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Standardization of technical and safety requirements in inland navigation: Modernization and greening of the inland waterway fleet in Europe

Overview of the Outcome of the EMMA Extension Project – Enhancing Inland Navigation in the Baltic Sea Region

Transmitted by the EMMA Extension Project Team

1 EMMA Extension Project

The EMMA Extension Project (08/2019-06/2021), aims at enhancing inland navigation in the Baltic Sea Region by supporting digitalization in inland waterway transport (IWT) and implementing new logistic concepts in the Baltic Sea Region.

The extension project is based on the results and recommendations of project EMMA (2016-2019), which brought inland navigation to a wider national and European agenda, strengthened its voice and successfully demonstrated feasibility of potential inland waterway transport services in the Baltic Sea Region. The EMMA Extension focuses on next steps towards further market deployment of IWT by capitalizing on the results and partnership of project EMMA and implementing practical IWT solutions.

The project is led by Port of Hamburg Marketing Reg. Assoc. and is implemented together with seven project partners from five Baltic Sea Region countries. The total budget available amounts to € 999 thousand, of which € 778 thousand is co-financed by the Baltic Sea Region Programme (ERDF). It was approved as Flagship of the European Union Strategy for the Baltic Sea Region under its Policy Area Transport.

Despite the COVID Pandemic, the EMMA Extension project has been able to support digitalization in inland waterway transport and implement new logistic concepts in the Baltic Sea Region with great success. Some main results are shortly described in the following chapters by country. Links to further information and material/contact persons is provided in each chapter in question.

2 Lithuania: First Cargo Transportations by Inland Waterways – Vessels from Klaipeda Seaport

During the EMMA Extension project, several pilot sailings by IWW vessels have taken place in Lithuania, where the main inland waterway is river Nemunas and Curonian lagoon from Kaunas to Klaipeda. Before the EMMA Extension, there had not been any cargo transportations by inland waterway vessels from Klaipeda seaport.

The first commercial sailings between Klaipeda-Kaunas-Klaipeda by barge took place in spring 2019 when, in total, 33 containers were delivered. In May 2019, sailings continued with the transportation of 38 containers. At the end of May and early June 2019, 20 more containers were transported. Altogether 91 containers were transported by inland waterways and the total distance travelled was 1400 kilometres.

Following these first test runs, the Lithuanian government has provided funding for improving inland waterways. This includes € 2.6 million investments for purchase of machinery for maintenance works in 2020–2021 and investments worth € 27 million for the E 41 fairway modernisation works in 2021–2023, increasing the depth of inland waterway. In addition to containers, the future aim is to move also other type of transportations into inland waterways, including transportations of grain, scrap metal and other bulk cargo.

The fourth sailing in spring 2021 was therefore a huge success as the most powerful autotransformer in the Baltic States was delivered to Lithuania for company Litgrid (Lithuanian electricity transmission system operator). After being assembled and tested, it was transported to the port of Derince by the Sea of Marmara and loaded on the ship which brought the autotransformer to Lithuania after covering more than 7 000 km via the Sea of Marmara, the Mediterranean Sea, the Atlantic Ocean and the Baltic Sea.

Domestic transportation of a huge cargo weighing 164 tons is an unusual event for Lithuania. After the delivery to Klaipeda, the autotransformer was loaded onto a barge at the Klaipeda container terminal. It took three days for the barge of the Inland waterways authority to transport the autotransformer through the Curonian Lagoon and the Nemunas river to Kaunas Marvele Cargo port. In Kaunas, the cargo was transferred to a 39-meter long trailer and special platform assembly, which, assisted by another trailer, was transported to the LitPol Link converter station in Alytus district.

In the media it was stated the arrival of a 164-tonne autotransformer was a crucial step towards energy security, as the transformer will allow power to arrive from neighbouring Poland to Estonia, Latvia, and Lithuania via the LitPol link (<https://www.lrt.lt/naujienos/lietuvoje/2/1409029/baltics-step-closer-to-leaving-moscow-controlled-power-grid>).

