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Evaluation of RIS Implementation

for the period 2006-2011

MAIN REPORT

Zoetermeer, July 2014

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Executive Summary

Background

RIS Directive and legal framework

In 2005 the European Parliament and the European Council adopted Directive 2005/44/EC, dealing with Harmonised River Information Services (RIS) on Inland Waterways of the Community. The so-called "RIS Directive" aims to establish a framework for the deployment and use of harmonised RIS in the Community, in order to support inland waterway transport with a view to enhancing safety, efficiency and environmental performance and to facilitate interfaces with other transport modes.
The definition of RIS, as stated in the RIS Directive (2005/44), is the following:
"River information services means that the harmonised information services to support traffic and transport management in inland navigation, including, wherever technically feasible, interfaces with other transport modes. RIS do not deal with internal and commercial activities between one or more of the involved companies, but are open for interfacing with commercial activities. RIS comprise services such as fairway information, traffic information, traffic management, statistics and custom services and waterway charges and port dues".

Besides the RIS Directive, the following European regulations are in force, jointly forming the legislative framework:

- Implementation guidelines, RIS Guidelines: 414/2007;
- Notice to skippers: 415/2007;
- Tracking and Tracing 416/2007 and 689/2012;
- Electronic reporting 164/2010;
- Electronic chart display and information system for inland navigations (inland ECDIS): 909/2013;
- Directive 2013/49/EU amending Annex II to Directive 2006/87/EC addressing the issues related to the Unique European Vessel Identification Number (ENI) and the European Hull Database.

Directive 2005/44/EC and the RIS guidelines specify the applicability of the legislation, the responsibilities of Member States, the minimum requirements for RIS, the services to be provided and the technical specifications to be applied. The regulations 415/2007, 416/2007, 164/2010 and 909/2013 provide the specific information and provide answers on the question how the technologies are to be implemented (notices to skippers, tracking and tracing and electronic reporting).

Evaluation of RIS Policy

Article 4(7) of the RIS Directive requires the European Commission (EC) to take appropriate measures to verify the interoperability, reliability and safety of RIS. Article 12 requires the EC to monitor the process of implementing RIS in the EU. Article 12 provides the basis for this evaluation, with the following main objective: to prepare and execute an evaluation of the RIS policy for the period 2006-2011.

This report provides the EC with information on:

- Evaluation of the state of transposition and implementation of the RIS Directive;
- Assessment of the coordination of RIS implementation;
- Assessment of barriers to and opportunities for further development of RIS.

In order to inform policy making on the further development of RIS, the evaluation provides information on the following evaluation criteria, which are the basis for presenting specific conclusions:

1. The *relevance* of the RIS objectives in view of the overall transport policy objectives;
2. The *state of transposition and implementation* of the RIS Directive in the EU Member States;
3. The *effectiveness and efficiency* of RIS implementation;
4. The *impact* of RIS on inland waterway transport market development, social conditions and environment;
5. The *effectiveness* of particular support actions implemented under the relevant national and EU programmes;
6. The *coherence* and interrelationship between various support programmes and instruments in support of RIS.

Regarding the scope of the evaluation the following remarks can be made:

- The time period of evaluation is 2006-2011. However, in some cases more recent information is included;
- The geographical scope of the evaluation is focused on EU 12+1, i.e. Austria, Belgium, Bulgaria, Czech Republic, Germany, Hungary, France, Luxembourg, the Netherlands, Poland, Romania, Slovak Republic, plus Croatia (which was a candidate country during most of the above-mentioned evaluation period). These countries are the Member States covered by the scope of the RIS Directive. Additional countries, such as Italy, Serbia, Sweden, Switzerland and Ukraine participated in the evaluation as well. In addition, countries outside Europe are considered, including Brazil, China, India and the United States.

The data collection process includes in-depth country reviews, for those countries that implemented RIS in Europe. In addition, desk research and targeted interviews are carried out and the evaluator participated in workshops and meetings, e.g. RIS weeks.

General conclusions

The following are the general conclusions of the evaluator:

- RIS has been a major development in the inland waterway industry. In the past years many public and private parties collaborated to define and implement standards and jointly worked towards a roll out the key RIS technologies in all EU 12+1 countries for which the RIS Directive applies. This has helped establish the foundation for more efficient, safe and environmentally friendly transport operations and therefore has contributed to the delivery of overall EU transport policy objectives.
- In addition to these aforementioned 12+1 countries, countries such as Serbia, Switzerland, Ukraine, Italy and Sweden, participated in the process, creating a broad geographical coverage. Furthermore, RIS has become a key concept in inland navigation policy making beyond the EU and is now also on the policy agenda in Brazil, China, India, and the United States.
- Major progress is achieved in the past years on the implementation of key RIS technologies and RIS services, such as fairway information and traffic information services. At the same time, it can be concluded that elements, such as applications focussing on optimising logistic processes and modal integration, are still missing or not yet functioning. Consequently, the implementation of the RIS Directive is still work in progress.

This involves both the implementation of legislation, the implementation of technologies and the actual use of RIS technologies and services in practice. The implementation of legislation has well progressed, but is still not complete. The implementation of technologies has progressed considerably but differs per technology and per corridor. Finally, the implementation of RIS services is still far from complete.

- Considerable differences with regards to RIS implementation exist between Member States. In some Member States, e.g. Netherlands, Austria, Germany, Belgium, Hungary, and corridors (Rhine and Danube) the implementation has reached a high level while in other Member States, e.g. Poland and corridors (e.g. East-West) RIS implementation is still less advanced. The differences between Member States concern the following aspects: the legislation, the level of implementation, the technologies implemented and the level of implementation and quality of RIS services[1].
- Differences regarding the pace of RIS implementation at the level of EU 12+1 are caused by a number of factors, including:
  - Differences in timing and initiation of the RIS implementation process, e.g. depending on EU accession date;
  - Differences in the size of the industry and the way infrastructure management is organised, e.g. related to the role of seaports, inland ports and regions;
  - Differences in the availability of resources to implement RIS.
- RIS implementation has taken much more time than foreseen in the Directive. In 2005/2006 it was expected that by 2010 the roll out of RIS would be close to completion. In reality, this time period has not been sufficient. The implementation faces specific bottlenecks, such as the (international) exchange of data and issues regarding protection of privacy.
- Because of differences in the pace of RIS implementation between Member States and corridors, key RIS technologies are not yet fully deployed and RIS services are not yet fully implemented. As a result, the benefits from the implementation of those technologies and services that were initially foreseen have not yet materialised. However, with increased future deployment of RIS technologies and implementation of RIS services, benefits are expected to materialise accordingly.

Specific conclusions

This section presents specific conclusions, based on the pre-defined evaluation criteria.

Relevance of RIS objectives in view of the overall transport policy objectives

- Analysis indicates that RIS implementation in 2011 positively contributed to safety and environmental performance, although the size of these contributions falls short to projected benefits. Because of the long-winding roll-out of key RIS technologies and services the contribution to overall EU transport policy objectives could be strongly improved by speeding-up the implementation process of RIS technologies and services. In general, the inland navigation market parties expect that RIS technologies and services can generate future benefits. This is amongst others demonstrated by the investments of skippers and barge operators in on-board equipment in the past years.

[1] The RIS services distinguished are: FIS – Fairway Information Services; TTI – Tactical Traffic Information; TM – Traffic Management Services; CAS – Calamity Abatement Services; ITL – Information for Transport Logistics; ILE – Information for Law Enforcement; ST – Statistics ;WCHD – Waterway Charges and Harbour Dues.

- The main benefits for skippers and barge operators are reduction of fuel consumption and improvement of level of safety. The benefits that have been realised with regard to the reduction of fuel consumption are caused by the use of AIS. AIS allows skippers to optimize their manoeuvring on a short time scale, in situations where the fairway is also shared with other vessels. The use of AIS has also led to an improved level of safety. Since the overall impacts in terms of total voyage cost reduction are limited, the effect on pricing and (consequently) modal shift is estimated to be very modest and could not be found.
- In conclusion, the RIS objectives are appropriate regarding the needs of the inland navigation sector. The RIS policy objectives focus on supporting inland waterway transport by enhancing safety, efficiency and environmental performance and on facilitating interfaces with other modes. Therefore, they are fully in line with EU transport policy, as formulated in the White Paper[2] on Transport. There is no need to realign the RIS policy objectives.

State of transposition and implementation of the RIS Directive in the EU Member States

General overview of RIS implementation

- In all EU 12+1 countries the RIS Directive has been fully transposed into national legislation. However, only the Netherlands, Hungary, Germany and Romania managed to do this within the timeframe that was stated in the Directive. It should be noted that Croatia, in 2007, was not yet an EU Member State and therefore not subject to the same timeframe window as other Member States. After becoming an EU Member State in July 2013, Croatia has transposed the Directive into national legislation.
- It was found that Czech Republic and Bulgaria have not fully implemented AIS yet. France, Belgium/Wallonia and Germany, do not always exchange data with shore based facilities. All the other countries meet the specifications of the AIS regulation, including the data exchange with shore based stations. Furthermore, in the implementation of AIS two types of additions to the regulation were observed:
  - *Purpose limitation of the use of AIS data*: the Dutch authorities concluded in an agreement with the Dutch inland shipping sector that the use of data by authorities was limited to specific purposes;
  - *Making the AIS/ transponder obligatory*: this happened in Austria, Hungary and the port of Antwerp and is planned by the CCNR for December 2014.
- Since the ECDIS regulation was published in September 2013, Member States are not yet required to fully implement the ECDIS regulation and to comply with its requirements. However, in the past Member States already developed to some extent ECDIS charts, even for waterways and ports lower than the required CEMT class Va.
- In case that ship reporting in inland navigation is required by national or international law, then also the Member State needs to support electronic reporting. In the present IWT market, ship reporting is not common but limited to certain operating areas and types of cargo. It is at present only obligatory for the Netherlands, Belgium, Germany, France (only Rhine river in container transport), Luxembourg (Mosel), Austria (only dangerous cargo) and Slovakia.

[2] WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport (EC, Brussels, 2011).

- Bulgaria and Poland are the only Member States not fulfilling all the requirements of the regulation for Notices to Skippers (NtS). ICEM messages are not published in Belgium (all regions), France (French ports) and Luxembourg. WRM messages (water depths), which are also obligatory, are not published in Belgium (all regions) and France (French Ports). Consequently, there is non-compliance in NtS publications.

Problems with RIS implementation

- An important problem with the transposition of the RIS Directive into national legislation is that protection of personal data has been implemented in different ways it the Member States.
- For reasons of protection of personal data, the use of personal data in the Netherlands and Germany is limited to specific purposes only and the skipper always remains the owner of the data.
- Article 9 on personal data of the RIS Directive leaves a lot of room for the Member States to implement their own data protection policies. This has resulted in different approaches on how to deal with international data exchange
- Most countries in the Danube corridor have successfully technically tested AIS data exchange between the neighbouring countries or with EU Position Information System in the past years. After a long period of discussions, a practical solution has been worked out to facilitate the data exchange.
- There is an on-going tendency for Member States, regions and even individual ports to make the use of AIS mandatory. However, it should be noted that the conditions of the obligatory regimes are not harmonised, e.g. regarding the use of ECDIS.
- The absence of a regulation on ECDIS3 and the lack of agreement on quality standards for digital maps were frequently mentioned as factors causing delay in investments of the private sector investment
- All RIS requirements in accordance with the RIS Directive, apply to Class IV waterways and higher. However, inland ECDIS map coverage is only necessary for class Va waterways and higher classes.

Implementation of RIS key technologies - AIS

- AIS requires both on-board equipment and land-side supporting infrastructure. At the end of 2012 the coverage rates were 92%, 79%, 89%, and 43 % for the shore station services along the Rhine, Danube, North-South and East-West corridor respectively.
- In Germany, the Netherlands and Belgium almost 100% of the active self-propelled fleet has installed on-board equipment. In France, this is about 55% in 2013. On the Danube in Austria and Hungary 100% of the fleet has installed equipment. Lower percentages apply to other Danube riparian countries. On the Danube corridor as a whole the average rate of installation of on-board equipment is 60%.
- Dutch skippers use the systems in 90% of the cases, while in 10% of the cases systems are switched off. Applications work well and are easy to use by IWT personnel. The technology is generally accepted.
- The acceptance of AIS is, however, not unconditional. Skippers and barge operators have concerns about their privacy.

[3] At the 10th of September 2013 the regulation on ECDIS was adopted.

- Localisation and mobile communication services are key technologies which are presently also available in smart phones and tablets. This new technology has considerable advantages in comparison to AIS, but there are also important reasons to keep using AIS in the near future:
  - *AIS is embedded in the existing institutional framework;*
  - *AIS is integrated with RADAR systems and Inland ECDIS;*
  - *AIS is integrated with AIS applied in maritime transport;*
  - *The coverage of AIS on the inland waterways is better than with Wi-Fi (in ports or resting places) or 3G communication networks;*
  - *AIS is a* self-organising system that can operate without shore connections.

Implementation of RIS key technologies - Inland ECDIS

- Inland ECDIS coverage of the waterway network is currently 89% along the Rhine corridor, 88% along the Danube corridor, 82% along the North-South corridor and 60% along the East-West corridor. Coverage is not yet complete and blank spots still exist. Often in practical applications these spots are filled with non-ENC maps of the suppliers.
- Inland ECDIS provides, as one of the key RIS technologies, the information basis for other RIS applications. AIS data and standardised Notices to Skippers are often displayed on the maps and used for correction of planning and/or loading.
- Inland ECDIS is widely used in the industry, often in combination with AIS and Radar systems. Also it is used as a background for the display of NtS. On the Rhine 76% of the vessels use Inland ECDIS, but only about 15% use the maps in navigation mode, which is considerably more expensive.
- An important problem with the current supply of maps is the significant difference in quality of the maps (reliability, maintenance, update frequencies) and the absence of quality standards. Different versions and different quality levels of maps are often used in the same corridors. This problem is expected to decrease significantly by the recently published regulation on ECDIS.

Implementation of RIS key technologies - Electronic Reporting International (ERI)

- Some countries have implemented the ERINOT[4] message, often using Barge Information and Communication System (BICS), an electronic web-based reporting system. The actual use of ERINOT is not widespread. Consequently, ERI is the only one of four key RIS technologies that is not yet widely used by the IWT industry.
- The use of ERINOT is compulsory since January 2010 on the Rhine for container ships with more than 20 containers on board or ships transporting containers with dangerous substances, regardless the number of containers. Monitoring on the Rhine shows that about 45% of vessels use ERI applications.
- Of the three types of standardised messages (ERINOT/ERIRSP, PAXLST[5], BERMAN[6]) which are supported, the last two are not mandatory in all EU 12+1 countries. The BERMAN message type is not used at all, and PAXLST is only used by a small group of operators in the Netherlands and Hungary
- ERI is considered not attractive enough for IWT operators in the current market. The uptake is hampered by factors on the side of authorities, including (i) problems with international data exchange between countries, (ii) the refusal to exempt operators from existing old reporting requirements in paper-format (or via VHf) or (iii) simply not being able to process messages in parts of corridor because they are still not implemented in countries, regions or ports.

[4] ERI NOTification.
[5] Passenger List message.
[6] BERth MANagement message.

- The international exchange of messages is not yet possible due to technical, organisational and political bottlenecks.
- The reporting requirements in IWT are not harmonised across the EU and sometimes differ even between countries or regions in the same corridor/ operating area. A more harmonised business environment would be attractive for companies that have to work in cross-border transport.

