‘CONVENTION
FOR
WASTE MANAGEMENT FOR INLAND NAVIGATION ON
THE DANUBE’

Compiled report RIS and ship waste management along the Danube

Work Package 3: Ship Waste System Development

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1 SCOPE OF DOCUMENT

This document is created based on the inputs provided by project partners participating in this Activity. The aim of this report is to indicate possibilities for using River Information Services as a support for improved waste management on the Danube. In the past years River Information Services and their respective implementations and deployment along the Danube River have created the new added value in terms of supporting navigation and related processes. River Information Services and ICT systems behind it are now offering quite sophisticated level of somewhat is considered to be intelligent transport infrastructure. Idea of deployment existing systems and available ICT infrastructure in order to improve waste management on the Danube seems to be very realistic and justified. It has to be considered that RIS as it is known today will not solve the problems related to the waste management, but can be utilized in the way that will lead to more efficient deployment, utilization and control within the processes related to the waste management.

This compiled report should indicate technologies, services and corresponding systems which have to be taken into account when improved waste management on the Danube is considered. The Report shall be considered also as input for pilot activities within Co-Wanda Project, as well as for preparation of guidelines for integration of RIS into International Ship Waste Management Convention.
2 SUMMARY

This report will describe how RIS based services and related systems and technologies on which they are based can be applied on the Danube. Report shall provide overall description, regardless of certain differences in between the countries and their RIS implementations and ideas of potential RIS usage. This Report can be considered as description of minimum definition of RIS based services that can be used for improved waste management on the Danube. It should also provide clear indication how these services can be used and ideas of further extension of the RIS based services.
3 IMPLEMENTATION STATUS OF RIS IN THE DANUBE REGION

3.1 STATUS OF IMPLEMENTATION

This chapter shall provide insight in the current state of affairs regarding the implementation status of RIS Services in Austria, Slovakia, Hungary, Croatia, Serbia, Romania and Bulgaria. The content of the chapter is adopted towards needs and in relation to the purpose of explaining relevance of described services and systems for ship waste management purposes and it might differ per country.

3.1.1 Status of RIS implementation in Austria

Availability & coverage of AIS technologies

In Austria the availability of seamless AIS infrastructure is since 2005 to 100 percent ensured. The transmission of dGPS (differential global positioning systems) for improved position accuracy and actual water level information from shorebased infrastructure via Inland AIS is also fully operational. Until 06/2013 the full international data exchange of AIS information is planned. Until 2011 450 transponders were provided to vessels by via donau in the course of an equipment programme.

The entire Austrian Danube is covered by Inland AIS infrastructure by means of 23 Inland AIS base stations along the Austrian Danube also covering the Danube Canal in Vienna. The base stations, located in Vienna are receiving AIS data of Inland AIS transponders on board of the vessels and are forwarding the data to the national RIS Centre where it is stored and made available for various RIS services considering data protection rules and access rights.

The following services are implemented and provided based on the Austrian T&T system:
- Provision of vessel tracks in case of investigations of an accident (on demand if confirmed by the Supreme Navigation Authority\textsuperscript{1})
- Landing / departing service: calculation of demurrage based on time at berths
- Provision of additional information via the Inland AIS base stations (e.g. water levels)
- Provision of vessel position data for data requests by authorised governmental and logistics stakeholders based on access rights

Not yet available but in preparation (currently available in test environment) is the transmission of the status of light signals and the exchange of estimated times of arrival / request times of arrival (ETA/RTA) information. Furthermore, the transmission of safety related messages (NOT\_Emergency.xml) and the exchange of data on convoy information and number of barges is currently under development via pilots within the IRIS Europe Initiative (via donau, 2011).

**Availability & coverage of Inland ENCs**

For the display of electronic inland navigation charts and additional information the RIS application ECDIS is of important use, contributing to make inland navigation safer and more efficient and thus also protecting the environment. As sources for charts surveys and aerial photographs are used.

Inland Electronical Navigational Charts (ENCs) are available for the entire Austrian Danube based on Inland ECDIS standard 2.1 and contain waterlevel & depth information (also for critical stretches e.g. free flowing sections). The Version 2.0 and 2.1 of the Inland ECDIS Standard can be downloaded free of charge from the website http://www.ris.eu/documents/ecdis.

\footnote{Austrian Supreme Navigation Authority of the Federal Ministry for Transport, Innovation and Technology = „Oberste Schifffahrtsbehörde“}
Inland ECNs of Austria are produced by via donau and shipping police data (waterway signs like boys, notice marks) are added by the Austrian Supreme Navigation Authority. The information is displayed on the homepage of the RIS service provider and free of charge for fairway users and software companies: www.doris.bmvit.gv.at. Updates are produced and published regularly. Depth data are contained for the entire Austrian Danube and updates done every 6 months in the critical sections. Waterlevel information can also be given via AIS in form of metric values. A full coverage of ENC exists in Austria since 2010. The provision of electronic charts to the RIS portal is currently tested via pilot tests.

Furthermore, based on the former D4D (Data Warehouse for Danube Waterways) EU project and the follow-up EU project NEWADA (Network of Danube Waterway Administrations - www.newada.eu) a special web portal (www.d4d-portal.info) has been developed providing ENCs free of charge—the Inland ENC Web Portal. The charts, which can be also shown without ECDIS viewer contain data supplied by the Austrian Federal Office of Metrology and Surveying (FOMS) and via donau and are updated continuously.

