RIVER INFORMATION SERVICES (RIS) IN GERMANY

by

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ABSTRACT

Since the first initiatives of the European Commission on River Information Services, this framework on information exchange to support traffic and transport management in inland navigation, has found its way throughout the world.

The PIANC RIS Guidelines are the basis for the RIS Guidelines as formally accepted by the Central Commission for the Navigation of the Rhine (CCNR) and the European Commission. The CCNR has been supporting the development of the technical standards to this day. Since 2005 the development of the technical aspects of River Information Services has been regulated by the European Commission.

River information Services were formally recognized as a concept for harmonized information services to support traffic and transport management in inland navigation, including interfaces to other transport modes.

The added value of River Information Services has found recognition throughout the world.

The standards of Inland ECDIS, Electronical Ship Reporting, Vessel Tracking and Tracing and Notices to skippers were published and the expert groups have been working on them to improve them and to develop new aspects for next versions.

Traffic and transport management in a transport corridor requires an integrated network-approach where the information services to the users are an interactive part of voyage and traffic planning processes. RIS enabled corridor management as support to transport management is becoming more and more an essential and explicit part of RIS.

The last years were very busy. So it is interesting to give a report of the status of RIS in Germany, about what happened in the last years, what is on-going, and which strategy is followed concerning RIS in the future.

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1. INTRODUCTION

River information services (RIS) is a collective term for a bundle of services: fairway information services, traffic information and traffic management information, informations support of accident management, transport-related services as well as services for waterway and port charges. Different RIS functions and sometimes also RIS sub-functions are available for the individual services. RIS can be implemented according to needs and resources. It is equally possible to realize only single RIS functions or sub-functions available as well as entire services.

Different RIS can be implemented on the basis of a number of existing RIS systems. Such systems are visual or radar reflecting navigation signals, light signals, mobile radio (voice and data), GNSS for ship positioning, VHF radio, internet, ship- or shore-based radar installations, shore-based CCTV cameras, electronic navigational charts (IENC), ship reporting systems or inland waterways tracking and tracing systems (Inland AIS).

Our presentation will give an overview of the actual RIS projects and our future strategy:

- Implementation of AIS at the main waterways of the German inland waterway network and examples of the use of Inland AIS on board at vessels as well as off shore applications
- Pilot lock management and implementation at the main waterways
- ELWIS (Electronic Waterway Information Service), the internet-based fairway information portal of the German Waterways and Shipping Administration
- Safety of Navigation, improved by Inland AIS AtoN
- Prospects for the near future

2. ACTUAL RIS PROJECTS

2.1 Implementation of AIS infrastructure

Following the developments in maritime navigation Europe developed the so called Inland AIS which serves the specific needs for inland navigation while preserving interoperability with maritime AIS. European waterway and shipping authorities in close cooperation with the river commissions are now preparing the mandatory carriage requirement for Inland AIS on European inland waterways or have already introduced the appropriate regulations in their waterways.

Since December 2016 the use of Inland AIS and Inland ECDIS is mandatory for all waterways of class IV and above as well as for selected waterways of class III in Germany. This onboard equipment enables the mutual recognition, identification and display of nearby vessels and their course on an electronic navigational chart. The use of these systems supports onboard navigation and diminishes the risk of accidents; thus, it enhances safety and ease the navigation and contributes to the efficiency and attractiveness of inland navigation.

In recent years, the Federal Waterways and Shipping Administration has set up additional shore-based AIS infrastructure along selected waterways. Today, a total of 3600 km of federal inland waterways are covered by shore-based AIS infrastructure.

In parallel with physically setting up infrastructure, the legislation procedure to adopt the legal basis for processing AIS data entered into force with the adoption of the 3rd amendment to the Inland Shipping (Federal Competences) Act on 5th May 2017.

2.2 Pilot lock management and implementation on the main waterways

To ensure a speedy lock operation, the locking operations should be optimized by minimizing the waiting time for vessels. Therefore it is a necessity to have e.g. an overview about the position of vessels and their sailing directions. Starting from the question of an optimal sequence for a special lock on e.g. the Danube, this question should be expanded to a chain of locks on the Danube. An existing electronic transport diary is intended to be further developed. The aim of this project is to develop a new concept for lock management with an electronic traffic diary using the inland AIS equipment and perform the testing and implementation of the Danube by the middle of 2018. Main task in the development was the usage of AIS data, such as position reports, vessel details. As a consequence the documentation gets more reliable and uninfected. Statistic output is simplified and standardized. The traffic diary is an official document and must be treated accordingly. This pilot should be applied to all other locks on federal inland waterways after its validation.