Implementation of RIS key technologies – Notices to Skippers (NtS)

- While special reports on sailing conditions and fairways in the form of publically broadcasted messages are used by many skippers, only 40-55% of skippers actually use software applications on-board that can process such messages. RIS NtS refers only to the messages which are communicated in an XML format.
- The NtS service can be integrated with Inland ECDIS, so that skippers can immediately update voyage plans. The NtS can be provided by pull (e.g. user downloads information from internet) or push service (user receives an e-mail with the information).
- The messages are available free of charge and, usually, available in various languages. Furthermore the national supplier of NtS often includes links to the websites of other national suppliers. However, the direct international exchange of the NtS between authorities across countries is currently limited. The authorities using this standard can integrate NtS of other countries in their own services.
- Many countries offer message services, but not all messages types are covered. Some countries do not include the non-mandatory (but recommended) weather report messages (WERM) because very good and detailed messages are already available by other suppliers, e.g. meteorological institutes

Implementation of RIS Services

- Fairway Information Services (FIS) are widely available. Many of these RIS services are provided via Inland ECDIS, but also via NtS and AIS. Only FISs related to infrastructure charges and pleasure navigation are usually not provided by key RIS technology. This RIS service is implemented and provided in all Member States where the key RIS technologies have been implemented. FIS are also used in commercial applications like voyage planning systems.
- For Traffic Information Services a distinction is made between tactical and strategic traffic information. Tactical traffic information is provided by AIS both for skippers and traffic managers on shore (if there are shore stations). So, this basic information service is directly provided by AIS. But Inland ECDIS and Nts contribute to the realisation of functions as well. For Strategic traffic information tools and additional data are typically used by infrastructure managers and are less relevant to skippers. TIS are implemented and also widely used in the IWT industry and by infrastructure managers.
- The RIS service Traffic Management (TM) is primarily relevant for authorities. It contains a number of functions (lock and bridge management) for which RIS key technologies (in particular AIS) are certainly relevant, but currently only used in pilot projects. This RIS service is only partly provided.
- Unfortunately, for all the remaining RIS Service groups: calamity abatement Support, information for transport/ logistics management, law enforcement, statistics, waterway charges and harbour services are not provided at present or are currently only in an exploratory phase or pilot study. There is only one exception in the group information for transport/ logistics management: Inland ECDIS, AIS and NtS contribute already to the subgroup Voyage planning. Although the present level of this contribution can be called basic (much more is possible) it can be assumed that the uptake of this is large since voyage planning is very important for skippers and fleet managers, and better information on the use of vessels is always useful for them.

- So few of the list of RIS services are currently provided. Only basic information services are provided. The main reason for the low uptake of the RIS services is that most of the services require a high uptake of the key technologies. Since this has only very recently been achieved (for some technologies at least), the diffusion process has still to begin.

Implementation of the organisation of RIS

- RIS implementation has primarily been a bottom-up process. The RIS coordinators at Member State level determined the activities and decided about the planning. International coordination was present but less emphasis was placed on steering this process of RIS implementation.
- The advantage of the bottom-up approach was proximity to users and ability to quickly adapt to national/regional circumstances. The disadvantage of the bottom-up approach was less emphasis on the coordination between Member States, in particular where it concerned cross-border transport operations. As a consequence, the RIS implementation process across countries and corridors diverged.
- The European RIS Committee gave significant leeway to expert groups and other parties or arrangements, including River Commissions, bilateral or multilateral arrangements between countries and the UNECE.

The effectiveness and efficiency of RIS implementation

Achievement of RIS policy objectives

- During the period under analysis important RIS building blocks and basic RIS services have been implemented. As a result, a foundation has been established for further deployment of RIS services that will bring additional benefits to society by means of enhanced efficiency, safety and environmental performance of inland waterway transport, as well as improved interfaces with other transport modes. Having said so, the expected benefits from ex-ante studies have only partly been realised so far, to a large extent due to slow implementation of RIS.

Financial resources

- The Commission Decision C(2007)3512 of 23 July 2007 established a multi-annual work programme for the period 2007-2013 for grants in the field of the trans-European transport network (TEN-T). Following the TEN-T Calls in 2008, 2010 and 2011, RIS projects with a volume of approximately EUR 100.5 million (TEN-T co-financing: EUR 33.6 million i.e. 33.4 %) have been completed or are currently still on-going.
- Within selected EU co-financed programmes (TEN-T, Structural and Cohesion Funds, Instrument for Pre-Accession) and under the previous financial framework, the total project volume amounts to approximately EUR 154 million, of which a total of approximately EUR 76.5 million has been co-financed by the EU. This is almost 50% of the total investment costs.
- National investments by authorities cannot be precisely determined but it is estimated that the total investments that were related to RIS may well amount to at least EUR 200 million. There are also private sector investments; however, this contribution only became significant towards the end of the evaluation period.

Effectiveness and efficiency of RIS support measures

- In the period 2007-2013 RIS entered the implementation phase. EU funding has been crucial for initiating RIS activities, especially in terms of realising cross-border activities. The EU support programmes have provided clear leverage for the implementation of RIS and as such has contributed significantly to the benefits of RIS implementation.

- While the full potential of RIS has not yet been achieved, the EU support programmes have been critically important. Without these programmes RIS would not have been conceived and implemented.

Effectiveness and efficiency of RIS implementation governance

- From a national and local perspective the effectiveness of RIS implementation according to the RIS Directive requirements has been high. The Member States with the highest inland waterway transport volumes have to a large extent implemented RIS and key RIS technologies (AIS, ERINOT, ECDIS, NtS). However, seen from an international perspective it can be concluded that the cross-border interoperability and harmonisation is not yet fully mature.
- The national orientation enabled a quick implementation of the key technologies since the implementation could take into account national needs and circumstances which were positive for the user uptake. The downside to this bottom-up approach is that RIS implementation has not been fully harmonised across EU Member States. The divergence in implementation of technologies in the market has adverse effects: it is more difficult to benefit from economies of scale; there are higher costs of operation and higher costs for applications (because system suppliers have a smaller market as well).

Impact of RIS on inland waterway transport market development, social conditions and environment

- In ex-ante studies carried out before RIS deployment large benefits were foreseen. To date, the benefits to society as a result of the substantial investments in RIS in the period 2006-2012 have not materialised to the extent as foreseen in the ex-ante studies. Partly this is caused by the fact that the pace of RIS implementation is considerably slower than foreseen.
- In particular the systematic usage of RIS applications by authorities for a number of key policy areas (lock management, traffic management, customs, port dues, statistics) is presently still in an early stage.
- The benefits of skippers and barge operators, using the key RIS technologies, are lower than the costs of purchasing the required equipment, software and data. The main benefits to skippers and barge operators are the reduction of fuel consumption and improvement of the safety level. A significant effect on pricing and on modal shift could not be determined.

Recommendations

RIS policy objectives and barriers to address

- *Completion of RIS Implementation***.** The most urgent activity is speeding up the RIS implementation process in order to reduce the lack of harmonisation. The present RIS implementation in the EU is still incomplete and needs to be completed. Two specific focal points are:
  - Attention of Quick Wins: the lack of harmonisation is in some cases caused by temporary factors, like shortages of financial resources in some regions, the late timing of activities, incidental delays or lack of manpower or expertise. In these cases additional efforts or money can help to reduce the lack of harmonisation in the short term.

  - Improve political and organisational consensus on EU level: the lack of harmonisation could, however, also be caused by bottlenecks that are more difficult to remove. When cross-border transport is affected the removal may require consensus between countries involved, River commissions, and the EC at the political level as well. Two subjects that were identified in this category are: (I) the objectives of RIS as such do not have to change but they are rather general and Mss do not always agree about these in practice. So different policy interpretations exist and more agreement is desirable. So they should be formulated more clearly and comprehensively*; and (ii) the need for more agreement* on the role of authorities and the private sector and the boundary between these parties.
- *Develop services with clear benefits for users and society*. The current RIS is predominantly oriented towards (various tasks of) infrastructure management and (nautical) safety. In the period 2014-2020 RIS applications for business and logistics should be more central as the basic components are now available due to the implementation of RIS key technologies.

RIS legislation

- *More uniform interpretation of RIS objectives*. This point relates to possible outcome of a discussion aimed at getting more agreement among Mss and stakeholders about policy objectives (see above). This may result in proposed changes of the legal framework.
- *Address regular legal adaptations*. A framework should be made for regular adaption of RIS legislation (up-dating of standards and other necessary amendments, etc.).
- *A number of specific adaptations*. Based on findings from workshops and interviews with experts the following specific adaptations are proposed:
  - *Proposals stemming from the revision of the Directive on ship reporting* formalities (2002/06/EC). A possible extension of this Directive to IWT is studied and this may concern Electronic reporting;
  - Making the RIS index a standard and obligatory (adaptation of the Annex I of Directive 2005/44/EC);
  - Inclusion of the obligation of Member States to send data to the European Hull database in ERI regulation;
  - *Adaptation* of Nets regulation for international data exchange.

Technologies and services

- *Focus on implementation of RIS key technologies*. Improving the present RIS implementation of technologies should have the highest priority in the next years, because these are the key for the roll-out of RIS services;
- *Growing attention for quality of RIS service and definitions*. Standards for the quality of RIS services and performance of RIS technologies were defined and explored in the IRIS II project.
- *Take into account ICT innovations*. It is important to keep monitoring developments in technology and be prepared to revise and update RIS standards, when the market supplies of systems changes.
- *Address possible market entry barriers*: The barriers for new players to enter the market shall be as low as possible in order to facilitate development and uptake of innovations, increase competition and keep RIS technologies and RIS services affordable.

- *Explore and support promising applications*. At least in four fields it is recommended to further investigate the prospects and test their feasibility: (I) RIS for enforcement of sailing and resting times; (ii) RIS for payment of services; (iii) RIS for optimising payload and reducing fuel consumption; and (IV) RIS for smart steaming and reliable ETAs.

Governance

- *High level political attention to common interpretation is needed t*o ensure interoperability and a common understanding and function of RIS in the European Transport System.
- *A new orientation towards interoperability and creating a common EU market for RIS applications* is needed for 2014-2020.
- *Develop a dedicated and longer term structure for technical support*. The maintenance of standards should be organised on a more permanent base.
- *Establish a single body for the coordination of work and RIS policy support*.

RIS Financing 2014-2020

- *There should be more attention for public private partnerships and enabling funding from private organisations and the IWT industry.*
- *Project funding should focus more on the interests of the IWT industry instead of the interest of infrastructure providers.*

PART 1: DESCRIPTION OF RIS

1 Introduction

1.1 Background

Europe has over 30,000 km. of canals and rivers that link together hundreds of key industrial towns and areas. The core network of around 10,000 km. connects The Netherlands, Belgium, Luxembourg, France, Germany, Austria, Slovakia, Hungary, Poland, Croatia, Romania, Bulgaria and outside the EU Switzerland, Serbia and Montenegro, Moldova and Ukraine. Although the backbone of this network is constituted by major rivers as the Rhine and the Danube, many tributaries and canals connect a variety of smaller towns and industrial centres. Despite this network, inland waterways still have a huge capacity that is not fully exploited which was recognised the EU Transport White Paper "Transport policy for 2010: time to decide"[7].

Transport's main potential barriers for sustainable socio-economic development in the European Union are traffic congestion, environmental impacts and economic costs. Measures to tackle these challenges, including development of inland waterway transport and inter-modal transport were proposed in the EU 2001 Transport White Paper. Inland waterway transport is seen as a reliable, economical and environmentally-friendly mode of transport and its future development required the introduction of modern concepts, technologies and solutions. Already back in 1998 the EU officially defined the concept of River Information Services, based on the results of several research projects and various applications. RIS was defined as a concept of harmonised services to support traffic and transport management in inland navigation, including interfaces to other modes of transport[8].

In the past decade, there has been an increase in the European Union in the use of information and communication technology in the Inland Waterway Transport (IWT) industry and waterway infrastructure network management. In particular, there was a gradual increase in the use of River Information Services.

In 2005, Directive 2005/44/EC[9] was adopted by the European Parliament and the European Council on Harmonised River Information Services (RIS) on Inland Waterways of the Community. In the remainder of this report, Directive 2005/44/EC will also be referred to as "RIS Directive". This directive aimed to establish a framework for the deployment and use of harmonised RIS in the Community in order to support inland waterway transport with a view to enhancing safety, efficiency and environmental friendliness and to facilitating interfaces with other transport modes.

The framework directive aims:

- To provide for a European-wide framework for the implementation of the RIS concept (to prevent a patchwork of national legislation and various RIS applications).
- To encourage European suppliers of equipment to produce hardware and software at reasonable and affordable costs and to perceive European RIS technology as a market opportunity.
- RIS applications to be interoperable and compatible on a national as well as European

[7] White Paper. European transport policy for 2010: time to decide, Commission of the European Communities, September 2001.
[8] River information Services, As policy implementation flows from research, European Commission. Directorate-General for Energy and Transport, November 2004.
[9] Directive 2005/44/EC of the European Parliament and of the Council, of 7 September 2005, on harmonised river information services (RIS) on inland waterways in the Community. Available online: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:255:0152:0159:EN:PDF.

level in order to allow continuous cross border traffic without technical obstacles.

- To harmonize data exchange and communication on a European level in order to facilitate the interoperability of the entire system.
- To develop a minimum level of security for users as well as hardware and software manufacturers.
- To implement the RIS Directive (2005/44/EC) technical guidelines for the planning, implementation and operational use of services are required[10].

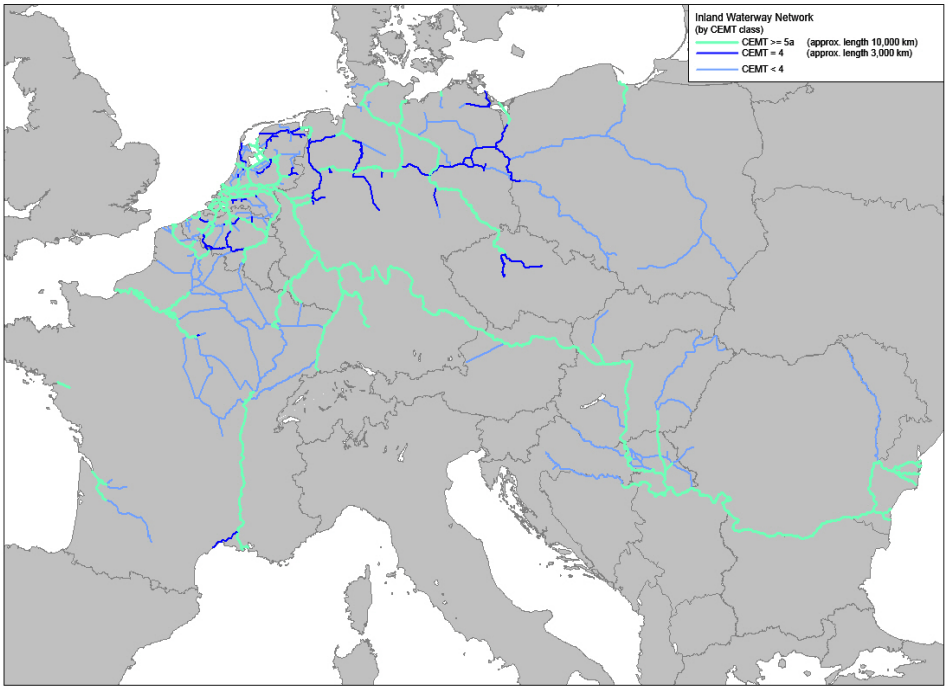
RIS streamlines information exchange between public and private parties participating in inland waterborne transport. The information is shared on the basis of information and communication standards. The information is used in different applications and systems for enhanced traffic or transport processes which will be further explained in chapters 3 and 6.

In order to support the interoperability of RIS, the European Commission will define technical guidelines for the planning, implementation and operational use of RIS in the areas of:

- electronic chart display and information system for inland navigation (inland ECDIS)
- electronic ship reporting
- notice to skippers
- vessel tracking and tracing systems
- Compatibility of the equipment necessary for the use of RIS.

All EU inland waterways greater than or equal to class IV are subject to the RIS Directive. The European waterways covered by the RIS Directive are shown in Figure 1.1 as classes CEMT 4 and higher in the legend. Waterways smaller than CEMT which are navigable by IWT are indicated in light blue in the figure as well (CEMT<4 in the legend).

Figure 1.1 European waterways covered by the RIS directive



Source: Panteia

[10] www.ris.eu.

In EU Member States, as well as other non-EU countries that are connected to the EU IWT waterways network[11], the process of implementation really took off after 2005. However, in countries that were involved in the pioneering work, such as Austria, the Netherlands and Germany applications were already in use on a modest scale prior to 2005.

The development of RIS is also recognised and fostered by the Rivers Commissions (Central Commission for Navigation on the Rhine (CCNR) and Danube Commission (DC)) and by the International Association for Navigation (PIANC). A number of important organisational and standardisation prerequisites have been developed within these organisations (closely together with EU and European experts). In 2002 PIANC compiled the RIS Guidelines on the basis of the results of the different European research and development projects. The harmonised development of RIS has not only been fostered by European initiatives such as TEN-T programmes, but also through the formulation of common RIS Guidelines, which have been adopted by the CCNR.

Article 4(7) of the RIS Directive requires the Commission to take appropriate measures to verify the interoperability, reliability and safety of RIS. Article 12 requires the Commission to monitor the setting up of RIS in the Community. This study must be seen within this context.