**Availability and Functionalities of Notices to Skippers**

Notices to Skippers (NtS) are a tool to inform about the status of the inland waterway infrastructure (e.g. bridges and locks), failures of aids to navigation, temporarily blockages of waterway sections or other types of infrastructure works, water level and water depth information, ice information and weather messages.

Notices to skippers are provided in a standardized data format, which can be both distributed via email and internet and are published in several formats (e.g. XML format, pdf file etc.).

Since March 2011 enhanced NtS applications based on the latest standards are in operation. They provide the following messages via a graphical web user interface or e-mail subscription:

- Fairway & traffic messages (FTM) – fully operational
- Water level related messages (WRM) – fully operational
• Ice messages (ICEM, EICEM, WEICEM) – fully operational

• Overview on fairway information (FWI) – fully operational

• International NtS - in pilot operation

• Weather Related Messages (WERM) – no activities planned (data exchange in pilot operation between SK, DE and AT)

Also the usability has been improved, providing an email subscription service, web search mask & display as well as an editor web interface. The international exchange of NtS in Austria is currently in Pilot Operation with Germany and Slovakia, so the related NtS can also be displayed within the Austrian NtS Service. NtS of other countries are referenced by related links.

NtS are published by the Austrian Supreme Navigation Authority and by via donau (http://nts.doris.bmvit.gv.at/) in different formats (code format for all messages are fully operational) that are available in 24 languages. Skippers are obliged to be informed about actual valid NtS, as these are considered as binding navigation rules.

Availability of ERI Services

The ‘Standard for Electronic Ship Reporting in Inland Navigation’ describes the messages, data items and codes to be used in electronic ship reporting for the different services of RIS in order to simplify controls and make procedures more transparent.

Several types of messages exist. In the field of ship waste management the following messages should be investigated regarding their potential use in waste management procedures.

• **ERI notification message (ERINOT):** ERINOT can be used for the reporting of voyage related information and of information on dangerous and non-dangerous cargo carried on-board vessels sailing on inland waterways. The ERINOT message is based on the Commission Regulation (EU) No 164/2010 and encompasses the following types:
o transport notification from vessel to authority (identifier "VES"), from ship to shore;
o transport notification from carrier to authority (identifier "CAR"), from shore to shore;
o passage notification (identifier "PAS"), from authority to authority.

- Berth Management message (BERMAN): The Berth Management (BERMAN) message combines the pre-arrival notification respectively general declaration into one single notification which is based on the Commission Regulation (EU) No 164/2010. The BERMAN message shall be sent by vessels sailing on inland waterways before arriving at or departing from a berth or a port and provides information about the time of arrival and the services required to ensure a prompt handling, to support procedures and to facilitate controls. The exchange of ERINOT information is already included in the pilot implementation phase in the framework of the international RIS data exchange (IRIS Europe I and II projects).

- Waste disposal information message (WASDIS): WASDIS is a message to convey information on last inspection and/or on waste and cargo residues on board of a vessel and/or equipment related to a means of transport. Furthermore it also includes information what still has to be disposed in the next place or port of call. This Waste disposal information message may be used for both national and international applications and has been designed to enable control of pollution caused by an activity of transport.

In Austria national ERI infrastructure is implemented and in test operation providing the possibility for skippers and fleet managers to submit their obligatory reports on dangerous cargo transports electronically by means of the ERINOT message (instead of fax reporting which is done so far). Furthermore also the ERIRSP message, the answering message for all ERI-notifications (ERINOT, BERMAN, PAXLST, WASDIS, etc.) is in operation in Austria.

A graphical web user interface, part of the DORIS portal allows fast creation of ERI report and submission to relevant authorities including notification to the next country along the route.
Furthermore an interface to the reporting application ‘BICS’, which can be installed on board the vessels on a PC or Laptop is implemented and allows sending / receiving of ERI reports also via this application which is widely used by Dutch skippers.

In Austria full operation is planned to be started in the course of the year 2013.

**Other available services**

- Electronic lock management is implemented on the 9 locks along the Austrian Danube enabling a more efficient planning and documentation of lock procedures

- The DoRIS Portal provides a series of functionalities and information for authorised users based on a role based access rights mechanism, like request of AIS and ERI data, provision and view of emergency reports, managing (creation, submission, etc.) ERI reports, etc. The DoRIS portal is currently in test operation and full operation is expected to be started in the course of the year 2013.

- Access points for limited wireless internet connection to access RIS web-based services are available at lock Freudenau and Abwinden.

- Several services for logistics stakeholders combining relevant information like estimated time of arrival, cargo information, etc. are in test operation at the moment.

- Furthermore a series of Value Added Services are provided to different stakeholders based on existing information out of RIS infrastructure and services.
3.1.2 Status of RIS implementation in Slovakia

The Implementation of RIS is realized on the territory of the Slovak Republic on the river Danube. Currently, it is in pilot operation. The pilot implementation has been done in IRIS Europe I and IRIS Europe II projects where the basic infrastructure for RIS (the key RIS technologies – VTT, NtS, and ERI) was implemented and put into pilot operation. The system is called “SlovRIS” (http://www.slovris.sk/).

