IMPLEMENTATION OF RIS IN POLAND.
THE CURRENT STATE AND PLANS FOR FUTURE DEVELOPMENT

RIS is an instrument for the organisation and management of inland waterway transport. It is a service package in a broad meaning which makes use of modern technology in order to optimise traffic and transport flows. This system allows to increase the navigation safety and effectiveness by providing up-to-date information both to skippers – who based on it can make decisions concerning cruise parameters (e.g. velocity) – and to ship owners who can plan the use of their fleet more effectively. RIS also enhances the flow of information between the managers/supervisors of the waterway and its users, allowing for better enforcement of the law or gathering statistical data. It facilitates calculating port charges and charges for the use of waterways. The aim of this article is to discuss the process of RIS implementation in Poland and to present how it may be developed.

INTRODUCTION

Inland navigation is one of the most neglected branches of transport in Poland. Despite its undeniable advantages, such as the capability to transport goods of considerable mass and volume, the lowest transport cost for an individual item, minor impact on natural environment and therefore low external costs, inland navigation does not play a significant role in transport business in Poland.

It results first and foremost from the appallingly bad technical condition of the waterway infrastructure, whose maintenance has not been conducted or financed properly for decades. To support this claim, one can refer to the fact that in the period of 1945-1948, when the damages to the waterways caused by the second world war had been repaired, more investment works had been done than during the following 60 years \[1\].

Moreover, inland navigation has undergone great metamorphoses in the meantime and it no longer consists only in the physical ability to transport goods from one point to another. Transport has become a link in a logistics chain, with its complex system of mutual connections between many subjects.

Modern logistic transport management requires therefore constant exchange of information between the many partners and operators in the logistics chain. The use of state-of-the-art technologies allows for better organisation and management of the transport on inland waterways and for the optimisation of the use of existing infrastructure and fleet.

One of the key technologies enhancing the attractiveness of water transport and enabling its fuller integration with other links of intermodal transport is the system of harmonised River Information Services (RIS).

1. PILOT IMPLEMENTATION ON THE LOWER ODER RIS

The necessity to have the harmonised river information services implemented by the end of 2013 arises from the provisions of Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005. By virtue of this directive, EU member states were obliged to adapt the RIS system on all waterways belonging to class IV (or higher), if they are connected to other waterways of the same class. In Poland, only the lower part of the Oder river meets these standards and hence the implementation of the RIS system was required \[2,3,4\].

Optionally, member states may also implement the system on other waterways if they consider it justified. Polish authorities decided to implement the RIS system only on the obligatory part in the first stage and extend this area at a later time.

According to the Act of 10 Jun 2011 amending the act on inland navigation and the act amending the act on inland navigation (Journal of Laws Dz. U. 2011 No 168, item 1003), the entity responsible for the implementation of the RIS system in Poland is the Inland Navigation Office in Szczecin, which is an administrative unit reporting to the minister responsible for transport.

The first stage of RIS implementation in Poland was carried out as part of the project "Pilot Implementation on the Lower Oder RIS" co-financed by the TEN-T fund [No 2010-PL-70206-P], on the basis of the Commission Decision of 10 Dec 2012 No C(2012)9020 and assumed that the RIS system will be implemented on the minimum level required by Directive 2005/44/EC of the European Parliament.

According to the Commission Decision of 28 Jun 2011 No K(2011)4564, Pilot implementation on the Lower Oder RIS was divided into three tasks:

1. Task 1 – the preparation of a feasibility study and the functional and utility programme for the pilot implementation on the Lower Oder RIS,
2. Task 2 – the pilot implementation on the Lower Oder RIS, including the construction of the RIS Centre,
3. Task 3 – verification of the pilot implementation on the Lower Oder RIS.

Under Task 1 the feasibility study for the pilot implementation on the Lower Oder RIS was prepared in 2011 and the functional and utility study was prepared in 2012. Both documents constituted the basis for designing and constructing the RIS system in Poland.

Task 2, i.e. the design and construction of the RIS system, was divided into 3 stages:

1. The construction of an inspection and measurement ship, along with necessary equipment to carry out bathymetric measurements.
2. The delivery of vital equipment, including CCTV system components, hydro-meteorological sensors, radars, server along with telephone exchange, multibeam echo sounder along with independent RTK GPS/DGPS positioning system, satellite com-
pass and specialist hydrographic software, VHF base stations, AIS base stations, specialist GIS software for the creation of Inland ENC and kits for the analysis of the radio spectrum and personal computers.