2.3 ELWIS (Electronic Waterway Information System)

ELWIS (Electronic Waterway Information System) has been the internet-based fairway information portal of the German Waterways and Shipping Administration since 1999. Back then, the service was designed to provide traffic-related information to skippers sailing on inland waterways in order to enhance safety, to ease of inland navigation, and to support voyage planning.

ELWIS is accepted and widely used in the shipping sector **(**see **Figure 1)**.

In 2017, 38 million pages were opened in ELWIS.

ELWIS-ABO is a special additional service that provides subscription-based information. Subscribers must register for this service and specify which kind of information they want to receive (such as water levels at certain gauges, high water/low water forecasts, notices to skippers, or ice reports) and choose a delivery method (email or text message). Information can be received automatically or

based on incidents. In 2017, more than 4.4 million emails were sent via ELWIS subscriptions. The availability of the system in 2017 was 99.96 %.

Since 2011, several improvements have been implemented. At the moment, a route- and chart-based search function is under way.

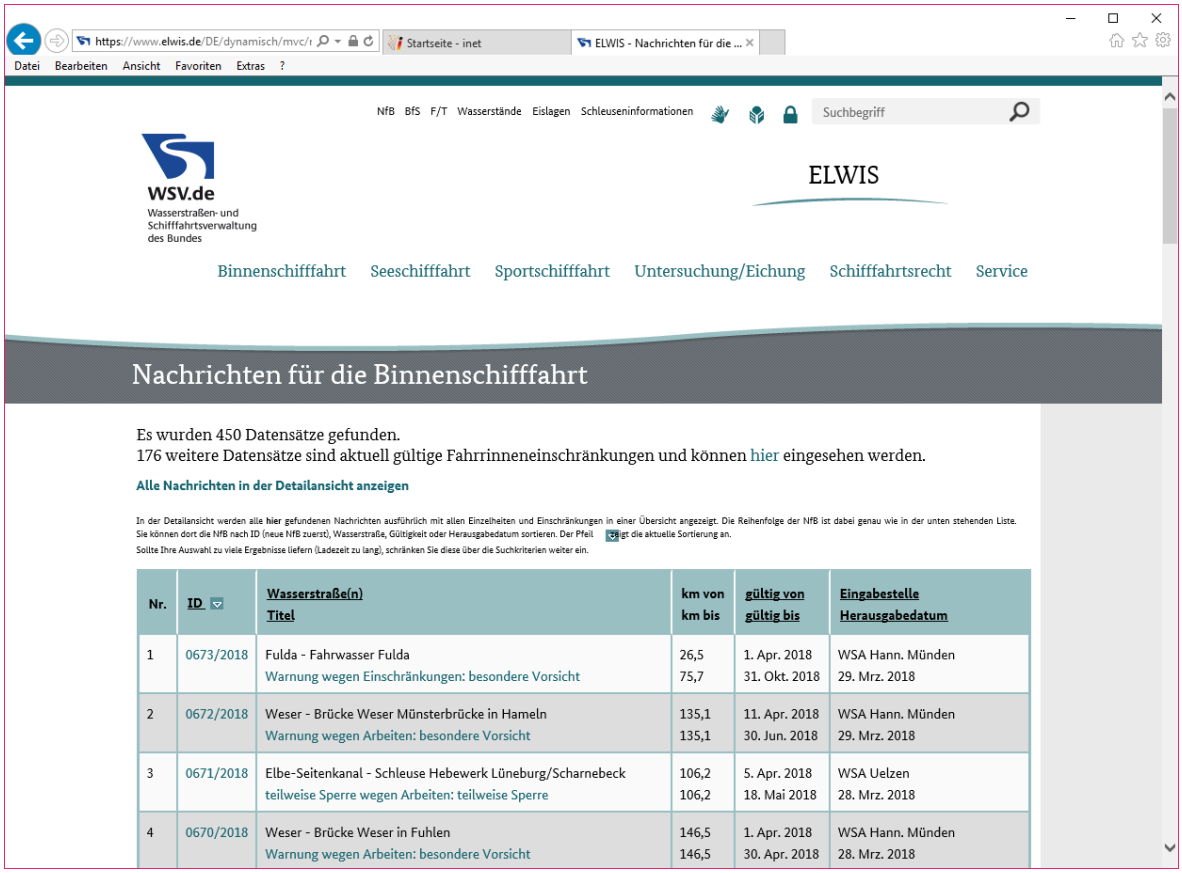

Figure 1: **ELWIS – Example of a message overview list for inland navigation**

2.4 Safety of Navigation, improved by Inland AIS AtoN messages

AIS AtoN and Inland ECDIS are suitable technical standards to improve safety of navigation. All the more when these standards are used in combined applications.