RIS in the Slovak Republic are provided by the State Navigation Administration (Štátna plavebná správa, SPS).

RIS implementation in the Slovak Republic considers following:

**AIS network and details on AIS based Tracking and Tracing systems**

The infrastructure for vessel Tracking and Tracing, based on Inland AIS, is operational on the river Danube. The network consists of four AIS base stations located in Bratislava, Gabčíkovo, Komárno and Štúrovo. It covers the river Danube from r.km 1880,2 to r.km 1708,2, including the border sections of Austria and Hungary, and the national Slovak section of the Gabčíkovo derivation canal. The AIS data are transmitted from the base stations to the central server in the RIS centre in Bratislava which stores the data (for 30 days) and distributes it to other RIS systems and applications.

The system provides static and dynamic data of vessels equipped with AIS transponders. Currently there is no legal obligation for vessels to have AIS transponder installed onboard in the Slovak Republic, however it shall come into force in the upcoming months.

The data are available for users registered in the RIS system. The users can see real-time or historical traffic image displayed either on ENC in an Inland ECDIS viewer or in web application using the Google maps. The system complies with the relevant international standards and regulations for Inland AIS and Vessel Tracking and Tracing, i.e. the EC Regulation No. 415/2007 as amended.
Availability and coverage of Inland ENCs

The Electronic Navigational Charts (ENCs) are available for the river Danube from r.km 1880,2 to rkm 1708,2, including the border sections of Austria and Hungary, and the national Slovak section of the Gabčíkovo derivation canal. The charts are produced by the Slovak Water Management Enterprise (Slovenský vodhospodársky podnik, SVP) and are available for free (for non-commercial purposes) on the SVP website (http://wwwsvp.sk/dunaj/default.asp?id=45&mnu=45).

The ENCs comply with the Inland ECDIS standard, version 1.02.

NtS Service

Notices to Skippers (NtS) are operational and available on the website http://nts-pilot.slovris.sk. The service is implemented in line with the latest version of the NtS standard (proposed amendment of the EC Regulation No. 416/2007). It uses XSD v3.0. Supported types of NtS messages are:

- Fairway and traffic related messages (FTM)
- Water level related messages (WRM); generated automatically once a day for gauges Devín, Bratislava, Medveďov, Komárno and Štúrovo based on the water levels measured by the Slovak Hydrometeorological Institute
- Ice messages (ICEM)
- Weather messages (WERM); generated automatically based on the data provided by the Slovak Hydrometeorological Institute

Supported formats and languages of NtS messages are:

- full text (FTM, WRM, ICEM) in 4 languages
- coded format (all types) in 12 languages
- XML format (all types)

Distribution of NtS messages:
- on the website
- exchange by using the web services interface (retrieving the messages from Austrian and German NtS service, and providing Slovak messages to the Danube FIS Portal)
- by e-mail (subscription service)

**ERI Service**
The system for electronic reporting was implemented in line with the technical specifications defined in the EC Regulation No. 164/2010 (the ERI standard). The service was put into pilot operation at the end of 2011 (within the IRIS Europe II project) but currently the users (skippers) don’t provide any electronic reports due to several reasons (legislation, lack of motivation). However, the system is ready and the pilot operation shall continue in the IRIS Europe 3 project. The system supports ERINOT and ERIRSP messages in version 1.2. The users (skippers) may provide electronic reports to the system either using the SlovRIS web application or the BICS application.

**Other available Services**
- Access points for wireless internet connection to access RIS web-based services are available in port of Bratislava and in the area of the Gabčíkovo lock. So-called SlovRIS WLAN Portal allows user to access the Slovak, Austrian and Hungarian NtS websites, RIS portals (SlovRIS, DoRIS, PannonRIS, Danube FIS Portal), download Slovak, Austrian and Hungarian ENCs, and access the SlovRIS web application to provide electronic reports.
- For users with the role of “fleet manager” the system provides functionality to view their own vessels’ position on a map.
3.1.3 Status of RIS implementation in Hungary

Deployment of RIS in Hungary has been done. Following services and related systems are in place:

Notices to Skippers that complies with the 3.0 XSD standard is available via the PannonRIS.hu webpage, ensuring legally compliant administration of FTM messages. With respect to ice and water level data, the interface between VITUKI and the RIS Centre is completed.

Electronic Reporting is available. Related Developments related to the ERINOT (1.2g XSD) and ERIRSP (1.2c XSD) messages have been pilot implemented within the framework of the IRIS Europe II project.