3. The pilot implementation on the Lower Oder RIS, as part of which the general contractor designed communications system and the installation of devices in locations pointed to in the Functional and Utility Programme, adapted offices for the purposes of the RIS Centre, installed all essential system components and integrated hardware and software.

The last stage of the RIS implementation in Poland consisted in carrying out an external audit whose aim was to verify whether the project had been carried out properly and whether it had met its objectives.

2. THE AREA COVERED BY THE RIS SYSTEM

The following waterways, beginning in the south in the town of Ognica and ending in the north at the border with the internal waters, have been part of the pilot implementation:
1. Lake Dąbie to the border with the internal waters – 9.5 km long
2. The Oder river from the town of Ognica to the Klucz-Ustowo Cutting and then as the Regalka river to Lake Dąbie – 44.6 km long

3. The West Oder river:
   a. From the weir in the town of Widuchowa (at the 704.1 km of the Oder river) to the border with the internal waters, together with side branches – 33.6 km long
   b. Klucz-Ustowo Cutting, joining the East Oder river with the West Oder river – 2.7 km long
   c. The Parnica River and Parnicki Cutting from the West Oder river to the border with the internal waters - 6.9 km long.

One should underscore that the northern section of the Oder river, from the port of Szczecin to the mouth of the Baltic Sea constitute inland maritime waters and therefore is managed with the use of Vessel Traffic System (VTS).

3. THE ELEMENTS OF THE RIS SYSTEM IN POLAND

The basic communication takes place between the RIS Centre, where the system operators gather information from various public institutions (such as Regional Water Management Authority or Institute of Meteorology and Water Management), waterways users (e.g. skippers) and system devices (water gauges, cameras, radars, hydro-meteorological stations), and skippers. Additionally, after further analysis, the information may be forwarded to:
- transport companies/ship owners – in order to increase the effectiveness of fleet management,
- freight forwarders – to facilitate the planning of goods transport, including intermodal transport,
- offices supervising the maintenance and modernisation of waterways (e.g. Regional Water Management Authority) – in order to plan necessary maintenance works and the development of the system and calculating charges for the use of the waterway,
- anti-crisis management centres – in order to coordinate rescue operations,
- the police – in order to enhance the enforcement of the law and help with planning rescue operations and chases,
- port, marina and terminal managers – in order to optimise the use of parking/mooring space and to calculate port charges,
- fire brigades – to coordinate rescue operations,
- border guards – in order to plan the controls of ships and their crews,
- Central Statistical Office – as an additional source of information, e.g. on traffic flows.

The RIS system in Poland is based on the following technical solutions:
1. Automatic Identification System (AIS), which consists of two base stations, located in the northern (Grain Silo Ewa) and southern (Widuchowa weir) part of the area covered by the actions of the RIS Centre.
2. CCTV system, which consists of 34 cameras (including 3 PTZ cameras with the possibility to zoom in and zoom out), installed in the most crucial places. The cameras have been installed at the entry and the exit of the RIS-controlled area. Since in Poland there is no obligation to have the AIS installed, those cameras are the main source of information on vessels entering the RIS-controlled area. Moreover, the cameras have been installed in all locations identified as potentially dangerous, i.e. at bridges and river bifurcations.
3. System of radars, which were installed as an additional source of information about vessel traffic on particularly dangerous sections of the rivers. As part of the pilot implementation, 12 short-range observation radars of low radio waves emission have been installed at bridges.
4. A system of meteorological sensors, which consists of 4 devices. They allow to monitor wind speed and direction, the amount and intensity of precipitation, temperature, atmospheric pressure. This information is presented on the information portal of the Inland Navigation Office in Szczecin and is archived, which will allow specialist analysis in the future.
5. A system of hydrological sensors, which consists of 1 microwave wave gauge measuring water levels. When these values are compared to reference values, it is possible to calculate very precisely vertical clearances below bridges, which constitute the main obstacle in inland navigation on the Lower Oder.
6. Differential global positioning system (DGPS), which allows to localise vessels with the accuracy of a few centimetres.
7. VHF communication system, which enables voice communication between skippers and RIS operators on the entire RIS area in Poland.
8. Internet information portal of the Inland Navigation Office in Szczecin, (www.szczecin.uzs.gov.pl), where one may find all information concerning waterways, conditions of navigation and current provisions. All RIS user may also download current electronic navigational charts for free.

The table below presents the location of sensors on the Lower Oder RIS.