Several concrete reference applications on the “Elbe-Weser” corridor, started within the frame of the RIS COMEX project. They will be installed and field tested. Both types of AIS AtoN, the “Real AIS AtoN” and “Virtual AIS AtoN” will be used for specific AIS AtoN messages.

The aim is to inform about the current situations and to visualize it in the Inland ECDIS chart on board of the vessels.

An indicated dangerous situation or a specific recommendation can support safety of navigation. In the “Elbe-Weser” corridor we plan to realize:

- Recommended tracks in specific shallow sections with frequent changes of the river bed, provided by virtual Inland AIS AtoN line messages (see **Figure 2**)

- Indication of a virtual caution area while a ferry (especially a cable ferry) is crossing (shown in **Figure 3**)
- Indication of currently limited vertical clearance under bridges (depending on water level) (see **Figure 4**)
- Indication of the current switching status of signals by the use of application specific messages (**Figure 5** shows an example)

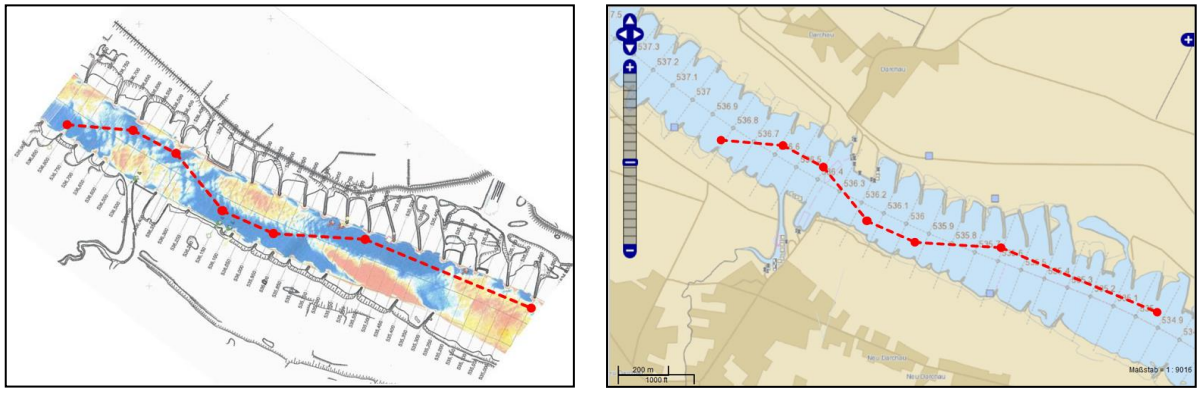

Figure 2: ***Construction of a recommended track, visualized in Inland ECDIS***

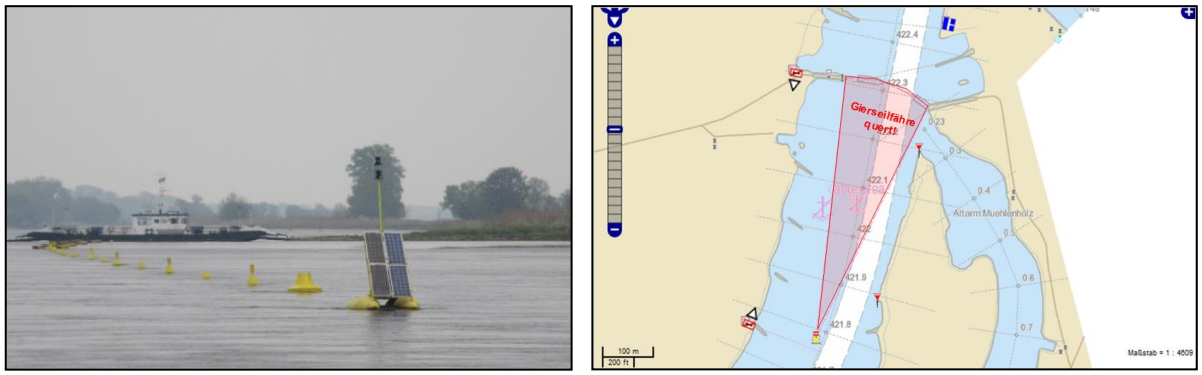

Figure 3: ***Cable ferry at the river Elbe, virtual caution area while the ferry is crossing***