- Vessel Tracking and Tracing Along the Hungarian stretch of the river Danube (between river kilometres 1 811 and 1 433), the on-shore infrastructure for Inland AIS is completed. The AIS carriage and operation requirement is in force.
- Provision of Fairway information services by means of Inland ENCs. The Inland ECDIS 1.02-compliant map, prepared by VITUKI, can be downloaded from the PannonRIS.hu webpage
3.1.4 Status of RIS implementation in Croatia

Currently available RIS services in Croatia comprises of:

- Tracking and Tracing Service by means of Inland AIS,
- Fairway Information Service by means of Electronic Navigation Charts (ENC),
- Fairway Information Service by means of Notices to Skippers (NtS).
- Electronic Reporting International (ERI)

In the scope of Croatian RIS system five AIS base stations were installed on the locations in Osijek, Vukovar, Opatovac, Čvorkovac and Batina. Existing base station system and communication network behind it are owned by the Agency for Inland Waterways. They form a closed communication system invisible to third parties. Existing system completely covers Croatian stretch of the Danube and Drava waterway up to Osijek and is in compliance with the standards and recommendation of the European RIS authorities (Directive 2005/44/EC on harmonised river information services on inland waterways in the Community, PIANC RIS guidelines, and IALA RIS guidelines).

AIS base stations cover full length of Croatian International waterways (Danube and Drava)

CRORIS web application displays base station status to authorized users, displays ship static and dynamic data to authorized users, allows sending and receiving of safety related messages, enables inland waterway traffic surveillance via Google Earth application

Electronic Navigational Charts are created for Croatian stretch of the rivers Danube, Drava and Sava. ENC are created in compliance with the international Inland ECDIS standard\textsuperscript{2} versions 1.02 and 2.0. ENC are responsibility of Agency for Inland Waterways and are suitable only as an

\textsuperscript{2} Rhine Commission decision «Standard Electronic Chart Display and Information System for Inland Navigation (Inland ECDIS Standard)" (protocol 2001-I-16 and protocol 2006-II-22)
information source. They are created for the purpose of navigation and they do not contain any commercial information.

ENC are available free of charge to all RIS users and can be downloaded from the web pages of Agency for Inland Waterways http://www.vodniputovi.hr/ENC.aspx and Inland navigation development centre Ltd. http://www.crup.hr/index.php?page=encdownload.

Croatian Inland Waterway Agency is providing Notices to Skippers (NtS) according to the Inland ECDIS standard on its website. NtS service is located at http://nts.vodniputovi.hr/ with the interface available in two languages, Croatian and English. NtS are functional for Croatian stretch of the rivers Danube, Drava, Kupa and Sava and are issued by Harbour Master’s Offices Sisak, Slavonski Brod, Osijek and Vukovar.

Croatian NtS are in compliance with the international standard for Notices to Skippers that provides a standardized data format, which can be used for publishing Notices on the internet (pull-services) or for distribution by e-mail (push services). The content of the messages is encoded in a XML-file. This file can be used by software applications like voyage planning or Inland ECDIS on board of a vessel or by internet sites. The encoded information can be used directly for calculations, as for example in voyage planning, or be translated to the language of the user and displayed.

A standardized Notice to Skippers in XML-format contains four different sections:

- Identification
- Fairway and traffic related messages
- Water level related messages
- Ice messages

Electronic Reporting International (ERI) represents standard for the data exchange that was created by the group of experts (including Croatia) in 2006. This standard is based on the detailed study of customs, police and logistic procedures and allows digital message sending for
every vessel. The message is sent from the initial starting port and via server network in single country automatically transferred to national server in the final destination country from where it is automatically distributed to potential users, police, port masters, port authorities, customs, ports, port operators, etc. ERI application is intended to highly improve and speed up procedures in goods and passenger traffic processes and it is of great importance for Croatia, as an EU member, to be involved into all future ERI development.

In the frame of ERI in Croatia user interface has been developed and central database with authorized access depending on users’ rights, and with traffic tracking system on the international network that is in charge of automatic message transfer and reception for particular vessels. Application is available via internet and is in compliance with the following technical and safety requirements:

- Data sender, i.e. user that imports data is always responsible for its integrity
- Most of the messages contains confidential data on vessel and cargo so data encryption is essential
- Data must be secured from unauthorized changes
- Data source has to be known, i.e. user that has imported data can’t disavow sending and data content
- Time and user that imports data has to be known

For now two types of messages in accordance to the EDIFACT standard have been developed:

- ERI notification message (ERINOT) that contains data on convoy, cargo (description, volume, dangerous cargo details), sender, receiver, departure port and destination port
- ERI response message (ERIRSP) is generated by the operational system and is sent to the ERINOT message sender. ERIRSP is a confirmation of ERINOT reception.
Other available services

Port management system (ePort application) was developed for supporting port activities related to vessel manipulation, such as berth management, cargo management, statistics and reporting. Application ePort is deployed to Osijek and Vukovar ports. Application is still in pilot phase but in its final stage is planned to serve as standard tool for port operators enabling automated registration of incoming vessels and their berth scheduling. ePort is designed to communicate with RIS over Data Gateway.
3.1.5 Status of RIS implementation in Serbia

RIS implementation in Republic of Serbia has been finished in April 2013. State of the art technologies have been implemented through the project of RIS implementation on the Serbian Danube, as well as on the Sava River.

Main components of the Serbian RIS system are the following:

- Tracking and tracing, based on Inland AIS standard has been rolled-out, covering the entire stretch of the Serbian Danube River. In addition, about 170 vessels have been equipped within the transponder equipment programme, where vessels have been equipped not only with AIS device, but also with Inland ECDIS viewer. AIS network, with complete coverage of the Danube River as well as Sava River. AIS network consist in total of 18 AIS basestations located alongside the Danube River (15 out 18), and Sava River (3 out of 18). Basestations are interconnected with communication backbone to the Central Segment of RIS system in Serbia, located in Belgrade. Tracking and Tracing system with advanced functionalities enables users to locate and track vessels, using standard Inland AIS technology. Visual representation within the system is possible by using standard stand-alone ECDIS viewer, as well as by means of WEB based technology.