1.2 Rationale for and timeframe of this evaluation

The technical assistance for this evaluation study has been provided under the Marco Polo accompanying measure concerning 'Provision of support services in the field of inland waterway transport' Lot 3: "RIS implementation survey and policy evaluation". The technical assistance was provided by experts from a consortium that was composed of the following partners:

- Panteia/NEA (leading partner)
- Planco
- KTI
- Policy Research Corporation

The main objective of the study is:

"To prepare and execute an evaluation of the RIS policy for the period 2006-2011".

More specifically, the purpose of the project is to provide the European Commission with an:

1. Evaluation of the state of transposition and implementation of the RIS Directive in accordance with Commission evaluation standards;
2. Assessment of the coordination of RIS implementation;
3. Assessment of barriers to and opportunities for further development of RIS.

Within the context of a further development of RIS, the evaluation in particular, focuses on:

1. The relevance of the programme's objectives in view of the overall transport policy objectives
2. The state of transposition and implementation of the RIS Directive in the EU Member States
3. The effectiveness and efficiency of RIS implementation
4. The impact of RIS on inland waterway transport market development, social conditions and environment
5. The effectiveness of particular support actions implemented under the relevant national and EU programmes
6. The coherence and interrelationship between various support programmes and instruments in support of RIS.

[11] Serbia and Ukraine are examples of non-EU countries that are connected to the EU Waterways.

1.3 Key RIS actors and stakeholder groups

Key actors involved in this evaluation are the EU Member States, through relevant ministries and agencies, and the inland navigation companies. Actor groups that can be distinguished are:

- RIS Policy makers
- RIS Managers
- RIS Service providers
- RIS Users

A full overview of the RIS stakeholders is presented in the RIS Guidelines[12] and the organisations and names of interviewed stakeholders are presented in Annex 3.

1.4 Structure of the report

This evaluation report consists of four parts, in order to create a clear division between facts, methodology, evaluation of the assessor and conclusions and recommendations.

- Part 1: Description of RIS (chapters 1-3)
- Part 2: Data and evaluation methodology (chapter 4)
- Part 3: Evaluation findings (chapters 5-9)
- Part 4: Conclusions and recommendations (chapters 10 and 11)

In Part 1 of the report, chapter 1 (this chapter) contains the introduction. In chapter 2, the legal context is described. In Chapter 3, a concise overview is given on the implementation of RIS. A more in-depth analysis of the history of RIS and a more detailed technical background is included in Annex 1 and 2.

In part 2, chapter 4 describes the data on which this evaluation is based, as well as the evaluation methodology. Evaluations questions are formulated. An important source of information and data are the country reports that are developed based on an extensive survey that was held within the context of this report based on interviews and desk research on national and regional level. The country reports have been included in Annex 4.

Part 3 contains the actual evaluation of the implementation of RIS. The evaluation questions are divided into five different categories, which correspond to the following five chapters:

- Chapter 5: Implementation of RIS legislation
- Chapter 6: Implementation of RIS key technologies and services
- Chapter 7: Implementation of organisation of RIS
- Chapter 8: Provision and use of financial resources
- Chapter 9: Impacts of RIS

Part 4 contains the conclusions and recommendations in chapter 10 and 11, respectively. The recommendations are aimed at activities in the period 2014-2020 in particular.

RIS uses terminology with sometimes a slightly different meaning than in regular English. In this report, the use of this terminology cannot be avoided. For this reason RIS definitions have been included ('General RIS Definitions'[13]).

[12] Please see: CCNR RIS Guidelines 2011, Edition 3.0: http://www.ccr-zkr.org/files/ documents/ris/guidelines30_e.pdf , section 3.4.
[13] See Annex of this report.

2 General legislative context

2.1 Introduction

On 25 May 2004, the European Commission submitted a Proposal for a Directive of the European Parliament and of the Council on harmonised river traffic information services on inland waterways in the Community. In submitting this proposal, the Commission was seeking to support the future development of inland waterway transport (IWT) by integrating and harmonising the existing national telematics services which have been introduced in the various Member States.

The proposal was part of a policymaking initiative to promote other transport modes as alternatives to road transport, in order to resolve the difficulties brought about by the inconsistent transport policy which deemed to be the root cause of the major problems the European transport system faced at that time. The European Commission believed that the deployment of the River Information Services (RIS) concept will secure compatibility and interoperability between already existing and new RIS systems at European level. The international river commissions (Central Commission for Navigation on the Rhine (CCNR) and the Danube Commission) backed the development and introduction of RIS. To that end, the CCNR already adopted for the Rhine the technical guidelines and specifications provided for under the directive and drawn up by the International Navigation Association (PIANC).

In principle, the Directive does not oblige private users (ship operators) to install equipment necessary for participating in RIS. However, MSs are asked to take appropriate measures to encourage users and vessels to comply with the equipment requirements provided for in the Directive. Furthermore, the scope of the Directive is limited to inland waterways of class IV and above[14].

RIS is a comprehensive set of services for navigation on the inland waterway network, which are agreed internationally for safety reasons and in the interests of pan-European harmonisation in: legal framework that consists of European and international legislation but also other international bodies are involved in the development of the legislative RIS framework for various communities.

2.2 Relevant EU policy and legislation

The key relevant documents of the EU are:

- **Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community (implemented by the Member States on 20 October 2007):** this Directive establishes a framework for the deployment and use of harmonised River Information Services in the Community in order to support inland waterway transport with a view to enhancing safety, efficiency and environmental friendliness and to facilitating interfaces with other transport modes. With the provided framework further development of technical requirements, specifications and conditions to ensure harmonised, interoperable and open RIS for the inland waterway community is being established.

[14] Opinion of the European Economic and Social Committee of the Proposal for a Directive of the European Parliament and of the Council on harmonised river traffic information services on inland waterways in the Community", (COM(2004) 392 final – 2004 /0123 (COD)), (2005/C 157/08).

- **Annex 1 RIS Guidelines of the RIS Directive: the RIS guidelines describe the principles and general requirements for planning, implementing and operational use of river information services and related systems:** the RIS guidelines describe the principles and general requirements for planning, implementing and operational use of river information services and related systems. The guidelines are applicable to the traffic of cargo vessels, passenger vessels and pleasure craft and should be used in conjunction with international regulations, recommendations and guidelines.
- **Corrigendum to the Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community (L344/52 of 27 December 2005):** in this Corrigendum the time-tables for the establishment of the RIS guidelines and the technical specifications regarding vessel tracking and tracing systems are is being altered to 20 December 2006 (RIS guidelines) and 20 January 2007 (VTS).
- **Commission Regulation (EC) No 414/2007 of 13 March 2007 concerning the technical guidelines for the planning, implementation and operational use of river information services (RIS) referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community:** This Regulation defines guidelines for the planning, implementation and operational use of river information services (RIS). The guidelines are set out in the Annex to this Regulation.
- **Commission Regulation (EC) No 415/2007 of 13 March 2007 concerning the technical specifications for vessel tracking and tracing referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community:** this regulation defines the technical specifications for vessel tracking and tracing systems in inland waterway transport. The technical specifications are set out in the Annex to this Regulation and correspond with the current state of art.
- **Commission Regulation (EC) No 416/2007 of 22 March 2007 concerning the technical specifications for Notices to Skippers as referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community:** this regulation defines the technical specifications for Notices to Skippers. The technical specifications are set out in the Annex to this Regulation.
- **Regulation (EC) No 219/2009 of the European Parliament and of the Council of 11 March 2009 adapting a number of instruments subject to the procedure referred to in Article 251 of the Treaty to Council Decision 1999/468/EC with regard to the regulatory procedure with scrutiny Adaptation to the regulatory procedure with scrutiny — Part Two:** The Commission should be empowered to adapt the Annexes to technical progress. Since those measures are of general scope and are designed to amend non-essential elements of Directive 2005/44/EC, they must be adopted in accordance with the regulatory procedure with scrutiny provided for in Article 5a of Decision 1999/468/EC. According to this Regulation, the Directive 2005/44/EC articles 10 (Amendment procedure) and article 11 (Committee procedure) have been replaced. This means for article 10 that Annexes I and II may be amended in the light of the experience gained from the application of this Directive and adapted to technical progress. For article 11 references are made to the advisory procedure: the EC shall be committed by an advisory committee composed of representatives of the Member States and chaired by a representative of the EC.

- **Commission Regulation (EU) No 164/2010 of 25 January 2010 on the technical specifications for electronic ship reporting in inland navigation referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community:** the technical specifications for electronic ship reporting in inland navigation are defined in this Regulation and are based on the principles set out in the Annex II of the RIS Directive.
- **Commission Regulation (EU) No 689/2012 of 27 July 2012 on Vessel Tracking and Tracing amending Regulation (EC) No 415/2007 concerning the technical specifications for vessel tracking and tracing systems referred to in Article 6 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community**: in order to remain interoperable with maritime vessel traffic management and information services (AIS), it was necessary to amend the EC regulation No 415/2007.
- **Commission Regulation (EU) No 909/2013 of 10 September 2013 on the technical specifications for the electronic chart display and information system for inland navigations (inland ECDIS) referred to in Directive 2005/44/EC of the European Parliament and of the Council**: in this regulation the technical specifications for inland ECDIS defined based on the technical principles set out in Annex II to Directive 2005/44/EC.
- **Commission Directive 2013/49/EU of 11 October 2013 amending Annex II to Directive 2006/87/EC of the European Parliament and of the Council laying down technical requirements for inland waterway vessels:** More than 14.000 vessels have been assigned a Unique European Vessel Identification Number (ENI) since the entry into force of Directive 2006/87/EC. This considerable amount of ENIs makes an efficient data exchange hard to manage without a suitable tool. Competent authorities need these data in order to avoid assigning two ENIs for one vessel, whereas RIS authorities need the data for the several RIS applications like preparing lock statistics. A central electronic register (hull data base) to which all authorities are connected is necessary to create an efficient data exchange and to adapt the Annex to this Directive to technical progress.

Focus on RIS directive

The key policy document in this report is the RIS Directive. The legal definition of RIS as stated in the aforementioned RIS Directive :

"River Information Services (RIS), means the harmonised information services to support traffic and transport management in inland navigation, including, wherever technically feasible, interfaces with other transport modes. RIS do not deal with internal and commercial activities between one and more the involved companies, but are open for interfacing with commercial activities. RIS comprise services such as fairway information, traffic information, traffic management, statistics and custom services and waterway charges and port dues".

RIS provides information to inland shipping business processes, ranging from lock management, traffic management, navigation, and transport logistics to harbour dues. The RIS Directive requires the EU Member States with waterways of CEMT class IV and above (Austria, Belgium, Bulgaria, Czech Republic, Germany, France, Hungary, Luxembourg, the Netherlands, Poland, Romania, Croatia and the Slovak Republic) to supply RIS users with all relevant data in an accessible electronic format. Furthermore the RIS Directive states that – the Member States shall actively encourage boat masters, operators, agents or vessel owners to fully profit from the services which are made available under the Directive. RIS should be built on interoperable systems that should be based on public standards, available

to all system suppliers and users.
In order to support RIS and to ensure the interoperability of these services (as mentioned in the legal definition) the Commission defined in accordance technical guidelines for the planning, implementation and operational use of the services (RIS guidelines) as well as technical specifications in the following areas:

- Electronic chart display and information system for inland navigation (ECDIS)
- Electronic ship reporting
- Notices to skippers
- Vessel tracking and tracing systems
- Compatibility of the equipment necessary for the use of RIS.

The RIS Directive consists of 14 Articles and 2 Annexes. A short description of the various articles is included in the next textbox and Tables 2.1-2.4.

Article 1 Subject Matter: In this article is defined that the Directive will establish a framework for the deployment and use of RIS as well as for the further development of technical requirements, specifications and conditions to ensure harmonised, interoperable and open RIS on the Community inland waterways.

Article 2 Scope of RIS: The RIS Directive is applicable for inland waterways of class IV and above which are linked with an inland waterway of class IV and above of another Member State including the ports on such waterways. Member States may apply the RIS Directive also on other waterways.

Article 3 Definitions: are given of the key RIS terms namely River Information Services, fairway information, tactical traffic information, strategic traffic information, RIS application, RIS centre, RIS users and interoperability.

Article 4 Setting up of RIS: This article obliges the Member States to take the necessary measures to implement RIS with regard to the supply of all relevant data concerning navigation (identification, name, position (actual), speed over ground, course over ground/direction, destination/intended route, vessel and convoy type, dimensions (length and beam), number of blue cones, loaded/unloaded, navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions) and voyage planning (position (actual, own vessel), speed over ground (own vessel), destination/intended route, ETA at lock/bridge/next sector/terminal, RTA at lock/bridge,/next sector/terminal, dimensions (length and beam) (own vessel), draught (own vessel), air draught (own vessel), loaded/unloaded) to RIS users, suitable electronic navigational charts, the receipt (if nationally required) of electronic ship reports of the required data of ships including also cross-border transmission and , provide standardised Notices to Skippers including water levels and ice messages. RIS centres shall be developed according to regional needs. For the use of AIS the regional arrangement concerning the radiotelephone services on inland waterways (Basel, 6 April 2000) shall apply. Member States will encourage the use of RIS and the Commission will take appropriate measures to verify interoperability, reliability and safety of RIS.

Article 5 Technical **guidelines and specifications**: in order to support RIS and to ensure interoperability the Commission defines technical guidelines for the planning, implementation and operational use of the services as well as technical specifications in particular the following areas: ECDIS, electronic ship reporting, notices to skippers, vessel tracking and tracing systems, compatibility of the equipment necessary for the use of RIS.

Article 6 Satellite positioning: in this article the use of satellite positioning technologies is recommended as exact positioning is required for RIS.

Article 7 Type approval of RIS equipment: RIS terminal and network equipment and software applications shall be type-approved for compliance

Article 8 Competent authorities: Member States shall designate competent authorities for RIS application and international data exchange.

Article 9 Rules on privacy, security and re-use of information: Member States need to carry out the processing of personal data necessary for the operation of RIS carried in accordance with Community rules.

Prior to the articles, the Directive provides more background on motivation, objectives and conditions. Also, the Directive formulates requirements for the Member States, which are also further elaborated in the regulations (mainly the technical requirements as defined in the Annexes of the Directive).

These requirements are:

Table 2.1 Requirements corresponding to various articles in the RIS Directive

Article	*Requirements*
Art 4.1: MS shall take necessary measures to implement RIS on inland waterways falling within the scope of Art. 2.	RIS implementation on all inland waterways of the Member States of class IV and above which are linked by a waterway of class IV and above of another Member State, including the ports on such waterways.
Art. 4.3 (a): Member States shall supply to all RIS users all relevant data concerning navigation and voyage planning.	In Annex 1 minimum data requirements are specified related to Article 4(3)(a): • waterway axis with kilometre indication; • restrictions for vessels or convoys in terms of length, width, draught and air draught; • operation times of restricting structures, in particular locks and bridges; • location of ports and transhipment sites; • Reference data for water level gauges relevant to navigation.
Art. 4.5. and art.5:technical specifications for AIS	Implementation of technical specifications for vessel tracking and tracing systems by 13 September 2009; amendment 27 July 2013
Art. 4.3 (b) and art. 5: Ensure that for all their inland waterways of class VA and above, electronic navigational charts suitable for navigation purposes are available to RIS users.	Implementation of technical specifications for the electronic chart display and information system for inland navigation (Inland ECDIS) by 29 March 2016.
Art 4.3 (c) and art. 5: Enable, as far as ship reporting is required by national or international regulations, the competent authorities to receive electronic ship reports of the required data from ships. In cross border operation this information shall be transmitted to the competent authorities of the neighbouring State before arrival of the ship.	Implementing of the technical specifications for electronic ship reporting in inland navigation by 25 July 2012.
Art 4.3. (d) And art. 5: Ensure that notices to skippers, including water level and ice reports of their inland waterways, are provided as standardised, encoded and downloadable messages	Implementing of technical specifications for Notices to Skippers by 22 September 2009

Article	Requirements
Art. 12.1 and 12.2 Transposition: 12.1 Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive 12.2 Member States shall take the measures not later than 30 months after the entry into force of the relevant technical guidelines and specifications referred to in Article 5.	Implementation of RIS Directive by 20 October 2007

More specific, with regard to the implementation of ERI, AIS en NtS the following requirements should be met by the Member States. The requirements of the ECDIS regulation are not taken into account, as the regulation has only been published in September 2013 which is outside the scope of this evaluation.