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<th>Tab. 1 Sensor location on the Lower Oder RIS</th>
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The RIS system in Poland consists of the following elements:

- **Inland Electronic Navigational Charts [Inland ENC]**, which are created in the highest, currently binding standard 2.3 and are available freely on the website. The Polish RIS Centre has at its disposal the entire production and distribution line for electronic navigational charts, including a measurement and inspection vessel equipped with a multibeam echo sounder and necessary software to carry out bathymetric measurements. Charts are updated as needed and their validity (e.g. the location of navigation beacons) is revised by RIS operators at least once every month.

- **Notices to Skippers – NtS**, which provide information about traffic and waterways, water levels, weather reports, and in winter – ice reports. The information is prepared in Poland by Regional Water Management Authority, which according to the act, is responsible for ensuring the maintenance of beds of natural watercourses and canals and for regulating water levels.

- **Vessel Tracking and Tracing – VTT**, which is used for constant monitoring of water traffic and transferring information to appropriate institutions and agencies. In Poland skippers make decisions concerning navigation independently, therefore RIS operators may not give navigation orders or recommendations.

- **Electronic Reporting International (ERI)** – which is currently being tested. This system, thanks to a special application, allows skippers to report their journeys and provide information required by law (e.g. on the crew, goods carried, destination port, etc.). It is considered that in the future all vessels will have to report electronically before they enter the RIS-controlled area.

4. PLANS FOR THE FUTURE – FULL IMPLEMENTATION ON THE LOWER ODER RIS

Inland Navigation Office in Szczecin is currently working on the development of the RIS system in Poland. It is planned that by the end of 2019 the area covered by the RIS system will have been enlarged and new services will be available for users.

The system will be created on the basis of the existing pilot implementation by supplementing it with further software and hardware modules and also further sensors.

The full implementation assumes that the system will be developed by adding the following elements:

- monitoring of navigation beacons with the use of AIS;
- water level predictions;
- legal bulletin;
- journey planning instruments;
- instruments enabling the harmonisation of the actions of emergency services in the RIS-controlled area;
- full equipment, programme and procedural integration with the marine VTS Szczecin system;
- multi-sensor data fusion;
- reports on incidents and accidents in the RIS-controlled area;
- increasing the system’s functionality regarding the protection of natural environment;

In further stages of the RIS implementation in Poland it is also possible to propose a programme of subsidising DGPS receivers, Inland AIS and Inland ECDIS software for ship owners.

Three territorial variants of full RIS implementation have been developed:

1. The area covered by the RIS system will be enlarged by the section from the town of Ognica to the town of Hohensaaten, i.e. by 30 km to the south. It would allow the creation of a functional communication system which would connect the marine port in Szczecin via an inland port in Berlin with inland waterways in Europe.

2. The area covered by the RIS system will be enlarged by the whole lower section of the Oder, i.e. from the town of Kostrzyn to the town of Ognica.

3. The area covered by the RIS system will be enlarged by the whole border section of the Oder, from the mouth of the Lusatian Neisse, i.e. at the 542.4 km of the river, to the town of Ognica.
CONCLUSION

Due to its characteristics and Poland’s geographical location, inland navigation should be a preferred means of goods transport, especially mass transport. However, decades of underfunding have caused technical dilapidation of waterways and port infrastructure. River Information Services, with their relatively low implementation costs, may help improve transport via inland waterways and allow to fully use current navigation conditions.

It is too early to fully evaluate the potential of this new technology and analyse all benefits coming from its implementation. [5] However, all analyses published so far show indisputably that river information services bring considerable macroeconomic profits. It is therefore essential for Poland to continue the development of the RIS system and to join the internationally harmonised RIS implementation in Europe and research on the future of river information services in the EU.

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Wdrożenie RIS w Polsce. Obecny stan i plany rozwoju

RIS jest instrumentem zarządzania transportem śródlądowym. W szerokim rozumieniu jest to pakiet usług, który ma zastosowanie w nowoczesnych technologiach jak optymalizacja przepływu ruchu i transportu. System ten pozwala na zwiększenie bezpieczeństwa i skuteczności nawiązania poprzez dostarczanie aktualnych informacji zarówno dla kapitanów - którzy bazując na nim mogą podejmować decyzje dotyczące parametrów podróży (np. prędkości) - oraz armatorów, którzy mogą planować wykorzystanie floty bardziej efektywnie. RIS poprawia również przepływ informacji pomiędzy zarządzającymi drogą wodną a jej użytkownikami, co pozwala na lepsze egzekwowanie prawa, czy gromadzenie danych statystycznych. RIS usprawnia także naliczanie opłat portowych i opłat za korzystanie z dróg wodnych. Celem niniejszego artykułu jest omówienie procesu wdrażania systemu RIS w Polsce oraz przedstawienie kierunków i możliwości jego rozwoju.

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