When spoken about vessel tracking and tracing, it is important to underline the transponder equipment programme that has been conducted within RIS implementation framework, resulting in more than 200 equipped vessels carrying different flags.

- System for production and distribution of Electronic Navigational Charts, according to the Inland ECDIS standard. Electronic Navigational Charts are covering the entire waterway network in Republic of Serbia that has international status. ENCs are available for entire stretch of the Danube, Sava and Tisa River.

- System for electronic provision of Notices to Skippers. Notices to Skippers service is partially available – System is fully operational, implemented according to the latest version of the NtS Standard. However, only Waterlevel Related Messages are automatically
generated, while there is lack of interest of competent authority for issuing of NtS (Kapetanije – Captaincies) are not willing to use the system to generate (issue) other messages.

- System for Electronic Ship Reporting (ERI). System for electronic ship reporting is fully implemented according to the latest version of Standard. System is not in use and for the moment, there is no reliable estimation when ERI usage shall be obligatory in Serbia. All competent authorities that should receive ERI messages are entitled, equipped and trained to do so.

- Lock Management System. Lock Management System is implemented and operational but no relevance for potential scenarios of RIS usage in management of waste.

- IALA dGPS provision correction system. This system is implemented and operational and it serves to provide more accurate positioning information to the vessels navigating in the Serbian Danube. It has not particular relevance for RIS usage in ship waste management.

- D4D system for provision georelated data – as a supportive tool when planning the voyage this system can be utilized in parallel to the usage of system for production and distribution of ENCs. As D4D contains the information encoded in ENCs, but also can contain additional objects and attributes, D4D can be used in planning process, especially that does not require special software tools to be used, except simple web browser and internet connection.

- Hull Database is implemented, and operational. Currently, Serbian Hull DB contains only the data for the hulls registered in Belgrade (minimum dataset). It is not clear when competent authorities (Captaincies) shall populate the remaining information within the Database. All governmental stakeholders that are involved in Inland Navigation and have the competencies to access to this information, are equipped and trained to use the Hull Database.
The implementation of the main components is already finalized, while the pilot operation phase ended in March 2013. It is planned that full scale operation of RIS in Serbia started in April 2013, but immediately after start, system was shut down due to lack of operation and maintenance budget.

RIS system that has implemented in Serbia has strong focus on the Governmental sector, introducing RIS services in daily operations of different public authorities, such as Directorate for Inland Waterways, Border Police, River Police, Police - Sector for emergency situations, Lock operators, Captaincies, etc.

Strong emphasis of RIS in Serbia in using different RIS services by different Authorities as implemented gives the opportunity for utilizing RIS for managing and controlling different activities in relation to the inland navigation, including waste disposal management.

Update on August 2013: Due to lack of budget for financing regular operation and maintenance of the RIS systems in Republic of Serbia, all described services and systems behind them are not operational in the moment. In 3rd quarter of 2013 Ministry of transport allocated part of the budget necessary for RIS operation and maintenance. Currently, Plovput as RIS operator in Republic of Serbia is performing required procedures and processes in order to re-establish Serbian RIS system. It might be expected that in 4th quarter of 2013 RIS will become functional again in Republic of Serbia.
### 3.1.6 Status of RIS implementation in Romania

The Romanian Naval Authority has introduced traffic management system along the Romanian part of the Danube. The system implemented is fully inline with EU Directive 2005/44/EC on harmonized river information services (RIS) on inland waterways in the Community. The first phase of this project was carried out in 2005 and consisted in establishing a core vessel traffic management information system covering all sectors presenting a danger for navigation. The system is now fully operational but limited to certain sectors of the Danube. The second phase will extend the system to cover the entire Romanian part of the Danube River.

Components and subsystems enable provision of following services:

- Notices to Skippers
- Electronic Ship Reporting
- Calamity Abatement Services
- Ship Registry Service (Hull Database)
- Seafarers Registry Service
- Web ECDIS Service
- Synthetic Traffic Info Service
- Provision of Fairway Information Services by means of ENCs
- AIS based tracking and tracing Services

The system is organized hierarchically into three levels, according to the organizational structure of the Romanian Naval Authority:

- The central level, at the NRA headquarters, with terminals at the Ministry of Transport and at the Ministry of Interior;
- Regional level in Turnu Severin, Giurgiu Galati and Tulcea;
- Local levels, in 22 ports from Sulina to Moldova Veche

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3. **Competent authority for provision of Fairway Information services by means of ENCs** is AFDI
3.1.7 Status of RIS implementation in Bulgaria

RIS implementation in Bulgaria is not yet finished. Currently, so called BULRIS system is being implemented that consists of the following components:

- Sub-system for vessel tracing: collecting, storing and visualization of data for the vessel traffic;
- Electronic reporting sub-system: accepting and confirming the electronic reports for freight and road data through standardized messages;
- NtS: transmission of information for the inland waterways, information and traffic management, route planning, information for ice and meteorological conditions.
- Sub-system for data exchange: providing national and international exchange of RIS data. This system fully conforms to the definitions for „National and International Data Exchange System“ described in IRIS project.
- VHF equipment (radiophone system): providing VHF radiophone connection between the operational RIS center in Ruse and the vessels; maintain a continuous VHF coverage and identification of transmitting equipment of vessels in the Bulgarian section of the Danube river.