Table 2.2 Requirements regarding Notices to Skippers

Subject	Notices to Skippers (NtS)
Description	Notices to Skippers (NtS) is a RIS key technology which provides in a standardized manner and which is language independent: a) fairway and traffic related information, as well as b) hydrographical information such as weather information, water level information and ice information
Minimal required activities and conditions	Provision according to technical specifications in the regulation 416/700 in XML- format downloadable via the Internet of: • Fairway and traffic related messages; • Water level related message; • Ice messages. Enabling specific downloads for sections of waterways, specific point or parts of a waterway, time of validity and date of publication of the notice.
Recommended or optional activities	• Provision via WAP and/ or E-mail services • Data exchange between authorities • Integration of messages of other authorities • Weather related message means a notice on the weather situation • While the strict adherence to coding prescriptions should enable software to automatically translate messages in most EU languages used and translating messages for broadcasting might still be considered for skippers that do not otherwise use NtS.
Legal base	EC Regulation 416/2007 concerning the technical specifications for Notices to Skippers as referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS)

Subject	Notices to Skippers (NtS)
International standards	a) Resolution of the Central Commission for the Navigation of the Rhine of 2004: (Resolution 2004-I-17) b) UNECE Resolution No.60 on International Standards for Notices to Skippers and for Electronic Ship Reporting in Inland Navigation (ECE/TRANS/SC.3/175, as amended
Time window for completion of minimal required activities	22nd of September 2009

Table 2.3 Requirements regarding Electronic Reporting

Subject	Electronic reporting (ERI)
Description	Electronic (Ship) Reporting (ERI) is a RIS key technology in Inland Navigation that facilitates electronic data interchange (EDI) between partners in inland navigation, as well as partners in the multi-modal transport chain involving inland navigation and avoids the reporting of the same information related to a voyage several times to different authorities and/or commercial parties.
Minimal required activities and conditions	In the case that electronic ship reporting is required by national or internal law standardised messages shall be applied according to the technical standards described in Regulation 164/2010 for the following four reporting messages: 1) (dangerous) goods reporting (IFTDGN)-ERINOT 2) Passenger and crew lists (PAXLST) 3) ERINOT response and receipt message (APERAK)-ERIRSP 4) Berth management port notification (BERMAN) The competent authorities shall be able, as far as ship reporting is required by national or international regulations, to receive electronic ship reports of the required data from ships. In cross-border transport, this information shall be transmitted to the competent authorities of the neighboring State and any such transmission shall be completed before arrival of the vessels at the border. Member States shall ensure that processing of personal data necessary for the operation of RIS is carried out in accordance with the Community rules protecting the freedoms and fundamental rights of individuals, including Directives 95/46/EC and 2002/58/EC.
Recommended or optional activities	• The competent authorities shall take the necessary measures to ensure the confidentiality, integrity and security of information sent to them pursuant this standard. • They must use such information only for the purposes of the intended services, for example calamity abatement, border control, customs. • A request to forward information contained in a

Subject	Electronic reporting (ERI)
	ship-to-authority-message to any other • Involved party will not be executed without explicit approval from the owner of the information being the skipper of the vessel or the shipper of the cargo. • An agreement on the protection of privacy between all involved public and private parties shall be concluded for new applications, based on UNECE Recommendation 26 that contains a 'Model Interchange Agreement
Legal base	The legal basis for electronic reporting is: EC Regulation No 164/2010 of 2010 on the technical specifications for electronic ship reporting in inland navigation referred to in article 5 of Directive 2005/44/EC of The European Parliament and of the Council of 2005 on harmonised River Information Services (RIS)
International standards	• Resolution of the Central Commission for the Navigation of the Rhine (CCNR) of2003: (Resolution 2003-I-23). • United Nations recommendations regarding the interchange of trade data (UN CEFACT recommendation 25, 31 and 32, EDI and E-Commerce agreements). • UNECE Resolution No.60 on International Standards for Notices to Skippers and for Electronic Ship Reporting in Inland Navigation (ECE/TRANS/SC.3/175, as amended)
Time window for completion of minimal required activities	25th July 2012

Table 2.4 Requirements regarding AIS

Subject	Vessel Tracking and Tracing System (AIS)
Description	Inland AIS (AIS stands for "Automatic Identifi-cation System") is a standardised procedure for the automatic exchange of nautical data between ships and between ships and shore installations. As an instrument for the tracking and tracing of inland navigation vessels it is one of the four key-technologies for "River Information Services" (RIS) for inland navigation and its purpose is to improve safety and efficiency in the sector. It supports on-board navigation, shore-based traffic monitoring as part of Vessel Traffic Services (VTS) and other tasks such as calamity abatement.
Minimal required activities and conditions	The regulation requires that AIS shall: • provide information - including the ship's identity, type, position, course, speed, navigational status and other safety-related information - automatically to appropriately equipped shore stations, other ships and aircraft; • receive automatically such information from

Subject	Vessel Tracking and Tracing System (AIS)
	similarly fitted ships; · monitor and track ships; • Exchange data with shore-based facilities. • User ID: Unique Station Identifier for inland AIS transponders
Recommended or optional activities	-
Legal base	The legal basis for AIS is: • Commission Regulation (EC) No 415/2007 of 13 March 2007 concerning the technical specifications for vessel tracking and tracing referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community • Commission Regulation (EU) No 689/2012 of 27 July 2012 on Vessel Tracking and Tracing amending Regulation (EC) No 415/2007 concerning the technical specifications for vessel tracking and tracing systems referred to in Article 6 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community
International Standards	• International standard for tracking and tracing on inland waterways (VTT); resolution no. 63 UN-ECE 2007 • Vessel Tracking and Tracing standard for inland navigation edition 1.01; 10-10-2007 CCNR • Vessel Tracking and Tracing standard for in-land navigation edition 1.2; 23-04-2013 CCNR. • Resolution of the Central Commission for the Navigation of the Rhine (CCNR) of 31 May 2006:“Vessel Tracking and Tracing Standard for Inland Navigation (VTT Standard 2006) “(Protocol 2006-I-21). • Decision of the Police Committee, Central Commission for the Navigation of the Rhine (CCNR) of 10 October 2007. “Vessel Tracking and Tracing Standard for Inland Navigation (VTT Standard, Edition 1.01) “(Protocol 2007-II-31). • Resolution of the Central Commission for the Navigation of the Rhine (CCNR) of 31 May 2007: “Vessel Tracking and Tracing Standard for Inland Navigation – Type approval, installation and operation of Inland AIS devices on inland navigation vessels“ (Protocol 2007-I-15). • Resolution of the Central Commission for the Navigation of the Rhine (CCNR) of 6 December 2007: “Vessel Tracking and Tracing Standard for Inland Navigation – Type approval, installation and operation of Inland AIS devices on inland navigation vessels“ (Protocol 2007-II-24). • Decision of the Police Committee, Central Commission for the Navigation of the Rhine (CCNR) of 16 October 2012. “Test Standard for Inland AIS”, Edition 2.0 (Protocol 2012-II-20,

Subject	Vessel Tracking and Tracing System (AIS)
	point 5.1), coming into force on 19 October 2012. • Police Regulation for Rhine Navigation, § 4.07. • Rhine Vessel Inspection Regulation, § 7.06 Nr. 3.
Time window for completion of minimal required activities	27 July 2013

2.3 International standards and policies

CCNR

In developing RIS, the CCNR strives to work closely with the European Commission. The work carried out by the CCNR and the standards adopted by the CCNR form an important basis for the RIS Directive. The CCNR, in turn, adapts the standards that are approved by the CCNR as far as possible to the specifications adopted in the framework of the Community Directive. The following legal framework is applicable for inland shipping on the Rhine.

- RIS Guidelines and Recommendations for River Information Services, Edition 3.0, as elaborated by the Permanent Working Group 125 of the World Association for Waterborne Transport Infrastructure PIANC; translated and edited by the CCNR Working Group on RIS on 30th August 20-12;
- Tracking and Tracing standard. Formalised as Commission Regulation (EC) No 415/2007 22 March 2007, concerning the technical specifications for Vessel Tracking and Tracing systems and as Vessel Tracking and Tracing Standard for Inland Navigation Edition 1.01, 10.10.2007 by the CCNR;
- Inland AIS test standard. Formalised as Inland AIS Ship borne Equipment – According to the Vessel Tracking and Tracing Standard for Inland Navigation – Operational and Performance requirements, Methods of Test and Required Test Results, Edition 1.01, 22.10.2008, by the CCNR;
- Notices to Skippers standard. Formalised as Commission Regulation (EC) No 416/2007 of 22 March 2007 concerning the technical specifications for Notices to Skippers and as Notices to Skippers International Standard, Edition 3.0, 27.10.20096, by the CCNR;
- Electronic Reporting standard. Formalised as Commission Regulation (EC) No 164/2010 of 25 January 2010 concerning the technical specifications for Electronic Reporting and as Standard for Electronic Ship Reporting in Inland Navigation, Edition 1.2, 19.10.2006, by the CCNR;
- Standard for Electronic Display and Information System for Inland Navigation, Inland ECDIS, Edition 2.0, 23.11.2006 as formalized by the CCNR as Protocol 2006-II-22. The transition from Edition 2.0 to Edition 2.1 of the Standard is in force and dated 22.10.2008;

- Guidelines and Criteria for Vessel Traffic Services on Inland Waterways, 31.5.2006 (Enclosure to CCNR protocol 2006-I-20) and IALA recommendation V-120, June 2001. The use of Inland AIS will become mandatory on the Rhine as from the 1st December 2014[15]

UNECE

The United Nations Economic Commission for Europe (UNECE) works for a smooth and efficient inland waterway transport across the region, as well as for further expansion of the networks to take ultimate advantage of this safe and sustainable mode of transport. Also in the area of River Information Services the UNECE is active but the work is accomplished in close cooperation with the European Commission, the River Commissions and other competent international bodies. The UNECE Working Party on Inland Water Transport is an intergovernmental body which ensures maintenance of relevant legal agreements such as the European Agreement on Main Inland Waterways of International Importance (AGN). It also adopts UNECE resolutions on RIS. Furthermore the role of the UNECE for bringing the RIS standards also to the broader UNECE area (in particular Serbia, Ukraine and Russia) should be mentioned.

The main resolutions of the UN ECE on RIS are[16] :

- UNECE Resolution No. 48 on Recommendation on electronic chart display and information system for inland navigation (inland ECDIS) (ECE/TRANS/SC.3/156/Rev.1);
- UNECE Resolution No. 58 on Guidelines and Criteria for Vessel Traffic Services on Inland Waterways (TRANS/SC.3/166);
- UNECE Resolution No. 60 on International Standards for Notices to Skippers and for Electronic Ship Reporting in Inland Navigation (ECE/TRANS/SC.3/175 as amended);
- UNECE Resolution No. 63, International Standard for Tracking and Tracing on Inland Waterways (VTT) (ECE/TRANS/SC.3/176).
- UNECE Resolution No. 73 on Guidelines and Recommendations for River Information Services - (Revised Resolution No. 57) (ECE/TRANS/SC.3/165/Rev.1)

PIANC

In developing and implementing RIS, authorities and enterprises involved were faced with the challenge of integrating the various RIS building blocks into a common architecture that offers some degree of consistency and synergy across applications. To achieve this, comprehensive international Guidelines and Recommendations for River Information Services were defined within PIANC. These guidelines describe the principles and general requirements for planning, implementing and operational use of River Information Services and related systems. They include in particular the definitions of the specialised terms used in RIS. The CCNR adopted the Guidelines and Recommendations for River Information Services (RIS Guidelines) in 2002 and a subsequent revision in 2004. Edition number 3 of the RIS Guidelines has been published in January 2012.

[15] CCNR decided, at its session in the autumn of 2013 to introduce an obligation to fit and use an Inland AIS device connected to an Inland ECDIS device in information mode (or a comparable device for displaying charts). The obligation will take effect on 1 December 2014, and applies to all vessels, with some exceptions (including small craft which do not have an inspection certification in compliance with the Rhine Vessel Inspection Regulations).

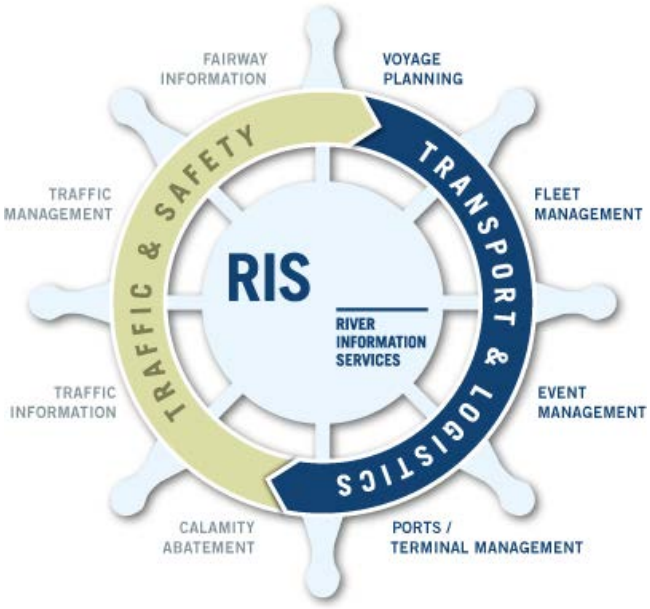
[16] http://www.unece.org/trans/main/sc3/sc3res.html,

3 RIS facts and figures

3.1 Introduction

RIS aims at the harmonised implementation of various types of information services around waterways and transport activities on those waterways. RIS aims to support traffic and transport management in inland, including interfaces with other transport modes. The implementation of RIS should not only improve safety and efficiency on the inland waterways but also enhance the efficiency of transport operations in general. The figure below summarise at a high level of abstraction the main objectives and fields where information services could be harmonised and improved, as these were originally conceived (RIS concept).

Figure 3.1 General schematic overview of main objectives and functions of RIS



Source: via donau

River Information Services can be divided into services which are either primarily traffic-related or primarily transport-related. RIS can be divided into eight main categories and all categories together contain about 75 distinct services. These eight main categories are:

Traffic related:

1. **FIS – Fairway Information Services**: contains geographical, hydrological and administrative data that are used by skippers and fleet managers to plan, execute and monitor a vessel's voyage.
2. **TTI – Tactical Traffic Information**: the information provided in TTI supports the skippers in his immediate navigational decisions with regard to short-term traffic situations. The STI-Strategic Traffic Information provides the skippers with a general overview of the traffic situation in a relatively large area. STI is mainly used for planning and monitoring.
3. **TM – Traffic Management Services**: Traffic management is carried out by the competent RIS authority and is aimed at optimal utilisation of the infrastructure and

assurance of safe navigation and protection of the environment on two levels: vessel traffic services (VTS) and locks and bridge management (LBM). A specific category of TM dealing with information services for traffic planning on a more strategic level is being developed more and more.

4. **CAS – Calamity Abatement Services**: related to the RIS authorities, three functionalities should be mentioned: (1) provision of information on accidents focussed on a traffic situation, (2) presentation of information to patrol vessels, police boats and rescue vessels and (3) initiation of search and rescue activities. Other functionalities belong to the tasks of local rescue teams like co-ordination of the assistance of patrol vessels and taking measures on traffic, environment and people protection.

Transport related:

5. **ITL – Information for Transport Logistics**: the development and use of RIS services for transport logistics is still in an initial stage. In the 7RFP RISING project[17], information services which would efficiently support inland waterway transport and logistics operations will be further identified and integrated into the RIS system like voyage planning, fleet management, port/terminal management and event management.
6. **ILE – Information for Law Enforcement**: RIS can support cross-border law enforcement on inland navigation such as the movement of people controlled by the immigration service, customs etc. Also law enforcement for the requirements for traffic safety and environment is possible with RIS.
7. **ST – Statistics**: RIS can be used to collect relevant data on inland waterway traffic and statistics. There will be no need for skippers and terminal and lock operators to provide special statistics as the data already collected for other services can be used.
8. **WCHD – Waterway Charges and Harbour Dues**: RIS can assist in levying charges for the use of infrastructure. The voyage data of a ship can be used to automatically calculate the charge and initiate invoicing.

3.2 Description of RIS key technologies

The RIS key technologies have a central position in the services to be provided; these key technologies are:

- *Inland ECDIS:* With Electronic Navigational Charts (ENCs) and inland electronic chart display and information systems for inland navigation (inland ECDIS) skippers are able to plan their voyage ahead;
- *Electronic Ship Reporting*: Electronic Ship Reporting consists of standardised electronic data exchange between skippers and waterway authorities (Ship to authority and authority to authority) concerning relevant cargo, traffic and transport information;
- *Vessel Tracking and Tracing (Inland AIS)*: similar to maritime navigation inland automatic identification system (AIS) on board of inland vessels allows for vessel tracking and tracing on inland waterways. Through AIS transponders data concerning tactical traffic information can be broadcasted and received;
- *Notices to Skippers*: Notices to Skippers are standardised messages for skippers containing fairway information allowing traffic management as well as voyage planning.