In addition to successful pilots that have gained a great media attention in Lithuania, the EMMA Extension pilot cruises have helped to identify the areas that need to be fixed when it comes to cargo transportation by inland waterway vessels. For instance, in 2021, the Klaipeda seaport will upgrade their computer systems to include inland waterway vessels for cargo operations. Furthermore, a container distribution terminal will be built in Kaunas and a new barge is expected to be built and commissioned in 2021.

3 Poland: Container Transport and RIS Pilot

3.1 First commercial container transport in the River Vistula

As part of the EMMA Extension project, the commercial container transport took place on the Vistula River for the first time in history. Containers were transported from the seaport of Gdańsk to one of the factories in the Kujawsko-Pomorskie Region.

On April 6, 2021, the commercial transport of containers with cargo from one of the factories located in the Kujawsko-Pomorskie Region set off from the Port of Gdańsk. After crossing the lock in Przegalina, a barge and a pusher entered the lower Vistula River and after about 15 hours of cruise reached Chełmno. On 8 April 2021, on the Vistula wharf in Chełmno, cargo was transshipped. Import containers were placed on trucks, while goods intended for export were loaded onto a barge. After 10 hours, the barge with pusher returned to the Port of Gdańsk, from where the containers were transported to sea vessels. The entire operation, during which 12 containers (approx. 300 tons of goods) were transported, took 4 days.

The main goals of the pilot were to promote inland waterway transport in Poland as the most economical, safe and environmentally friendly mode of transport, to increase knowledge on the use of inland navigation services and infrastructure among cargo owners and shipping companies, and to promote activities related to the planned construction of the Bydgoszcz logistics hub and recognition of it as a hub of the TEN-T core network. One important goal was the practical verification of water transport possibilities and reloading goods that go from seaports into the interior of the country as an alternative to road or rail transport. In this case, inland waterway transport can be included in the supply chain, which in the future could run through the logistics centre in the heart of the Kujawsko-Pomorskie Region – the Bydgoszcz Logistics Hub. Thanks to studies prepared by the voivodeship self-government, such as a location study for the multimodal platform Bydgoszcz-Solec Kujawski and The Last Mile Concept for the Bydgoszcz Logistics Hub, the parameters of the future port have been determined and the needs of economic entities from the region have been identified in terms of optimization of logistics operations and the use of inland navigation.

The organization of the EMMA Extension cruise fitted perfectly into the national transport policy and the activities carried out by the Ministry of Infrastructure to promote the use of alternative modes of transport and the transfer of some cargo from road to rail and water transport as well as building modern inter- and multimodal terminals that will improve the existing supply chains. This issue is also important in the context of the planned revision of the TEN-T Network and the possibility of including international waterways and the Bydgoszcz Logistics Hub. In addition, the promotion of water transport will also indirectly justify the necessity and legitimacy of developing strategic programs for the Vistula and the Oder rivers.

The potential of this solution raised the interest among domestic and foreign shipowners and representatives of the industry as well as entrepreneurs operating in the Kujawsko-Pomorskie Region.

3.2 Installation of bridge clearance applications in the Oder River

Another Polish EMMA Extension pilot implemented automatic readings of safe clearances under bridges across the Oder River in Szczecin. Measurement and telemetric sensors and information boards were installed on two selected bridges to safeguard a very accurate measurement of clearance under bridges and to indicate the current value of the clearance to skippers in real time.

Due to often limited clearance under bridges in the operation area of the RIS-ODER system, the clearance is particularly important information for captains of inland vessels, allowing them to make the right decision on passing under the bridge. Thanks to the information boards that will display the current value of a clearance under a bridge, the navigation safety will increase significantly. Another key element is the logistics aspect as it will allow to shorten the passage time of a vessel. The knowledge of the current clearance may also aid the ship's loading process and help to adapt the height of the cargo. In the long run this will lower the cost and make the transport more profitable for the operators.