It is expected that full scale roll-out of BULRIS system shall be finished by end of 2013.
3.2 RELEVANCE OF IMPLEMENTATIONS ON INTERNATIONAL SCALE

In previous chapter, it was described what particular services, subsystems and technologies have been implemented and used in seven countries on the Danube. Each country had its own national implementation. For successful application of RIS in terms of ship waste management, RIS has to become more international. Despite the fact that RIS implementation in Danube region is based on the international standards, taking into account European RIS Directive and its technical annexes, there are still gaps to be bridged, especially in terms of perception of the RIS among different authorities in different countries, having differences in RIS related procedures, different regulation and legislation as well as still having (mainly legal) problems in international data exchange. Ship waste management can’t be considered as limited issue to be linked to a single country or sector of the waterway/river.

At the beginning, pilots and tests, first learning’s and experiences either already happened or will happen on the national level. However, as navigation itself, ship waste management should not be considered isolated as national issue (regardless the fact that most of the actions start at that level) but as international topic to be addressed. Same principle is applicable to RIS, including the application of RIS for ship waste management purposes.
4 OVERVIEW ON CURRENT PRACTICE OF USING RIS IN SHIP WASTE MANAGEMENT ALONG THE DANUBE RIVER

This chapter will provide in short overview on the current practice of RIS usage in supporting waste management for the Danube countries involved in Co-Wanda project.

4.1 USAGE OF RIS IN SUPPORTING WASTE MANAGEMENT FOR THE DANUBE COUNTRIES

The information gathered within national reports about current practice in RIS usage for supporting waste management (and related processes) in inland navigation are compiled in this chapter giving full overview for countries concerned within Co-Wanda project.

4.1.1 Usage of RIS in supporting waste management in Austria

In Austria, there are several different ways to provide information to users that can support waste management.

4.1.1.1 Information on the DoRIS Website

On the DoRIS Website (http://www.doris.bmvit.gv.at/en/services/disposal_of_ship_wastes/) information on the collection of ship waste are given. Besides general information how to properly handle ship waste and a waste type description, also maps are given displaying the location of reception facilities and types of waste that can be disposed (see Figure 1).
Figure 1: Overview of waste reception facilities in Austria

Apart from a map giving an overview of waste reception facilities in Austria, also lock and port specific maps exist.

Figure 1: Waste Reception at Lock Persenbeug
4.1.1.2 Information displayed on ENCs

Information on the position and specifics of the waste reception facilities on the Austrian section of the Danube is also available on the electronic navigational charts (ENCs) of DoRIS. Furthermore, compact information on the topic of environmentally sound collection and disposal of ship wastes including an overview map of the reception facilities in Austria as well as detailed maps showing which types of wastes can be disposed of in ports and at locks can be found in the flyer “Information on the collection of wastes from cargo vessels in Austria”, which is available in several languages in the Austrian ports and locks with waste reception facilities.

4.1.1.3 Information given via Notices to Skippers

During the WANDA project in the course of pilot actions, a mobile bilge collection vessel operated on the Austrian and Hungarian section of the Danube accepting bilge water and other oily and greasy ship waste free of charge. For service information Notices to Skippers were generated in order to give details about the operation, timetable and section of the collection vessel.

4.1.1.4 Additional Information Platforms

Furthermore, on the FIS (Fairway Information System) portal (http://www.danubeportal.com/FIS_WEB/), the Blue Pages (http://www.blaue-seiten.at/), the D4D portal and the WANDA homepage (www.wandaproject.eu) also information about waste collection facilities are given and sometimes also displayed.

4.1.2 Usage of RIS in supporting waste management in Slovakia

Unlike Austria, in Slovakia there is current practice in terms of using RIS for supporting waste management processes in inland navigation.

4.1.3 Usage of RIS in supporting waste management in Hungary

RIS is not yet in use to directly support ship waste management in Hungary. However, first tests and investigations have been rolled out in co-operation of the National Transport Authority, KTI and RSOE in the frame of the WANDA project (such as information on the bilge boat in a notices
to skippers, tracking and tracing of the bilge boat, statistics based on AIS information). Within Co-Wandaproject is expected to have more operative RIS pilot outlined and implemented.

4.1.4 Usage of RIS in supporting waste management in Croatia

Currently, RIS is not being used in ship waste management in Croatia. Legally, ship waste disposal can only be done within port area in Croatian ports. Port Authority Vukovar has organized waste disposal facility within bunkering station which is not yet fully functional but it is planned to put it into operation during the lifetime of CO-WANDA project. Other Croatian inland waterway ports also have similar plans and designated areas for ship waste disposal.