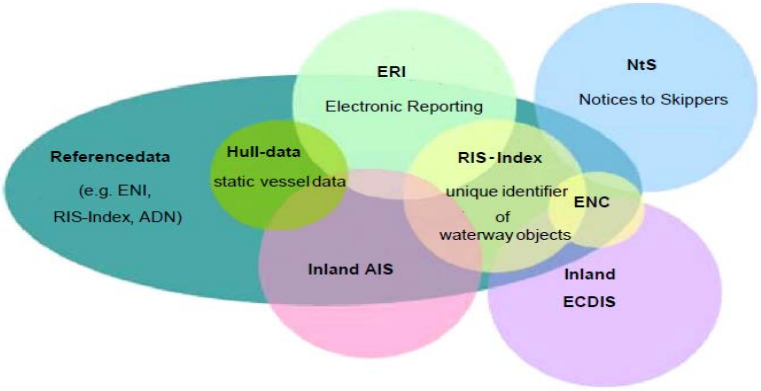
These RIS technologies are called *key* RIS technologies because they are considered technologies that are pivotal for the realization all eight main RIS Categories or Services, which were outlined in Chapter 3.1. Each of these key technologies will be

[17] www.rising.eu.

discussed more in detail in four subsections below. The basis of the technologies is described in the Annex I of the RIS Directive which forms the basis of also some of the reference data.

It should be noted, however, that in order to operate properly and efficiently with these RIS key technologies two (second order) supporting services were built. These are a RIS references data (including RIS Index) and the Hull data base. These tools/ services are key elements in the RIS standards and are an important link between the various RIS-services. The interrelationship between various technologies is sketched in Figure 3.2.

Figure 3.2 Interrelationship between various RIS technologies



The RIS reference data include data of the entire inland waterway network, for instance the location of locks, bridges and ports. These data are generated by the national authorities and skippers need the data in RIS applications. Within the PLATINA project and in cooperation with national authorities' data management procedures have been defined as well as the development of the European Reference Data Management Service/ERDMS (a reference management tool). This tool supports the harmonised generation of Reference data as the data can be downloaded from one central point. This service provides a central database, a web service application for maintaining RIS reference data, which is used by various RIS-systems in the inland shipping sector across Europe. The exchange of computerised data between the RIS users and the RIS services is facilitated by the use of the codes and references. The RIS Index is a list of (ISRS) location codes with additional information on the objects like their characteristics (name, fairway….), restrictions (available depth, clearance etc.), operating times etc. and is part of the reference data. The exchange of data in connection with River Information Services (RIS) is of course dependent on the correct usage of standard codes. The need to ensure common understanding of data exchanged throughout Europe, with many different languages and many different legal regimes leads to a strong requirement to encode the data in a common and accepted standard manner. The countries applying RIS are obliged to identify the objects. This has led to the need to develop a European wide encoded harmonized list of objects, which is called the RIS index.

The hull database is another important link between the various RIS services. In the EU research project COMPRIS the consortium came to the conclusion that a unique identifier for vessels is necessary for the implementation of RIS. Within the EU Directive 2006/87/EC, the RheinschUO and EC regulation 164/2010 a minimum set of hull data to be exchanged among vessel certification and RIS authorities has been established. Later the Commission Directive 2013/49/EU amended the Directive 2006/87/EC by

introducing the obligation to report to the EHDB. The European Hull Database (EHDB) has been facilitating the data exchange. The hull database serves two main purposes:

- providing information on vessels with a unique European Vessel Identification number (ENI) and their certificates;
- providing a possibility to check whether a vessel has already an ENI.

3.3 Organisation of RIS implementation

The development on River Information Services was initiated in Europe by the European Commission. The potential of RIS to bring inland navigation to an improved position in the transport chain was at an early stage also recognised by international organisations like the UNECE, several river commissions like the Rhine, Sava and Danube Commission and PIANC, the International Association for Waterborne Transport Infrastructure. The UNECE, the Danube Commission and Sava Commission in Europe and also the river commissions in Asia all take their part in the development and implementation activities of RIS.

The organisation of the RIS implementation in specific countries is described in detail in the Annex 4, "RIS implementation survey and policy evaluation - Country Report", September 2013.

3.3.1 Organisational aspects of Directive 2005/44/EC

In Europe, the main milestone in the organisation of RIS was the adaptation of the Directive 2005/44/EC. This Directive provides a framework for the establishment and further development of technical requirements, specifications and conditions to ensure harmonised, interoperable and open RIS on the Community inland waterways. Such establishment and further development of technical requirements, specifications and conditions was carried out by the Commission, assisted by the Committee referred to in Article 11 of this Directive. This is the Committee that was already instituted by Article 7 of Council Directive 91/672/EEC of 16 December 1991 on the reciprocal recognition of national boatmasters' certificates for the carriage of goods and passengers by inland waterway with references to Decision 1999/468/EC on the procedures of the Committee.

Next to the RIS Directive the EC formalised a common implementation framework – the RIS Guideline – as a first step towards the practical implementation of River Information Services. This framework has been created by International Guidelines and Recommendations for River Information Services (RIS Guidelines 2004) that were elaborated by PIANC[18].

The RIS Guidelines were adopted as Commission Regulation (EC) No 414/2007 concerning the technical Guidelines for the planning, implementation and operational use of river information services (RIS) referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised River Information Services on inland waterways in the Community. In addition to the Member States, the RIS Committee a number of other organisations are active in the coordination of RIS implementation across the borders of countries.

[18] In august 2012 a new version of the RIS Guidelines were published, version 3.0 prepared by PIANC and CCNR with more elaborated guidelines on the implementation (a.o. new "Mission Statement").

3.3.2 River Commissions

River Commission have been active in the organisation of the implementation of RIS. In particular CCNR has been very active and important for the organisation of implementation of RIS on the Rhine corridor. Amongst others in terms of issuing regulations in order to ensure that the technical standards are complied with in an efficient manner. If and where necessary, CCNR introduced a statutory requirement for vessels to have the necessary equipment. The CCNR also published technical standards for electronic navigational charts, electronic ship reporting, notices to skippers for inland navigation and automatic vessel tracking and tracing (Automatic Identification System, AIS). The experiences with formulating these standards were used to support the development of the standards at the European Commission where the standards were duplicated and/or adjusted and improved The CCNR introduced mandatory electronic reporting for container vessels on 1.1.2010.

3.3.3 UNECE

The United Nations Economic Commission for Europe (UNECE) deals with a wide range of issues, amongst others on River Information Services. This is coordinated by "The UNECE Working Party on Inland Water Transport" (SC.3), which is an intergovernmental body which ensures maintenance of relevant legal agreements. It also adopts UNECE resolutions on the inland water transport issues listed above. SC.3 meets once a year. With regard to RIS the main role of the SC.3 is to ensure the development of RIS outside the EU Member States is running in the same way outside the EU area meaning duplication the EU regulation in this field. The technical descriptions are in line with the EU resolutions and include existing technologies. The UN resolutions have the character of recommendations meaning that these need to be adopted through national legislation.

3.3.4 PIANC

PIANC is a forum where professionals around the world join forces to provide expert advice on cost-effective, reliable and sustainable infrastructures to facilitate the growth of waterborne transport. Established in 1885, PIANC is a partner for government and private sector in the design, development and maintenance of ports, waterways and coastal areas. As a non-political and non-profit organisation, PIANC brings together the best international experts on technical, economic and environmental issues pertaining to waterborne transport infrastructures. Members include national governments and public authorities, corporations and interested individuals.

PIANC established a Working Group that developed in 2002 the Guidelines for River Information Services, which are still an important pillar in the implementation phase of River Information Services. In 2004 the first revision of these Guidelines was drafted and published. Within PIANC the RIS working Group 125 was established with the following tasks/results:

- Status report on the implementation and operation of River Information Services;
- Update of the PIANC RIS Guidelines 2004;
- Document on RIS definitions;
- Proposal for a RIS working group on the effects of maritime concepts as eNavigation, eMaritime and VTM on RIS.

The RIS working group has members from: Austria, Belgium, China, Czech Republic, Finland, France, Germany, Hungary, Poland, Russia, Serbia, the Netherlands and USA.

3.3.5 RIS Expert Groups (EGs)

The technical work towards European standardization is carried out by RIS Expert Groups (EGs). The RIS Expert Groups produce the standards including up-dates, but also technical clarification documents and other relevant documentation. The developed standards are delivered to the EU, CCNR or other international bodies in order to make the standards legally binding.

Participants of the expert groups are representatives of governmental bodies, branch organisations, research institutes, consultants and the industry. All expert groups operate a non-governmental, independent body of advising experts (a platform) without any legal status.

Currently there are four RIS expert groups:

- Electronic Chart Display and Information Systems (ECDIS);
- Electronic Reporting International (ERI);
- Notices to Skippers (Nts);
- Vessel Tracking and Tracing (VTT).

River Information Services (RIS) standardisation contribute to the harmonised implementation of RIS throughout Europe. Under the RIS Directive the European Commission is assisted by the RIS Committee. Furthermore, according to the RIS regulations, the European Commission will also take due account of the work carried out by the different expert groups. These groups are composed of representatives of the authorities of the Member States responsible for implementation of the technical regulations.

RIS Expert Groups meet every six months during the so-called RIS week. Besides discussing the proceedings for every Expert Group there is also a common issues meeting which can be joined by all Expert Group members. In the period in-between the RIS expert groups work on the development of the standards.

3.3.6 International projects funded by instruments such as TEN-T and FP7

In order to support the implementation of RIS, a number of international projects provided international organisational structures for research and international coordination purposes[19]:

- The IRIS Masterplan (2004-2005, TEN-T) paved the way to a harmonised and co-ordinated planning and implementation of RIS in the European Waterway network;
- The IRIS Europe I project (2006-2008, TEN-T) was the first project in Europe supporting the co-ordinated implementation of RIS and as such an example for future projects;
- The IRIS Europe II implementation project (2009-2011, TEN-T);
- Platform for the implementation of NAIADES, PLATINA (2008-2012, FP7);
- River Information Services for Transport and Logistics, RISING (2009-2011, FP7);
- Danube initiative NEWADA, Network of Danube Waterway Administrations (2009-2012), are projects depicted here as important contributions to the implementation and operation of RIS.

[19] Please see also PIANC REPORT 125 part I, chapter 11 pages 51 onwards.

3.4 RIS Waterway network

The RIS Directive applies to 12+1 countries[20]. About the waterway network it is stated that the Directive applies to:

"…. all inland waterways of the **Member States of class IV and above** which are linked by a waterway of class IV or above to a waterway of class IV or above of another Member State, **including the ports on such waterways** as referred to in Decision No 1346/2001/EC of the European Parliament and of the Council of 22 May 2001 amending Decision No 1692/96/EC as regards seaports, inland ports and intermodal terminals as well as project No 8 in Annex III (3). For the purposes of this Directive, the Classification of European Inland Waterways set out in UNECE Resolution No 30 of 12 November 1992 shall apply."

For ENCs in article 4 of the RIS Directive another (higher) waterway class boundary is given:

"……In order to set up RIS, Member States shall:.
…….. (b) ensure that for all their **inland waterways of class Va** and
above in accordance with the Classification of European Inland Waterways, in addition to the data referred to in point (a), electronic navigational charts suitable for navigational purposes are available to RIS users;"

In the EU (excluding the network in non-EU countries) 11,160 km is the total length of the network with waterway classes CEMT IV or higher and 75% of this network has a waterway class strictly higher than class IV. The total length of the navigable waterways in the countries was in 2010 29,995 km[21]. So from a purely spatial viewpoint, the RIS Directive applies to about 37% of the total navigable waterway network of the countries involved.

In the next table the length of the RIS network (in kilometres[22]) is given for four corridors and countries in the corridors. In a separate column the part with waterways larger than class IV, is indicated as well. Parts of the corridor in non-EU countries are marked in italics.

[20] RO, BG, HU, SK, PL, CZ, AT, DE, NL, BE, LU, FR and HR (which was in 2005 a candidate country).
[21] EUROSTAT Transport in figures 2013 (table 2.5.7).
[22] Based on the Official waterway documentation from various countries.

Table 3.1 Data for corridors to which the RIS Directive applies (countries in Italics are not EU countries)

Corridor	*Kms class IV and higher*	*Kms class Va and higher*
Rhine	**3180**	**2583**
- Switzerland	*22*	*22*
- France	243	243
- Luxemburg	18	18
- Germany	1745	1403
- Netherlands	1152	897
Danube	**3881.5**	**3309.5**
- Germany	623	623
- Austria	336	336
- Slovakia	172	88
- Hungary	385	344
- Croatia	137.5	137.5
- Serbia	*1152*	*705*
- Bulgaria	236	236
- Romania	750	750
- Moldova	*0.5*	*0.5*
- Ukraine	*89.5*	*89.5*
North-South	**2981**	**1922**
- Netherlands	429	429
- Belgium	975	448
- France	1577	1045
East-West	**2450**	**1388**
- Germany	2064	1200
- Czech Republic	271	106
- Poland	115	82

Source: corridor definition: Panteia. Based on infrastructure data from official national sources

3.4.1 Corridor overviews regarding RIS

In order to efficiently present the data and information that was gathered on a country level, the results have been summarized by means of making overviews from a corridor perspective. It is possible to uniquely allocate almost the entire RIS network (see table 3.1) to four corridors:

- Rhine corridor: Rhine stream area, Neckar, Mosel and waterways in Northern Netherlands;

- Danube corridor: Danube including Main Danube canal and parts of tributaries like Sava, Drava (higher or equal than class IV) until the Black-sea and White Gate-Midia canal;
- North South corridor: Southern Netherlands (Schelde and Maas), Belgium and France (until the Mediterranean but excluding Mosel and Upper Rhine);
- East-West Corridor: Oder- Wisla, Elbe and Mittellandkanal.

In the present section ***the (technical) availability*** of the key RIS technologies will be presented by means of tables and indicators for each particular corridor. The material in this section is derived from the country reports (see Annex 4).

Table 3.2 Data for corridors to which the RIS Directive applies

Key RIS technology	*Technical availability*	*Usage of technology*
AIS	Shore based infra in place; Type approval in place	Actual use of AIS on board of vessels by skippers
Inland ECDIS	Maps have been produced for a particular waterway; type approval in place	Maps are used on-board to visualise events, support voyage planning etc.
ERI	ERI can be applied if required on a particular water way trajectory. Authorities can process the messages.	ERI messages are send and processed
Nts	Messages are broadcasted reporting over incidents, depths, particular infrastructure trajectory	Messages are processed and read into on-board systems

It should be emphasised that the technical availability of the key technologies does not necessarily mean that they are actually used (see Table 3.2). It means that the framework conditions were created so that technology could be used, if required. Users may e.g. find the services not very useful, prefer alternative applications or find the services too difficult to work with etc. So it is important to make this distinction and this is also the reason why the actual use of the services is discussed separately in the next section.

The key RIS technologies have a close relationship with infrastructure. For digital maps this is obvious, but this is also true for NtS services (applicable to a certain parts of the network), ERI (if required only on a particular geographic operating area) and of AIS (support by shore stations /repeaters and regulatory environment in place).

So, four indicators relating to the **technical availability of a key RIS technology** to length (in km) of the waterway network[23] were defined and calculated. For the definition and method of calculation of the indicators see the textbox on the next page. For each of the four key technologies the indicators are calculated based on information from the country studies. The results are listed in table 3.3. For Notices for Skippers four different types of messages mentioned in the RIS Directive are distinguished.

Table 3.3 indicates that the indicators are highest in the Rhine corridor and the North-South corridor and much lower in the East-West corridor, except for NtS.

[23] Based on infrastructure data from official national sources (national infrastructure managers).

The percentages in table 3.3 mean to give a quick overview of the current availability of key RIS technologies in different corridors. They are not meant to show a breach of the RIS Directive. An indicator smaller than 100% does not directly indicate a breach of the RIS Directive, it could, however, indirectly.

First, only Members States and not Corridors are responsible for the implementation of the Directive and the regulations. So one always needs to look at individual countries in the corridor (this will be done in subsequent tables).

Second, the indicators do not always correspond to RIS Directive requirements. E.g. in de NtS message columns: WERM is not mandatory but the other messages are and in this case an indicator lower than 100% points to a breach of the Directive.
On the other hand, the IENC indicator relates to both charts for class IV and class Va. Only the latter is required, so this indicator does not reflect a breach of the Directive.

