tendering procedure, implementation phase)* *3. construction phase of the scanning gate (specifications, tendering procedure, implementation phase)* *4. IT-integration into the IT-operations control system*
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	*Rostock Port (infrastructure provider)* *RTM (terminal operator)* *DB-Netz (German rail net operator)* *External service providers (construction/IT etc.)*
Timeline *Indicate the time horizon for the implementation of the action*	*2025*
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	*200.000 euros up to 650.000 euros (depending on solution)*
Sources of financing[2] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	*Own financial resources* and potential available funds
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	*With the scanning of the train units a lot of data will be gathered automatically in a very time-efficient manner. It will establish a new level of tracking and tracing activities of the units for the terminal operator and internodal customers.* I*nformation will be available immediately and in a better quality.*
KPIs *Please identify the KPI to be used for measuring the action's impact*	*Less insurance claims by transport operators or freight forwarders. Consequently, less insurance costs for cargo/freight unit damages;* *Up-to-date information for transport status of the cargo for the customers/freight forwarders/transport operators.*

[2] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

	Less storage times of cargo units due to direct transhipment from train to truck. Larger handling capacity on the intermodal terminal.

Action no. 3: *Development of an external user interface in form of a terminal information and handling system*	
Description of action/measure *Describe the action foreseen and the expected results from its implementation*	*The terminal information and handling system will be a platform or an interface which enables a direct data exchange (e.g. trailer position at any time at the terminal, condition of the trailer etc.) with external users (customers, transport operators, freight forwarders). The external users will have a direct access on the data and they will have the opportunity to insert data, e.g. pre-register transport units for trains, retrieval of photos in damage matters.*
Description of the main steps for its implementation *List and describe in detail the main steps for the implementation of the action (i.e. planning phase, tender procedures, etc…)*	**1.** *internal elaboration of the specification* *2. tendering procedure for IT hard- and software* *3. implementation by an external service provider*
Stakeholders involved *List the stakeholders involved. What is their role in the action? Will they be the direct beneficiaries?*	*Rostock Port (infrastructure provider)* *RTM (terminal operator)* *External service provider (IT developer)* *Customers / other intermodal actors (potential users)*
Timeline *Indicate the time horizon for the implementation of the action*	*2025*
Investment cost *How much will cost the construction/realization of the future initiative/action/technology?*	*50.000 euros*
Sources of financing[3] *What are the sources of financing? Private capital, public capital, CEF, etc...* *How much is the share covered by each of them?*	*Own financial resources and potential available funds*
Impact of the initiative *Describe the expected future economic, social, environmental impacts of this initiative*	*More digitalization of the processes and therefore better and faster information for all stakeholders*

[3] This information, if already available, could be assumed in the draft version and it has to be confirmed in the final one

KPIs *Please identify the KPI to be used for measuring the action's impact*	*Higher time efficiency answering customer requests;* *Higher customer satisfaction*

4. Conclusion

Based on the implementation of the planned actions above which are directed to improvements of the ICT-systems for multimodal transport at the Port of Rostock the processes of port operations will be more efficient and smoother in the future.

For instance, transport operators or freight forwarders will be able to pre-register transport units for trains directly via an information and handling system by entering all relevant data for the transport. Once having entered these data and the transport unit passes a scanning facility at the port (e.g. the train scanning facility) the ID-No. of the freight unit will be recorded, combined and checked with further entered data from the transport operator as well as photos will be taken automatically to document the condition of the transport unit and equipment. All this information will be shared immediately with the IT-operations control system and will be also directly available for the transport operator via the terminal information and handling system who can track the transport unit from that time on. Depending on the further transport chain of the freight unit (already included in the entered data set of the transport operator) the IT operations control system will assign internal transport/transhipment orders at the terminal. These transport/transhipment orders will be more efficient than in the past optimizing crane moves and driving distances, avoiding empty runs of trucks at the terminal and searching of units in storage areas. In the future freight units will have a distinct position in the storage area optimized to their forwarding. Furthermore, a direct loading/unloading between train and truck without storage times at the terminal would be easier manageable.

All the described overlapping processes that are based on ICT improvements will lead to a higher freight handling capacity of the terminal and to a higher throughput of cargo units at the Port of Rostock.