4.1.5 Usage of RIS in supporting waste management in Serbia

Long term practice in Serbia was that there were no facilities and related services that can be offered to those that are navigating on the Serbian Danube. Accompanied with poor control mechanism and possibilities to create penalty system, the practice was that the ship waste was mainly simply disposed into river. Since the RIS has been implemented in Serbia just recently, there is no practice of using RIS in ship waste management in Serbia.

4.1.6 Usage of RIS in supporting waste management in Romania

Currently, services available within RORIS are not used in ship waste management. The functionalities that are available give possibility to use RORIS to notify the navigators on the program of work and the capacity to take charge of waste collection stations in the sector of the Danube, as well as a way to announce port authorities of the need to discharge wastes. Notifications can be made via VHF, internet based messages (ERINOT, EDIFACT, custom web application) or AIS messages, but this is not a practice exercised so far.

4.1.7 Usage of RIS in Supporting waste management in Bulgaria

In Bulgaria, there are no RIS applications that are used for ship waste management supported
5 POTENTIAL OF RIS INFRASTRUCTURE AND SERVICES TO SUPPORT WASTE MANAGEMENT AND DISPOSAL

This chapter shall represent a summary and shall draft conclusions about technologies, systems and corresponding RIS services that are commonly understood among different countries to be used for supporting ship waste management in the Danube region. The results of analyses of the available RIS services and related technologies, current practices and future plans are taken into consideration when drafted this report (an especially this chapter).

5.1 PROPOSAL FOR RIS BASED SUPPORT TO THE WASTE MANAGEMENT AT THE DANUBE

After several years of operating RIS in the Danube region (despite different level of implementation in the different countries), several technologies, systems and related services can be recognized as key-ones when it is about supporting ship waste management processes on the Danube.

These technologies, systems and related services shall be described here.

5.1.1 ENC

Electronic Navigational Charts are considered to be one of the essential tools to provide information about ship waste reception facilities on the Danube River, when usage of RIS is taken into account. The idea of providing information on the position and specifics of the waste reception facilities on Danube by means of electronic navigational charts (ENCs) can be easily implemented due to already widely accepted practice of creation and publishing the ENCs by almost all waterway authorities on the Danube. Information that is encoded within ENCs can be easily distributed to the skippers, and becomes feasible. ENCs are representing the part of so called fairway information services, and provision of them can be boosted in several ways that we have witheesed in the past years. For the moment, ENCs are mainly distributed via internet, by waterway administrations, free of charge. Accessibility to the relevant information is addition improved by developing WLAN access points network in the Danube region, that can
be accessed by those directly involved in navigation, in order to obtain relevant information. This represents one step closer to the point of having relevant information onboard of the vessel. However, reality is also the presence of the different methods of supplying ENC updates by different ECDIS systems suppliers to the end users.

5.1.2 Tracking and tracing

Tracking and tracing systems are already deployed alongside the Danube. The key-technology used for setting tracking and tracing systems is AIS based transponder technology. Infrastructure implemented on shore, enables competent authorities to receive information about vessel id, position, movements, etc. Practically the entire Danube is covered with AIS, while the extensive transponder equipment programme has taken place in different countries. Moreover, in some countries transponder carriage requirements are set, so vessels navigating in those countries have to have AIS transponder onboard. Systems for vessel tracking and tracing in different countries are providing solid platform for development of extended functionalities that can enable significant improvements in tracking and tracing vessels in terms of monitoring, controlling, and registering waste disposal.

There are several scenarios of using AIS based tracking and tracing systems for improvements the waste disposal on the Danube River:

- Registering of the vessels entering certain navigation area (i.e. passing border in between countries)
- Registering of the vessels leaving certain navigation area (i.e. passing border in between countries)
- Registering the vessels entering the waste disposal facility area
- Registering the duration in between two visits of a vessel to waste disposal facility
- Automatic identification of vessels enables control of validity of vignette (electronic or virtual)
- Automatic charging for waste disposal within facilities
There is no doubt that AIS based tracking and tracing plays dominant role among RIS based systems and services. Supporting ship waste management processes shall not differ that general situation, and it is estimated that tracking and tracing of vessels, associated with required information about ship waste and its disposal shall become one of the main usage scenarios of RIS in the process of ship waste management of the Danube as well as its control.

5.1.3 NtS

Notices to Skippers have been implemented in the countries within the Danube region according to international standard and already deployed. Currently, the practice of using NtS for waste disposal support has not been practiced.

It is intended that during the WANDA project in the course of pilot actions, a mobile bilge collection vessel operated on the Austrian and Hungarian section of the Danube accepting bilge water and other oily and greasy ship waste free of charge. In such or similar cases, Notices to Skippers can be used to provide details about the operation, timetable and section of the collection vessel for waste disposal purposes.

Further on NtS service can be used to broadcast the information about operation, opening hours and other details about fixed facilities for waste disposal on shore.

5.1.4 D4D

The Inland ENC Web Portal that is operated by all waterway management organisations of the Danube area and covers the following areas

- Danube river (2.415 km - Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania)
- Danube-Black Sea Canal (64,2 km - Romania)
- Main-Danube Canal (171 km - Germany)
- Main (387 km – Germany) (via donau, 2012)
can also be used for provision of the information about waste disposal and treatment facilities that can be accessed by those that are navigating.