Network Indicators

- ***Indicator Inland ECDIS***: (kms for which IENCs are available)/ (total kms in corridor);
- ***Indicator NtS***: (kms for which NtS are produced)/ (total kms in corridor);
- ***Indicator ERI***: (kms where ERINOT/ ERISP messages are supported)/ (total kms in corridor);
- ***Indicator AIS***: (kms for which shore infrastructure is available)/(total kms in corridor).

Calculation method of the indicators

1) A database of infrastructure links of the IWT RIS network is used (see figure 1.1 for the RIS network)
2) Per link attributes are filled with category (1-0/ yes/no) variables to indicate presence or absence of a property of the link (e.g. is an IENC available=1 ; not available=0)
3) These variables are multiplied by the distance of the link in km.
4) Next all the indicators are summed for all links in the corridor
5) The sum is divided by the total kms in the corridor. The remaining number (a number between 0 and 1) is expressed as a percentage.

Table 3.3 Coverage rate of the IWT infrastructure by key RIS Technologies

Corridor	*Kms RIS*	*%Kms >class IV*	*IENC*	*AIS*	*ERI*	*NtS"*			
						FTM	ICEM	WRM	WERM
Rhine	3181	81%	89%	92%	92%	100%	92%	100%	45%
Danube	3809	86%	88%	79%	62%	100%	100%	100%	51%
North South	2980	65%	82%	89%	88%	100%	88%	88%	19%
East-West	2451	57%	60%	43%	11%	95%	95%	95%	11%

Source: calculations Panteia

"Note: FTM= Fairway and Traffic related Message
ICEM=ICE Message
WRM= Water level Related Message
WERM=WEather Report Message

Rhine Corridor

In table 3.4 basic information on the state of implementation of key RIS technologies in the Rhine corridor is presented. The following points should be noted with respect to the implementation of the key technologies:

1. Only in the Netherlands all NtS message types are provided. Weather[24] related messages are provided in Germany by other sources (but not in NtS standardized form). This is not a breach of the RIS Directive since WERM is not mandatory. The lack of ICEM messages, which are mandatory, in France and Luxembourg is a breach;
2. In the Rhine corridor AIS use is already very high. In Germany and the Netherlands the equipped fleet is already significantly higher than 90%. The installation of on-board equipment of the French fleet is lower but increasing (the 50% target was reached in 2013). The equipment of the French Rhine fleet, which is a small part of the entire French fleet, is at an equally high level as the German and Dutch fleets. The AIS implementation in Germany is with a few exceptions limited to ship-ship communication.
   There is no international data exchange of AIS data between Germany and France and Luxembourg. The German authorities do not see a legal base for international data exchange and storage of AIS data in a central database. Data privacy is a major concern;
3. Voyage reporting is currently only required for container vessels on some main inland waterways in the Rhine corridor. Electronic reporting according to the ERINOT standard 1.2 can be carried out with the free software application BICS. RIS centres manage the reported voyages in Germany with the application reporting and information system(MIB respectively MIB II+). Due to the international exchange, electronic reporting is only necessary once. International data exchange is implemented with the Netherlands, France and Luxembourg;
4. The coverage of the Rhine corridor waterways with ENCs is extensive. However, there are some gaps in the upper Rhine area (French-German Border area for which there is now a joint project that will produce the ENCs before 2016).

For the implementation of the RIS Directive in ports in the Rhine corridor the important distinctive factor is the organisation of the RIS implementation in Member States. While in the Netherlands only the port of Rotterdam has an independent status in Germany and France the position of ports is much stronger. The RIS implementation in the Netherlands more centralised than in Germany and France.

In Germany[25] port authorities are responsible for the provision of RIS applications related to inland ports. In German inland ports the implementation process takes a long time and only a few ports have implemented River Information Services so far. Mannheim and Cologne are among the positive exceptions with some services. Obligations for inland ports include the electronic publication of Notices to Skippers, provision of electronic navigation charts and provisions for electronic reporting, if reporting is mandatory. The federal level does not have any means to force inland ports to enhance RIS activities.
So, since the scope of the RIS Directive includes the ports (see article 2.1) this is a case of non-compliance with the RIS Directive.

[24] Weather related messages (WERMs) are not mandatory.
[25] See for the next lines: Annex 4 Country report Germany.

In France the situation is comparable to Germany. The French ports are in charge of implementing RIS in their area. The main French seaports are Marseille, Le Havre and Dunkirk. The main French inland ports are Rouen, Paris, Strasbourg, Lyon and Lille.
But the French ports are more active in the Implementation of RIS than the German ports. French ports have implemented to some extent the NtS (FTM and some also WRM). Electronic reporting is not available in French ports but the ENC coverage is almost 100%.

Table 3.4 Technical availability of the key RIS technologies in the Rhine corridor

		France (VNF)	*Luxembourg*	*Germany*	*Netherlands*
Notices to Skippers	Fairway & Traffic Messages (FTM)	Yes	Yes	Yes	Yes
	Water Related Messages (WRM)	Yes	Yes	Yes	Yes
	Ice Message (ICEM)	No	No	Yes	Yes
	Weather Related Messages (WERM)	Yes	No	No	Yes
	Method of diffusion	Online internet portal and e-mail subscription	Online internet portal and e-mail subscription	Online internet portal and e-mail subscription	Online internet portal and e-mail subscription
AIS	AIS shore-side infrastructure	Yes	Yes, in testing phase	Only ship-ship communication available	Yes
	On-board equipment[26]	Yes,> 50 % of the fleet meaning more than 500 ships	Most of the vessels meaning almost 35 ships	Yes,> 90 % of the fleet meaning more than 1450 ships	Yes meaning 3730 ships
	Exchange	No (neither national nor international)	No	No	Possible but not operational
Electronic reporting messages supported	ERINOT and ERIRSP	Yes and Yes	No and No	Yes and No	Yes and Yes
	BERMAN and PAXLISTS	No and No	No and No	No and No	Yes and Yes
	Exchange	No	No	Yes	Yes
ENC	Coverage (regarding the Rhine)	Almost 100 %	100%	100%	100%
	Provision free of charge	Yes	Yes	Yes	Yes

Source: Country reports, Annex 4

[26] The number of ships is calculated, based on the number of ships registered in the IVR database multiplied with the indicated percentage of available on-board equipment coming from the Member States.

Danube Corridor

In Table 3.5 basic information on the state of implementation of key RIS technologies in the Danube corridor is presented.

The following points should be noted with respect to the implementation of the key technologies:

1. NtSs in standardised format are available along the Danube. Each country produces NtSs. As in the Rhine corridor, it is the non-mandatory WERM message that is not always included in the range of messages offered by countries. Only Slovakia, Serbia, Croatia and Bulgaria produce the whole range of messages. Germany, Austria, Hungary and Romania only the mandatory messages. The international exchange of NtS messages is only implemented between Austria, Slovakia, Croatia and Germany. Notice that this is not a breach of the RIS Directive, the international exchange of NtS data is recommended in the regulation but not required.
2. On the Danube a 100% rate of usage of AIS is reached in Austria and Hungary, where the use of AIS is mandatory. In other countries the rates are smaller. The estimated rate of installation for the entire Danube fleet is 62% (2013). The use of AIS on the Danube Corridor is not as high as in the Rhine corridor. Currently only Austrian and Hungarian authorities made AIS transponders mandatory on vessels navigating on their sections of the Danube River waterway. Similar regulations are expected in Croatia and Slovakia in the next years. The use of AIS was facilitated by support/funding programmes in most countries (except Bulgaria). As a result most vessels of the Danubian fleet (vessels participating in international transport) have AIS equipment

   In most countries the AIS data exchange between the neighbouring countries or with EU Position Information System[27] was successfully tested from a technical point of view.
3. All countries except Bulgaria and Romania are able to receive electronic ship reports (ERINOT/ERISP) of the required data from ships. BERMAN and PAXLST are implemented only in Hungary and Serbia. Within the Danube region the standards refer to UN/ECE recommendations regarding electronic reporting. The EU member States in the corridor, however, have the legal obligation to support international data exchange because they are subject to the RIS Directive. Table 3.5 shows that the international exchange of data is neither possible in the Upper Danube (between Germany and Austria) nor in the Lower Danube (Romania and Bulgaria). Bulgaria and Romania have not yet realised international data exchange, but plan to realise it in 2015.
4. The Danube is extensively covered with ENCs. However, the following points should be noted with regard to ENCs:
   - The charts are in some countries rather old and varying standards are used;
   - The charts are not updated regularly or if they are, the frequency is insufficient, only Austria is updating the charts frequently;
   - None of the charts contain depth data. Finally, it should also be noted that in some stretches of the Danube the river bed changes so frequently that only real-time mapping would be sufficient.

[27] The European Position Information Service (EPIS) is a concept (tested in the PLATINA project) of a potential augmentation to River Information Services (RIS). EPIS is intended to support authorities and logistic service providers in providing data on the actual position, voyage and cargo of a vessel and is provided on a pan-European basis whereby a user based in one Member State can retrieve information on the progress of a vessel in another Member State in order to support the relevant (and authorised) operations. (see EU RIS. Portal for more information).

The new Commission Regulation No. 909/2013 is based on edition 2.3 of the Inland ECDIS standard and requires Member states have to produce Inland ENCs in accordance with this standard within 30 months after the entry into force of the Commission Regulation. Given the remarks about quality of charts above, this will be a substantial innovation.

Table 3.5 Technical availability of the key RIS technologies in the Danube corridor

		Germany	Austria	Slovakia	Hungary	Croatia	Serbia	Romania	Bulgaria
Notices to Skippers	Fairway & Traffic Messages (FTM)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Water Related Messages (WRM)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Ice Message (ICEM)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Weather Related Messages (WERM)	No	No	Yes	No	Yes	Yes	No	Yes
	Method of diffusion	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal	Online portal or e-mail subscription
AIS	AIS infrastructure	Only ship-ship communication available;	Yes, obliged	Yes	Yes, obliged	Base stations are available	Yes, 15 base stations are available	Yes, 4 AIS base stations are available	No
	On-board equipment	Yes,> 90 % of the fleet meaning more than 1450 ships	Yes, 100 % coverage meaning 21 ships	Yes, > 70 % as 45 mobile and 15 portable AIS transponders were installed	Yes, 100 % coverage meaning 106 ships	Only governmental vessels[28]	More than 100 ships equipped	Yes, 100 % meaning 262 ships	No
	Exchange	No	Possible	Possible	Possible	Possible	Possible	No	No
Electronic reporting	ERINOT, ERIRSP	Yes	Yes	Yes (pilot)	Yes	Yes	Yes	No	No
	BERMAN and PAXLISTS	No	No	No	Yes	No	Yes	No	No
	Exchange	No	Yes	Yes (pilot)	Yes	Yes	Yes	No	No
ENC	Coverage (regarding the Danube)	100%	100%	100%	100%	100%	100%	100%	100%
	Provision free of charge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Country reports, Annex 4

[28]There was an equipment programme a few years ago where he Ministry trough low budget support equipped all domestic vessels which navigate on international waters of Danube river. In 2013. it was planned to equip the rest of private fleet, but according Croatian legislation the private companies could not get financial support if they had not settled all they debts to the state. Other vessels will be equipped trough national low budget support in next period/years. Croatian shipping companies will be covered fully considering of AIS equipment.

North-South Corridor

In Table 3.6 basic information on the state of implementation of key RIS technologies in the North-South corridor is presented.

The following points should be noted with respect to the implementation of the key technologies:

1. NtS are produced by all Member States in the corridor. Only the Netherlands produce the whole range of messages. Flanders does not publish the WERM message and France no ICE messages. Brussels and Wallonia only publish Fairway &Traffic messages. The last two regions and France do not strictly comply with the RIS Directive requirements.
   Notices to skippers are exchanged amongst RIS authorities in Flanders, Wallonia and the Netherlands. As a result, a skipper only needs to visit one website to have information on the Notices to Skippers for voyages in the Netherlands and Belgium. However, there is no exchange of messages with France (this is allowed by the RIS Directive). So there is no single access point and skippers need to visit separately the VNF's website to acquire information. This is inconvenient.
2. Except for France the use of AIS is higher than 90% in the countries/ regions in the corridor. In France 50% of the fleet is equipped.
   Rijkswaterstaat in the Netherlands, NV Waterwegen en Zeekanaal and NV De Scheepvaart, the port of Antwerp and the port of Ghent in Flanders have integrated their radar systems with their AIS systems to be able to identify vessels. Wallonia, on the other hand, currently does not have AIS onshore infrastructure. In France, AIS information is not even nationally exchanged, resulting in multiple AIS systems and websites in France, i.e. VNF's website (ais.vnf.fr) and the port of Dunkirk.
3. The hardware, software and organisation to process electronic messages are in place in the Netherlands, Belgium, the Belgian ports and in France. While the CBS[29] system for the Scheldt Area is ready to send and receive ERI data between Belgian and Dutch RIS authorities, this does not yet occur in practice. Further upstream in the North-South corridor no ERI infrastructure exists in Wallonia.
4. The North-South corridor is extensively covered with ENCs. They are freely available in all countries and regions in the corridor.

Currently no seamless RIS exist along the North-South corridor due to an

- Incomplete national RIS implementation, and;
- Incomplete RIS cooperation between countries.

It is clear from table 3.6 that the implementation of AIS and ERI in parts of the North-South corridor, in particular Wallonia and France, is not complete. Furthermore, the international exchange of RIS data is often difficult, impossible or RIS standards are not used (e.g. the GINA system in Wallonia). In practice skippers, sailing in the corridor do not experience a seamless RIS supply in their business operations. There is a marked difference between the Northern part of the corridor (Flanders and the Netherlands) which is much more integrated and the Southern part (Wallonia and France). The problems in the Southern part of the corridor concern both RIS data exchanges between RIS authorities within the same country as well as between RIS authorities of different countries (e.g. VNF and SPW[30]).

[29] In Belgium, Flanders actively coordinates RIS activities with The Netherlands in the Scheldt area. The Scheldt area is an important area for maritime and inland navigation ensuring the transport to and from the Belgian ports of Antwerp and Ghent. By way of formal agreement, the Common Nautical Management authority was established which can be considered as a joint-venture responsible for the management of the Scheldt area. The day-to-day operations are managed by the Common Nautical Management in the Scheldt area. On a technical level the use of a Central Broker System (CBS) furthermore allows Flemish and Dutch authorities to exchange data between the systems of the Common Nautical Management, the Belgian systems (such as Flaris) and the Dutch systems (IVS-90).

[30] SPW stands for Service Public Wallone. SPW is the RIS authority in Wallonia.

Table 3.6 Technical availability of the key RIS technologies in the North-South corridor

		Flanders	*Brussels*	*Wallonia*	*Netherlands*	*France (VNF)*
Notices to Skippers	Fairway & Traffic Messages (FTM)	Yes	Yes	Yes	Yes	Yes
	Water Related Messages (WRM)	Yes	No	No	Yes	Yes
	Ice Message (ICEM)	Yes	No	No	Yes	No
	Weather Related Messages (WERM)	No	No	No	No	Yes
	Method of diffusion	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription	Online portal or e-mail subscription
AIS	AIS infrastructure	Almost 100 % coverage	No	No	100% coverage	100%, coverage of class IV and above
	On-board equipment	Yes,> 90 % of the fleet	Yes,> 90 % of the fleet	Yes,> 90 % of the fleet	Almost 100%	50 % of the fleet
	Exchange	No	No	No	Possible, but not operational	Not national nor international
Electronic reporting	ERINOT, ERIRSP	Yes	No	No	Yes	Yes (pilot)
	BERMAN and PAXLISTS	No	No	No	No, Yes	No
	Exchange	Yes, Between authorities in Flanders. Not otherwise	No	No	Yes	No, but work in progress for national exchange
ENC	Coverage (regarding the Rhine)	100%	100 %	100 %	100%	100 %
	Provision free of charge	Yes	Yes	Yes	Yes	Yes

Source: Country reports, Annex 4

East-West Corridor

In Table 3.7 basic information on the state of implementation of key RIS technologies in the East-West corridor is presented.