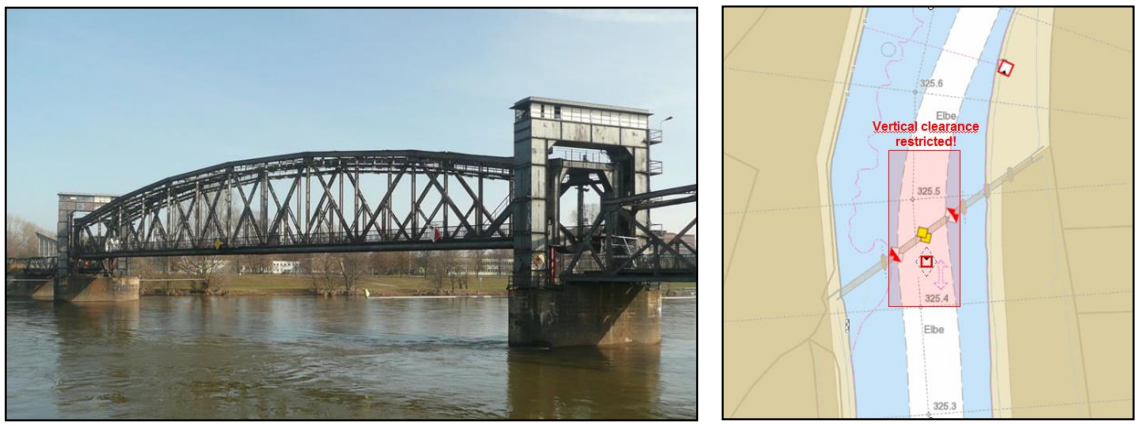

Figure 4: ***Bridge at the river Elbe, virtual caution area is indicating low vertical clearance***

Figure 5: ***Current switching status of signals, visualized in Inland ECDIS***

We invest about 900.000 euro for:

- Extending the existing AIS land infrastructure and realizing the specific AIS AtoN messages for broadcasting (Overview map in **Figure 6**)
- Amending the already existing working environment for managing, providing and monitoring AIS AtoNs in the corridor (System components of the technical infrastructure in **Figure 7**)
- Amending the Inland ECDIS systems in cooperation with the Inland ECDIS manufacturers to receive AIS AtoN messages and visualize them in the system on board
- To test efficiency and effectivity of providing information via incremental IENC updates to the users
- To provide additional the AIS AtoN information via a Web Map Service to reach pleasure craft users who are not legally obligated to use Inland ECDIS on board.

The project is co-financed by the European Union.