Information about waste disposal facilities can be represented in different way (it is still to be agreed among countries supporting and operationg D4D system) and can contain different data that can support ship waste management process (again, to be agreed among countrise supporting and operating D4D system). Availability of this portal can play crucial role for many users to obtain the proper information in web based graphical environment, with clear visual and geographical representation of facilities and associated information.

In addition, there is intention to use D4D platform as a basis for production of so called paper electronic navigational charts, where the Danube Commission has expressed potential for this paper ENC to replace so called Carte de pilotage. Such paper ENCs can represent an added value to the skippers navigating on the Danube, searching the answer where ship waste can be properly disposed.

5.1.5 ERI

Electronic Reporting Systems can be considered as a second prominent system and related services within RIS concept. Even already very sophisticated, developed and functionaly capable to perform its main role, reality is that ERI is not yet fully deployed and accepted by skippers and shipping companies.

It is expected that Electronic Reporting systems shall become more and more important and one of the major scenarios of ERI usage in ship waste. It is expected that the main benefit of ERI usage sheall be reflected thru unilization of ERI notification message (ERINOT), Berth Management message (BERMAN) and Waste disposal information message (WASDIS).

5.1.6 WLAN

As already mention WLAN access points deployment is a process that already started in some areas of teh Danube. WLAN infrastructure can play one of the important roles in providing information to the users and brining closer and more available RIS based services that can be applied in ship waste management processes. Bearing on mind relatively low price of the WLAN
technology it is expected that in next period WLAN shall be deployed more and more. However, on the longer run, new technologies replacing WLAN might appear, at least to medium terms. Currently, the costs of mobile operators and availability of signal is not at the level that can provide reliable and cheap service due to roaming costs for data transfer. Latest steps undertaken by European Commission have promising character in terms of suspending principle of charging roaming costs (at least in the EU). Combined with new technologies, 4G, LTE, it might replace WLAN on medium-long terms on the Danube River, especially taking into account development of IT and integration with different communication technologies (e.g. tablets with integrated 3G or 4G modules, or adequate laptop/netbook computers). Key issue is for sure, access to the global network to be enabled, in order to have access to RIS based services and corresponding systems.
6 CONCLUSIONS

This chapter should summarize main ideas expressed in this report, reflecting some additional remarks that can have relevance when RIS is considered as a tool for supporting ship waste management processes.

First and most important remark (or observation) is that RIS has to come into maturity stage in terms of system operations and availability. We are witnessing the situation that some most advanced systems can suffer and become useless in case there is no proper strategy and action plan for daily operation and maintenance. In order to rely on application of RIS systems for supporting ship waste management (especially in international environment), the availability level of RIS systems and related services has to be at very high, and above all harmonized in all the countries participating in this process. The recommendation is to search for proper solution at European level to enable efficient and harmonized RIS operations and to ensure quality in provision of related services despite of differences among countries that are operating RIS systems.

Secondly, legal requirements have to be set properly and harmonized. This is affecting mandatory usage of certain systems, services or equipment, but also enabling authorities for seamless exchange of the information among different authorities and users. It should not be forgotten that the Danube is one river and that navigation process should not be influenced by just changing the flag on the vessel or crossing some imaginary line that represents border between two countries. Ship waste will equally affect any country and its environment if not treated properly. Therefore, the way for removing administrative barriers in terms of restrictive and not-harmonized regulation preventing logical, efficient and rational RIS operations alongside the Danube have to be removed. Requirements set to the skippers and shipping companies have to be harmonized. For example, not all of the Danube countries are requiring mandatory transponder carriage onboard of vessel. In such situation, it is not expected that RIS can be properly deployed for supporting ship waste management processes.
In the chapter 5, key technologies, systems and services that can support ship waste management process are identified, and it is highly likely that in most of the countries the usage scenarios considering what is listed in chapter 5 will be properly accepted by the competent authorities.
## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbr.</th>
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<tbody>
<tr>
<td>RIS</td>
<td>River Information Services</td>
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<tr>
<td>AIS</td>
<td>Automatic Identification System</td>
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<tr>
<td>NtS</td>
<td>Notices to Skippers</td>
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<td>ERI</td>
<td>Electronic Reporting International</td>
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<td>ENC</td>
<td>Electronic navigational charts</td>
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<td>WP</td>
<td>Work Package</td>
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<tr>
<td>T&amp;T</td>
<td>Tracking and Tracing</td>
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<td>IALA</td>
<td>International Association of Lighthouse Authorities</td>
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<tr>
<td>dGPS</td>
<td>Differential Global Positioning System</td>
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<tr>
<td>ECDIS</td>
<td>Electronic Chart Display Information System</td>
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<tr>
<td>D4D</td>
<td>Data Warehouse for the Danube Waterway</td>
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<tr>
<td>WLAN</td>
<td>Wireless Local Area Network</td>
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<tr>
<td>LMS</td>
<td>Lock Management System</td>
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<tr>
<td>ERINOT</td>
<td>ERI notification message</td>
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<td>BERMAN</td>
<td>Berth management message</td>
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<tr>
<td>WASDIS</td>
<td>Waste disposal message</td>
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<tr>
<td>NEWADA</td>
<td>Network of Danube Waterway Administrations</td>
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</tbody>
</table>
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