The following points should be noted with respect to the implementation of the key technologies:

1. NtS are available for the various Member States along the corridor. Only the Czech Republic produces all types of Nts messages. Germany and Poland do not produce the (non-mandatory) WERM message. There is no single access point for NtS for the entire East-West corridor. Based on automatic coded translation the German ELWIS system provides NtS also in Czech and Polish. The Czech LAVDIS system provides notices in German language. Polish NtS are only available in Polish language and not yet according to the standard format, which is a breach of the RIS Directive However, in Poland the new RIS system will allow coded translation in foreign languages such as German.
2. Many vessels are equipped with AIS transponders in the German part of the corridor. Although the share is somewhat lower compared to other waterways, the majority of German vessels operating along the East-West corridor are equipped with an AIS transponder. AIS shore stations are missing in the German part of the corridor and will only be installed on a few sections along corridor. Germany plans no installation of AIS infrastructure East of Magdeburg. The main national waterway connections with seaports Bremerhaven and Hamburg will be covered in the next years, but shore-based AIS infrastructure will not be available for Berlin and traffic moving to Polish or Czech borders. It is not required by the RIS Directive to build shore stations. As part of the on-going RIS implementation in Poland, the installation of two shore-based AIS stations along the Odra is planned to be realized in 2014. This will provide full AIS coverage of the Odra. In the Czech Republic, the installation of two shore-based AIS stations is in preparation, as well as the launch of an equipment programme with 100 AIS transponders. The implementation is planned for 2013 and test operations for 2014. While the coverage will be limited, this will increase the share of vessels equipped with AIS and stimulate skippers to use AIS. So far, the share of Czech vessels equipped with an AIS transponder is rather low. In contrast, 80% of Polish vessels operating international are equipped with AIS.
3. Electronic reporting between Germany and the Czech Republic has not been implemented along the corridor yet, despite Czech initiatives. Based on a proposal by regional German authorities to extend electronic reporting to the East, the Czech Republic started an initiative to launch international data exchange with Germany for electronic reporting. However, Germany did not find this necessary at the moment, due to the absence of reporting obligations on German waterways on the East-West corridor. After the launch of the new electronic reporting application, which is jointly developed by Germany and the Netherlands, international data exchange between the Czech Republic and Germany will be possible and international exchange of voyage reports will become possible in the future (2015-2016 earliest). In Poland, reporting obligations exist for inland vessels carrying dangerous cargo. Electronic reporting of these voyages is possible since the end of 2013. The system is prepared for international exchange of electronic reports, but this has not been implemented. Polish officials do not expect the implementation in the near future.
4. Electronic navigational charts are available for the main East-West route through Germany to the Polish border, except for a short section on the Eastern part of the Mittelland Canal. In Poland, the elaboration of ENC for the Odra is part of the on-going RIS implementation. The inland ECDIS application for the Polish Odra was completed in December 2013. ENCs are available for the waterway corridor between Germany and the Czech Republic. There is a full ENC coverage of the German Elbe. ENCs are also available for Czech Elbe waterways on the other side of the border.

Table 3.7 Technical availability of the key RIS technologies in the East West corridor

		Czech Republic	Germany	Poland
Notices to Skippers	Fairway & Traffic Messages (FTM)	Yes	Yes	Yes, but not according to standard
	Water Related Messages (WRM)	Yes	Yes	Yes, but not according to standard
	Ice Message (ICEM)	Yes	Yes	Yes, but not according to standard
	Weather Related Messages (WERM)	Yes	No	No
	Method of diffusion	Online portal or e-mail subscription	Online portal or e-mail subscription	Not according to standard; pdf/html for download only in Polish
AIS	AIS infrastructure	No	Yes but only ship-ship communication available; landside infrastructure in preparation	100 % coverage at the end of 2013
	On-board equipment	No	90 % of the fleet	80 % of the international Polish fleet, lower share of domestic fleet.
	Exchange	No	No	No, conditional on the Polish legal framework
Electronic reporting	ERINOT, ERIRSP	Yes (pilot), No	Yes, No	No
	BERMAN and PAXLISTS	No, No	No, No	No, No
	Exchange	No	No	Yes (pilot)
ENC	Coverage (regarding the East-West Corridor)	100%	100%	No
	Provision free of charge	Yes	Yes	No

Source: Country reports (Annex 4)

3.4.2 TEN-T funded projects

The following table presents an overview of important RIS implementations projects that received co-funding from the European Union.

Table 3.8 Short project description TEN-T funded projects (2007-2013)

Country	Name project	Short description
Poland	Pilot implementation on the Lower Oder RIS (2010-PL-70206-P)	This Action is the very first stage of the Polish RIS deployment and consists in the preparation of a RIS feasibility study on the Lower Oder and the launch of its related pilot scheme. In line with the guidelines set up in the abovementioned Directive, the Action plans to test on the Lower Oder an interoperable, reliable and safe RIS information system managed from a new Lower Oder RIS centre to be constructed and based in the Inland Navigation Office of Szczecin. The pilot includes the testing of different technical specifications that will be harmonised in order to reach European interoperability and to include Polish inland waterways into the pan-European RIS network.
France	River Information Services II (SIF II) (2010-FR-70204-P)	The main objectives of the RIS II action are the full scale implementation of transponders on vessels, the full scale deployment of AIS antennae on the French high capacity network and the development of new information services. The first part of the action is the financing of transponders on the pushers, the units for the transport of passengers and the self-propelled barges on the French high gauge waterway network. To equip the entire fleet, the need is estimated at 1,360 transponders for the next three years. At the same time, the deployment of the Automatic Identification System (AIS) infrastructure is planned on all transnational waterways of class IV and above. The extension of the AIS coverage on the Moselle river and on the French part of the Rhine river will improve the reliability of the RIS Centre. In addition, the data gathered at the RIS Centre will be used in order to create new services. These services results from the exchange of several types of information (voyage notification, water level data...).
EU	Deployment of Inland AIS transponders in Flanders and the Netherlands (2010-EU-70201-P)	This Action consists of an equipment subsidy programme aiming at stimulating skippers to install on-board AIS transponders. In the Netherlands, this Action is expected to equip 1,100 additional vessels in order to encompass the rest of the shipping fleet on the Dutch waterways, while the Flemish part of the Action aims at equipping 750 additional vessels. The subsidy is available to ships from any flag state, provided that they make demonstrable use of the Dutch and Flemish waterways. This Action will enable real-time tracking and tracing according to the River Information Services guidelines. Full deployment of Inland AIS transponders is indeed a key step in implementing RIS, since the quality and success of many of its services depends critically on the availability of accurate, timely and complete position information of commercial vessels.
Belgium	Implementation of RIS in Flanders II (2010-BE-70202-M)	This project focuses on additional investments on WLAN, Fairway Information Services and extended applications. Some extra work will be done on the internal systems of the waterway managers and port authorities, in order to offer a wider range of RIS services to skippers. Hence the basic building blocks for RIS in Flanders will be further complemented with specific applications. Studies/Works
Netherlands	Study and implementation of AIS monitoring network (2008-NL-70001-P)	The aim of this particular project is to install an inland AIS (Automatic Identification System) monitoring network covering all the waterways of the Netherlands. This includes interfacing with other existing maritime AIS monitoring networks and integrating with Vessel Tracking Services (VTS) and lock-based radar systems
Netherlands	Implementation of Fairway	The objective is to develop and implement Fairway Information Services (FIS) that will fully comply with the RIS Directive and

Country	Name project	Short description
	Information Services (2008-NL-70000-P)	subsequent technical specifications. This will be the first time that all available fairway information for skippers will be combined and integrated in one consistent information system.
EU	Implementation of River Information Services in Europe IRIS II (2008-EU-70000-S)	The main objectives of the project are the following: 1. Further development and pilot implementation of national and international data exchange making use of multilateral legal agreements and this way providing services especially for logistical RIS users 2. Contribution to the amendment of the technical specifications for RIS technologies and services and later on implementation of these technical specifications 3. Participation in standardization of RIS services and technologies 4. Pilot implementation of new RIS services and RIS technologies 5. Feasibility studies outlining future services for RIS
EU	Full deployment of inland AIS transponders (2008-EU-70000-P)	The aim of this particular action was to install inland AIS (Automatic Identification System) transponders on all vessels longer than 20 metres or all shorter vessels that operate commercially and use the main waterways (class IV and higher) in Germany and the Netherlands. The plan of the German and Dutch authorities, based on existing navigation databases, calls for 9,800 vessels to be equipped with inland AIS. By doing so, real-time tracking and tracing according to the RIS guidelines will be enabled.
EU	Implementation of RIS on the Westerscheldt river (2008-EU-30001-P)	The Westerscheldt, located on the border between Belgium and The Netherlands, is a very important axis for waterborne transport, used by maritime and inland navigation at high capacity. The Action's objective is to adapt the existing local traffic management systems in such a way that they will be able to offer maritime traffic management as well as river information services. This will help make navigation on the Westerscheldt safer and smoother.
Belgium	Implementation of RIS in Flanders(2008-BE-30000-P)	The main objective of the action is to improve safety, efficiency and environmental performance of inland navigation by introducing harmonised, interoperable and publicly accessible tools and information systems. The Action will also improve the competitiveness of inland shipping by offering high-quality infrastructure to users.
EU	VTMC of the future (2011-EU-7002-S)	The action consists of definition studies and pilots on Vessel traffic management concepts and systems in Germany and the Netherlands. The activities will be focused on: • Conceptual development of a comprehensive VTM system aiming at improving VTM processes and services to stakeholders. This will lead to a blueprint for an integral VTM approach that will be tested and evaluated in an operational environment (pilot centre) • Improvement of the logistic chain's performance through a study and a pilot • Study and pilot on the implementation of a reporting system for the Rhine based on the EU technical Regulation 164/2010 A definition study and a pilot development for Nautical Network Data Services (NNDS)
Italy	RIS along the Northern Italian	The Action supports the improvement of the management capacity of the Northern Italian Waterway System (NIWS) by financing the

Country	Name project	Short description
	waterway System (2010-70203-S)	organisational, technical and legal studies related to setting up a RIS system. The studies will be validated through the implementation of a RIS pilot scheme to test the viability and the effectiveness of the system in supporting the efficient management of the waterway. A RIS centre, 4 base stations, the equipment of 20 vessels and a software prototype development will be realised as part of the pilot.
EU	Implementation of River Information Services in Europe IRIS III (2011-EU-70001-S)	IRIS Europe 3 shall ensure the continuation of RIS implementation in Europe and shall provide the necessary cooperative implementation framework for setting up pilot implementations for Quality of Information Services for RIS, nationally and internationally. Quality aspects for international RIS data exchange on technical, legal and organisational level will be implemented, so that enhanced pilot implementations of new RIS services based on existing and new RIS key technologies can be implemented. New and enhanced interfaces to European. Services will be pilot implemented and validated, and continuous contributions to the maintenance and amendment of Standards and technical specifications will be provided.
EU	Implementation of RIS on the Westerscheldt river II (2011-EU-70003-P)	In this context, the proposed action which follows up on the previous TEN-T funded Action RIS in the Westerscheldt (2008-EU-30001-P) aims to strengthen safety in an increasingly dense traffic area (where both sea-going vessels and inland barges navigate) by improving the monitoring of vessel traffic in the River Scheldt region. This will be achieved by implementing a better performing Vessel Traffic Management and Information Services (VTMIS) software, integrating maritime and inland vessel traffic services. The action will also extend the range of available RIS technologies such as an enhanced Fairway Information Service Portal, and a “state of the art” tracking and tracing software application based on Radar and Automatic Identification System (AIS) according to the RIS guidelines.
Belgium	Implementation of RIS in Flanders III (2011-BE-70001-P)	River Information Services (RIS) are customised information services for inland waterway transport and make it possible to co-ordinate logistical processes with actual transport situations on a constant basis. RIS play a key role in making cargo transport and passenger services on waterways more efficient and ecologically sound while, at the same time, increasing traffic safety.

3.5 Findings in research literature on the uptake of key RIS technologies and services

The use of the RIS technologies was the object of research in several studies in past years. These surveys provide insight into the use of RIS technologies.

The most recent surveys were all held in 2012:

- ICT survey among Flemish skippers (1067 forms were mailed and the response rate was 9.7%)[31];
- Umfrage Telematik by VBW among NL, BE, CH en DE skippers (9000 forms were sent and the response rate was 5.2%)[32];
- Survey Umfrage Ausrüstung by WSV on various German Waterways among skippers of all nationalities (from 1.04.2012 until 30.6.2012) June (response rate unknown but 1510 forms were filled in and were found useful);
- Survey among Dutch skippers in December 2012 by Panteia aimed at investigating the demand and information available for resting places (1843 survey forms were send via the Internet to Dutch skippers; the response rate was 29%)[33].

Unfortunately, all of the surveys mentioned were held in the Rhine- and North-South corridors. In the upper Danube corridor (Germany/ Austria) and the German part of the East-West corridor the picture on the actual use of RIS applications is expected to be similar as the population of skippers and vessels will not differ much. However, on the Lower Danube and the Czech and Polish part of the East-West corridor the situation deviates much more from the Western-European market characteristics. Generally, the use of RIS technologies in these regions is lower than in the surveyed areas.

Use of PCs and Internet

All the surveys confirm that the use of computers on board of vessels is now very high (94-99%). In the past the presence of computers on board was less common. In the Flemish questionnaire, data from previous questionnaires were included, see table 3.9. It can be seen from the table that the share of vessels with a PC on board of vessels has increased[34] between 2005 and 2012 from 88 to 97% while the daily usage for professional use increased very much from 29% of the respondents in 2005 to 82% of the respondents in 2012.

Table 3.9 Use of PC Flemish skippers (2012)

Year	*PC onboard*	*Daily professional use*
2005	88%	29%
2008	95%	77%
2012	97%	82%

Source: Promotie Binnenvaart Vlaanderen

The internet access on board of vessels increased in the past 7 years: about 84% of Flemish skippers report having Internet access, which was 30% lower in the year 2005. In the surveys in Germany (Umfrage Telematik) and the Netherlands (Dutch skippers; Panteia survey) the current access of Internet on board was respectively 94% and 95%.

[31] Resultaten enquête: ICT gebruik aan boord 2012 (PROMOTIE Binnenvaart Vlaanderen. June 2012)
[32] See Binnenschifffahrt –ZFB—Nr5-2013. The survey results are also contained in publication referred to in footnote 14.
[33] Business case Informatie Systeem Ligplaatsen (Panteia, 2013 restricted report).
[34] Survey Page 9 survey ref footnote 11.

Use of AIS

In 2012 the use of AIS in the different surveys was already very high (see table 3.10) and support programs are still running. AIS is frequently linked to Inland ECDIS (see the third column in table 3.10)

Table 3.10 Use of AIS on board (2012)

Survey	AIS onboard	Linked to Inland ECDIS
Flemish skippers	94%	74%
Telematik Umfrage	84%	
Umfrage Ausrüstung	93.5%	75%
Dutch skippers	99%	80%

Source: Promotie Binnenvaart Vlaanderen, VBW, WVS, Panteia

In the Dutch survey respondents were asked when and how often skippers switch off the use of AIS equipment. Given the discussions around privacy it was expected that many of skippers would switch off equipment regularly. However, the figures in Table 3.11 do not confirm this; they indicate that the number of skippers that switch off is very modest; by far most skippers always keep the AIS equipment switched on.

Table 3.11 Switching off AIS by Dutch skippers (2012)

	For a short time	For a long time
Frequently	4%	10%
Sometimes	5%	10%
Almost never	91%	80%

Source Panteia

Since in the Dutch study it was very important to determine whether or not this is indeed true, switching off equipment was also investigated in another way, namely by looking to the traffic moving into/ out of seaports and the German-Dutch border and comparing these movements with nautical data (www.marinetraffic.com.). This was done in 2013 for a time period in April. The results of this are listed in Table 3.12.

Table 3.12 AIS switched on by Dutch skippers (2013)

Passage points chosen	AIS Switched on
Amsterdam – Centraal Station	87%
Antwerpen – Invaart Rooyersluis	98%
Rotterdam - Waalhaven	90%
Millingen a/d Rijn	91%

Source Panteia

These percentages seem to be consistent with those in Table 3.9. However, it was observed that in the case of Antwerp, the percentage of systems switched on is significantly higher than in the other passage points. This could, very likely, be explained by the fact that in Antwerp AIS is obligatory, which is not the case in the other passage points. If that explanation is right, 8-10% points is currently about the size of group skippers that "consciously" switches off AIS.

Use of Inland ECDIS

AIS is frequently linked to geographical maps, this was noted in table 3.10.

Table 3.10Table 3.13, derived from the German Survey from WSV, gives more detail lists different types of use of AIS related to Inland ECDIS. The table shows, that if AIS is linked, it is in only 15.4 % of the cases to navigation mode[35] and in most cases (49.4%) for use in the information mode only.