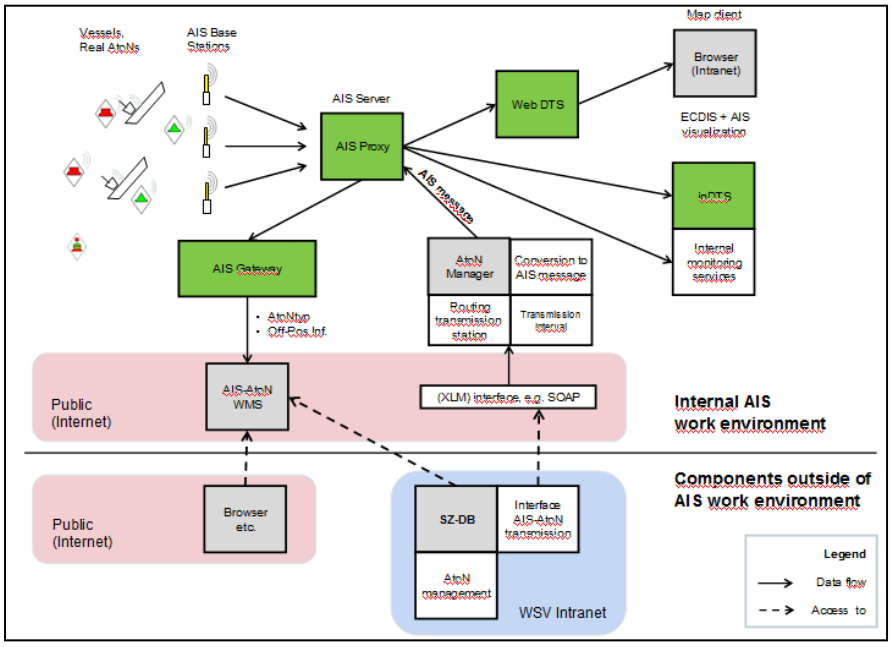

Figure 7: ***AIS data management and AIS services***

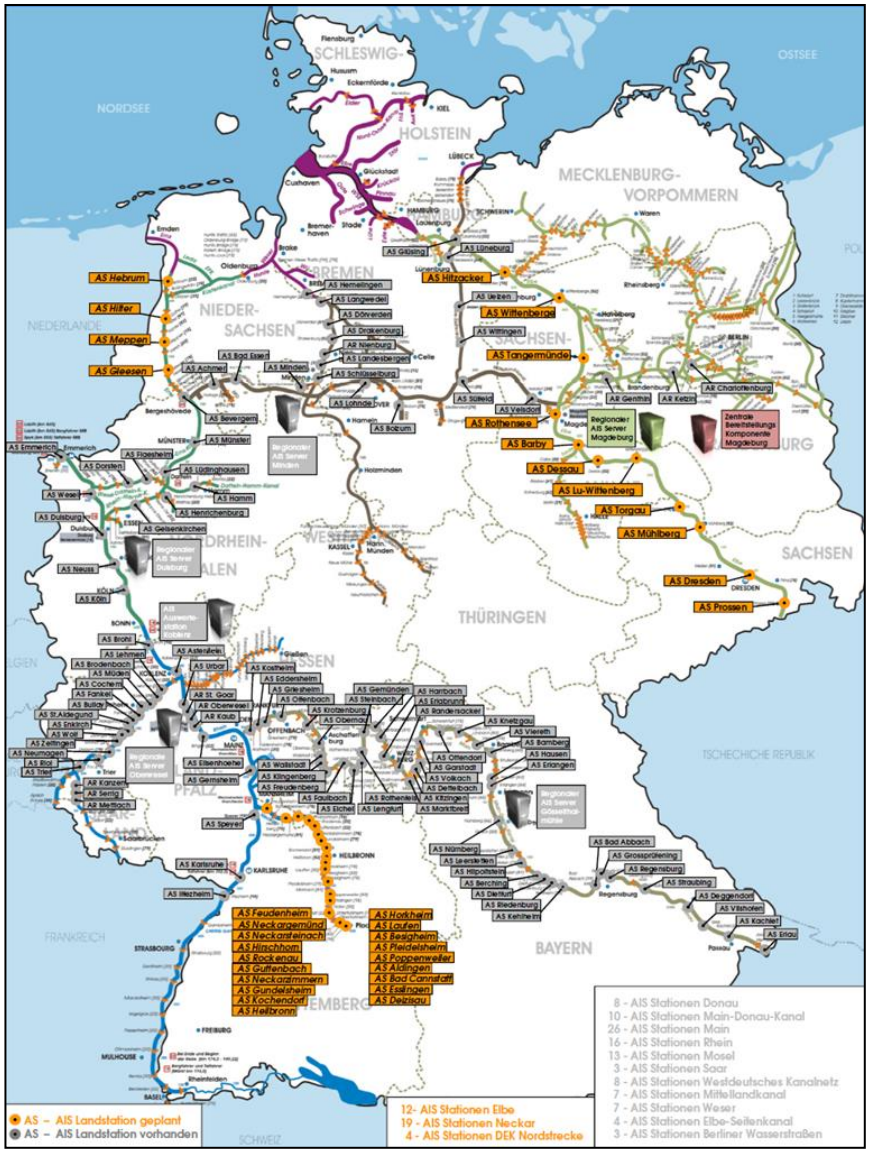

Figure 6: ***AIS land infrastructure in Germany***

3. Prospects for the near future and our strategy

Currently, project work is ongoing to develop a successor to today's reporting and information system, known as MIB and MIB II+.

Particular attention will have to be paid to the efficient use of data. A European RIS concept and a RIS Masterplan will be designed and implemented within the RIS COMEX project in accordance with the specific needs of waterway corridor sections.

New important challenges are automated navigation and digital test fields.

Nowadays, automated navigation covers a very wide range of technical solutions and use cases - ranging from simple navigation assistance to fully automated navigation.

As with maritime or road transport, technological developments aim at automated navigation in inland navigation. Inland navigation international projects, such as LAESSI (Control and Assistance Systems to Enhance the Safety of Navigation in Inland Waterways) is to support the skipper in his tasks of guiding the vessel and thus make inland shipping safer and also more efficient. Beyond evaluating the technical capabilities and associated advantages / disadvantages, implementing demonstrators should enable to gain experience.

Hence the Federal Ministry of Transport and Digital Infrastructure and the City of Hamburg are heading for jointly implementing a digital test field in the port of Hamburg.

Objectives are:

- improvement of infrastructure of the port of Hamburg
- optimal use of transport carriers
- increased digital connection of intermodal supply chains

The existing smart PORT system will offer an appropriate basis for the pilot implementation.

Further initiatives are foreseen on inland waterways.

Unlike other modes of transport, no international definition of automation levels in inland navigation is currently available. First proposals have been presented by the CCNR.

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