River Information Services (RIS) stand for the harmonised information services which support traffic and transport management in inland navigation including interfaces with other

modes of transport. RIS-ODER consist of location of sensors in the RIS area (including CCTV cameras, AIS stations, hydro- meteorological stations) serving as the primary source of information; operation of the RIS Centre, where information is processed; free provision of electronic navigation charts for inland navigation (IENC); issuing Notices for Skippers (NtS); as well as vessel tracking and tracing (VTT). The implementation of automatic readings of safe clearances under bridges across the Oder River as part of the EMMA Extension project improved navigation safety in the area covered by the RIS system. Even though the investments were implemented in the Szczecin area, it will have an influence on the route planning for cross-border shipments and operations between the Polish and German inland waterway systems.

4 Finland: Implementing Smart Fairway in Saimaa

The project EMMA showed that central European RIS applications will not be the solution for Finnish IWT. Finnish systems used are VTS and smart fairway solutions and another system is not feasible to install. EMMA proved that functional extensions could support the increase of safety in navigation and simplify transport management solutions. The aim of the EMMA Extension pilot in Finland was thus to install a smart fairway solution in Saimaa.

As a part of the EMMA Extension project, 34 smart buoys were installed in the Saimaa deep fairway, which is Finland's most important inland waterway for commercial shipping. The implementation took place in class 2 fairway number 6795 in Haukivesi-Joensuu deep-water fairway section which is the fairway used for commercial shipping purposes and is connecting North Karelia to other inland waterway sections in the Saimaa area and to Saimaa Canal - which is the only link to the Baltic Sea area and Motorways of the Seas.

The technology inside the buoys produced at Meritaito's factory in Joensuu makes shipping safer and maintaining of fairway easier. Remote-controlled signs send information about, among other things, the functionality of the light and the condition of the power supply, and the actual location of the sign. All this information improves the navigability of the fairway and increases maritime safety.

The maintainer of the fairway receives information on the location of the buoys, which reduces the risk of an accident if ice or log bundles move the signs. In addition, the buoys communicate with each other, making it easier for ship pilots and captains to observe the fairway. Their lights are adjusted according to the lighting conditions, so they would not distract other traffic. Changing the lighting power of signs brings a whole new element to the development of fairways. Safety is enhanced in particular by the fact that the pilots and VTS centre can adjust the light output of beacons and the rhythm of lights in real time to support the navigation of vessels in poor visibility and weather conditions. When the ship arrives, the lighting can be enhanced. In future, these buoys might also function as 5G base stations.

In addition, modern technology reduces the carbon footprint, while location inspections of signs can be done more efficiently.

5 Germany: Extending Service Portfolio of Geofenced RIS Services

The software prototype ELIAS is the result of a long series of research and implementation projects in several different programmes, including the EMMA project. It builds on the technical basis of the RIS standards while at the same time generating a new user experience. Its goal is to maximize usability by collecting and combining distributed information and generating added value by applying modern data science techniques on the available data.

EMMA Extension partner, Institute of Shipping Economics and Logistics (ISL), and Lead Partner, Port of Hamburg Marketing (HHM), supported the Polish RIS pilot with technical knowledge and consultancy linked to common standardised interfaces to connect new

digitalised data services and functionalities to external systems like ELIAS, such as real-time data regarding bridge clearance. Regarding the Polish bridge clearance pilot, the interface between the actual bridge clearance service and ELIAS was implemented. This will enhance the capabilities of the ship operators and freight forwarders to carry out their route planning.

6 Sweden: New Fairway Simulation

The Swedish EMMA Extension activity on new fairway simulation testing the extended IWW area will be finished in June 2021. The Swedish Maritime Administration is directly involved in this activity and has high interests in the results. They will be used to potentially open a new IWT zone in Sweden and by that, enable new IWT business and logistic solutions in the area.