Table 3.13 Use of AIS related to Inland ECDIS (2012)

Inland AIS-Transponder on board	*Vessels*	*%*
No AIS-Transponder on board	113	7.5
Inland AIS without link to Inland ECDIS	328	21.7
Inland AIS linked to Inland ECDIS (Navigation-Mode)	211	14
Inland AIS linked to Inland ECDIS (Info-Mode)	746	49.4
Inland AIS linked to Inland ECDIS (Navi+Info-Mode)	20	1.4
Inland AIS no data on link to inland ECDIS	67	4.4
Invalid data	25	1.6
Total	1 510	100

Source: WVS

Inland ECDIS is primarily used as background system for the visual display of positions of vessels, navigation and the planning of the voyage. Voyage planning applications are widely available in the industry (in the survey of Dutch Skippers about 90% of the respondents indicated that they used of applications). For planning purpose one does not need to use the navigation mode.

Use of Electronic reporting

Table 3.14 The use of electronic reporting applications in various surveys (2012)

Survey	*%*
Flemish skippers	48%
Telematik Umfrage	45%
Dutch Skippers	44%

Source: Promotie Binnenvaart Vlaanderen, VWB, Panteia

Table 3.14 shows that on average 45-48% of the skippers in Western-Europe uses electronic reporting applications. This technology is used less intensively than AIS and ECDIS. However, in IWT reporting requirements are less stringent than in maritime transport and in many cases very limited.

In the survey for Flemish skippers it is indicated that in 2008 only 13% used electronic reporting applications, so there was a steep rise of the use of this technology in the past 5 years. The need for electronic reporting, moreover, varies with type of cargo (e.g. containers, hazardous goods) and the size of vessels. This last point is illustrated by survey data for Dutch skippers; see table 3.15.

Table 3.15 Use of electronic reporting applications among Dutch skippers (2012)

[35] Navigation mode: integrated with radar used for navigation.

Category of vessels	%
Vessels < class IV	35%
Vessels >= class IV	70%

Source: Panteia

Table 3.15 shows that the vessels which have to operate in the RIS waterways network in Western Europe are twice as likely to use electronic reporting as smaller vessels.

Use of Notices to Skippers

The use of Notices to skippers in publically broadcasted form (teletext, radio) in the IWT industry, is widespread. The use of these data in applications on-board of vessels is less common. In the surveys among Flemish and Dutch skippers respondents were asked about the use of NtS, see Table 3.16 In the survey among Dutch skippers there was also a question about the use of particular types of messages (see Table 3.17).

Table 3.16 The use of on board software for Notices for skippers (2012)

Survey	%
Flemish skippers	56%
Dutch Skippers	43%

Source: Promotie Binnenvaart Vlaanderen, Panteia

Table 3.17 The use of different types of messages available on-line for Dutch skippers (2012)

Type of message	%
General traffic messages	63%
Water level messages	57%
Ice charts	35%

Source: Panteia

PART 2: DATA AND EVALUATION METHODOLOGY

4 Evaluation Methodology

4.1 Background

The Terms of Reference defines the following information to be provided by the evaluation:

Regarding Directive 2005/44/EC, i.e. the RIS Directive:

- The *relevance* of the programme's objectives in view of the overall transport policy objectives.
- The *state of transposition and implementation* of the RIS Directive in the EU Member States.
- The *effectiveness and efficiency* of RIS implementation.
- The *impact* of RIS on inland waterway transport market development, social conditions and environment.

Regarding the support actions and programmes:

- The *effectiveness* of the particular support actions implemented under the relevant national and EU programmes.
- The *coherence and interrelationship* between various support programmes and instruments in support of RIS.

In order to respond to above-mentioned evaluation criteria, the evaluation is based on the principles of *critical, evidence-based judgement*, as defined in the Commission Guidelines for Evaluation[36]. These concepts are elaborated in the Box below.

Critical judgement: Evaluations must take a neutral point of view. They must be independent and impartial. After collecting and analysing a wide range of data, from a diverse and appropriate range of sources, the evaluator must be able to draw conclusions which identify both the good and bad consequences of an intervention. The judgement should be as specific as possible.

Evidence-based: Evaluations are not mere speculation, or modelling of the future – they are based on facts and real-life chains of events. A word commonly used in this context is « robust »: every conclusion can be traced back to evidence.

Source: Public Consultation on Commission Guidelines for Evaluation

4.2 Evaluation framework

An *evaluation framework* has been developed to evaluate the RIS policy for the period 2006-2011 on the basis of critical, evidence-based judgement. This evaluation framework consists of the following parts:

1. **What do we measure**: this part starts with the RIS evaluation questions, as presented in the Terms of Reference. Where useful these evaluation questions are broken down in sub-questions. Also, additional information requirements as defined in the task description are added. Based on this it is defined what should be measured.
2. **How do we measure:** this part defines how we measure the information required to respond to the evaluation questions. This starts by defining the indicator(s) per evaluation question, together with the source. In addition to the indicator, additional inputs for the evaluation are included, together with sources. Additional

[36] See document "Public Consultation on Commission Guidelines for Evaluation" (EC, 2013).

inputs come from literature, legal documents, interview minutes and workshops. These additional inputs are used to either complement the results of the indicators or provide an alternative basis for assessment in case the indicator(s) provide too limited or no information.

3. **How to respond to the evaluation question:** this part explains how the indicator and additional information will provide the basis for responding to the evaluation question. Also the limitations of the indicator(s) and additional inputs are noted.

The evaluation framework helps us to define our evaluation questions and link evaluation questions to indicators and other inputs for evaluation. It also serves as guidance for the data collection process. These elements are further detailed in the sections below.

4.2.1 Evaluation questions

The Terms of Reference defines 17 evaluation questions:

1. What is the contribution of RIS to the overall EU transport policy objectives and to what extent are the objectives of RIS appropriate regarding the needs of the market/public administrations and the problems the intervention is meant to solve? In view of the objectives of the EU Transport policy White Paper, is there a need to realign the RIS policy objectives and if yes in which way[37]?
2. What is the *effectiveness* and *efficiency* of the *support measures for RIS*?
3. What is the *effectiveness* and *efficiency* of *RIS implementation governance*? Are all relevant actors involved in RIS implementation? Has there been duplication of activities? Should the governance of certain activities in relation to RIS be more streamlined?
4. To which extent is RIS implementation *effectively coordinated* and driven by its objectives? Have there been implementation activities for RIS which contribute only to a lesser extent to its objectives?
5. Which *quality standards for RIS* are in place/being developed and to which extent does RIS implementation comply with these standards and to which extent are RIS services *technically interoperable*?
6. What is the *perception* by those actors who already make use of RIS? What is the perception of those who do not yet make use of RIS? What is the transport industry perception of RIS? Why has RIS not been more fully taken up by the logistic operators?
7. To which extent have the *benefits identified in ex-ante evaluation* work on RIS been realised? For areas (if any) identified where the benefits have not been realised, what have been the obstacles and how can they be overcome?
8. To which extent is the *roll out of RIS across the EU synchronised* and what are the consequences of any possible lack of synchronisation? To which extent have resources been made available in due time, in appropriate quantity and quality?
9. What are the *future plans for RIS deployment* of the Member States and of the private operators, what is their expected efficiency and effectiveness and to which extent will they contribute to the RIS policy objectives and the EU's transport policy respectively?
10. What are the *financing needs* for RIS for the period 2014-2020 and how are these investments spread over time? Which investments should be borne by the public sector and investments should be borne by the private sector (i.e. the operators)? How should support to RIS be organised taking into account the instruments that will become available under the Multiannual Financing Framework 2014-2020? Have the co-financing rates for RIS deployment been effective in the past? Do they need to be changed for period 2014-2020?

[37] This question concentrates on relevance.

11. What is in broad terms the *state of the art of ITS implementation in other transport modes* and to which extent have or can opportunities for modal transport interconnection between RIS services and ITS services of other modes be (en) exploited?
12. To which extent does the *geographical distribution of take-up of RIS* corresponds to the geographical distribution of market needs/opportunities? What are the main factors that determine the level of take up of RIS?
13. Is there any differentiation of *RIS uptake by different market segments*? Can such differences be rationally explained from a cost/benefit point of view?
14. To which extent have the *possibilities of EU funding support been taken* up to a full extent? What have been the barriers – if any – for a full uptake of EU financing support?
15. What is the *adequacy of communication* on the RIS policy and on the results of the supported RIS projects?
16. What is the *impact of the economic recession and budgetary crisis* on the projects supported by the various instruments and on the RIS policy itself?
17. To which extent have *RIS policy objectives been achieved*? Have positive/negative *spill-overs* onto other economic, social or environmental policy areas been maximised/minimised?

The task description, as included in the Terms of Reference, includes additional questions that are linked to the evaluation questions:

Task 1 Evaluate the state of transposition and implementation of the RIS Directive in accordance with Commission evaluation standards

1.1 Assess the degree of completeness of the transposition of the RIS Directive into national legislation of the Member States;
1.2 Evaluate, in qualitative and quantitative terms the implementation of the RIS Directive in the Member States, taking into account inter alia the completeness, quality of information/services, degree of interoperability; user friendliness;
1.3 Evaluate the appropriateness of the RIS objectives to address the needs of the market, the needs of the public administrations and the problems the policy is meant to solve;
1.4 Evaluate in qualitative and quantitative terms the impact of the RIS;
1.5 Evaluate, in qualitative and quantitative terms the effectiveness and efficiency of RIS implementation;
1.6 Evaluate the perception of RIS by all the stakeholders directly or indirectly affected by RIS;
1.7 Evaluate the impact of the co-funded projects and programme actions;
1.8 Evaluate in qualitative and quantitative terms the “untapped potential” of RIS;
1.9 Evaluate the synergy of EU support to RIS with national funding programmes;
1.10 Compare RIS with ITS policy and implementation for other modes of transport and evaluate the degree of synergy.

Task 2 Assess the coordination of RIS implementation

2.1 Evaluate the structures involved in RIS-related policy coordination and the degree of efficiency and effectiveness of this coordination;
2.2 Analyse the tools, processes and management activities related to the implementation of the RIS support actions (e.g. EU and nationally funded RIS implementation projects) in terms of their effectiveness and efficiency.

Task 3 Assess barriers to and opportunities for further development of RIS

3.1 Identify potential improvements for the RIS legal framework so as to optimise its contribution to the overall transport policy and assess their likely costs and benefits;

3.2 Identify potential improvements for RIS implementation so as to optimise its contribution to the overall transport policy, from the perspective of functional scope of RIS services, data sharing and exchange, RIS governance and RIS financing and assess their likely costs and benefits;

3.3 Identify the barriers for the further development of RIS – taking into account the tasks 3.1 and 3.2 and identify measures to overcome these barriers;

3.4 Summarise the overall findings of the evaluation;

3.5 Draw up recommendations resulting from the evaluation relevant for the Impact Assessment for a possible revision of the RIS Directive or of its implementing measures.

Moreover, in chapter 3 of this report already the basic data is provided on the level of implementation of RIS based on the country reports (Annex 4).

4.2.2 Allocation of evaluation questions to evaluation chapters

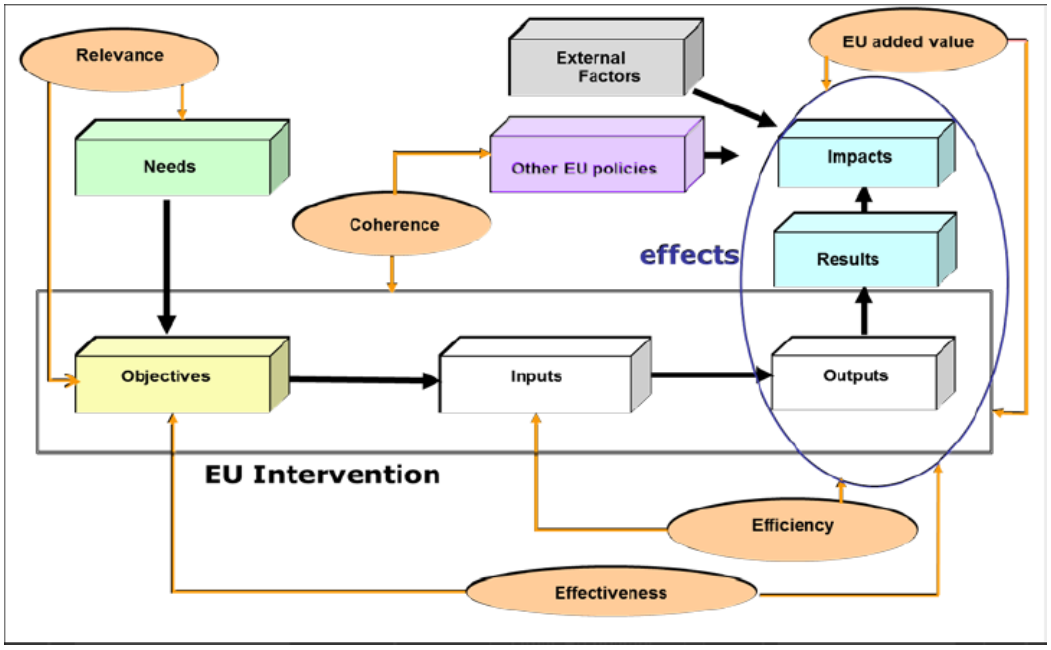
Chapter	*Coverage of evaluation questions and tasks*
5 Implementation of RIS legislation	• 5.1 Transposition of RIS directive into national legislation (Task 1.1)
6 Implementation of RIS key technologies and services	• 6.1 Interoperability (Q5) • 6.2 User acceptance and take-up (Q6, Q12, Q13, Task 1.6, Task 1.2) • 6.3 ITS in other modes and links to RIS (Q11, Task 1.10) • 6.4 Identification of untapped potential and possible further applications (Task 1.8)
7 Implementation of Organisation of RIS	• 7.1 Effectiveness and efficiency of implementation of governance (Q3, Q4, Q8, Task 1.5, Task 2.1, Task 2.2) • 7.2 Adequacy of communication of RIS policy and supported projects (Q15)
8 Provision and use of Financial Resources	• 8.1 Coherence and interrelationship EU funding/ MS funding/ Private funding (Q8, Q14, Task 1.7, Task 1.9, Task 2.2) • 8.2 Impact of economic crisis on funding (Q16) • 8.3 Effectiveness of support programmes • 8.3.1 EU support programmes (Q2, Task 1.7, Task 2.2) • 8.3.2 National investment and support programmes (Q9) • 8.3.3 Identification of financing needs (Q10)
9 Impacts of RIS	• 9.1 Impact of RIS implementation 2006-2012 (Q1, Q17 Task 1.4) • 9.2 Comparison of identified impacts with ex ante evaluation studies and their obstacles (Q7)

4.2.3 Indicators and additional inputs

The evaluation framework aims to define (an) indicator(s) for each evaluation (sub)question. Together with the additional inputs these indicators help to respond to the evaluation question. Indicators are defined based on RACER principles[38]. Important notions are the fact that indicators need to be relevant and measurable. The extent to which indicators are indeed measurable poses a problem. Not in the last place because the RIS implementation is a process with a long duration (taking many years) and different speeds across Member States. Limited data availability and limitations in attribution of effects to RIS provide additional measurement challenges.

In order to define indicators we have placed the evaluation criteria in the intervention logic, as presented in Figure 4.1.

Figure 4.1 Intervention logic and evaluation criteria



Source: Commission Guidelines for Evaluation

We have applied logical framework analysis to link indicators to evaluation questions (Annex 5). Below, summarised results are presented:

- The *objectives* of the RIS implementation.
- The *inputs* for the RIS implementation are the required basic resources for the implementation process (e.g. funds, people, time, capital). These include both project resources as well as the more permanent resources allocated to RIS (e.g. persons working in Member States or activities of RIS expert group members). The size of the inputs will be measured in monetary values.
- *Outputs* are products of the implementation which are under direct control of the project managers. The outputs are: (i) the implementation of legislation; (ii) the implementation of RIS technologies; and (iii) the organisation of the implementation process. The outputs are the basic activities, which are necessary for realising effects on the higher levels.

[38] RACER principles: Relevant – i.e. closely linked to the objectives to be reached; Accepted – e.g. by staff and stakeholders; Credible for non-experts, unambiguous and easy to interpret; Easy to monitor (e.g. data collection should be possible at low cost) and Robust – e.g. against manipulation.

- The most important issues to investigate with respect to the outputs are: (i) was the legislation transposed and was this done in time and correctly; (ii) are RIS technologies available and do they function properly; (iii) to what extent are technologies really used in practice; and (iv) was the organisation of the implementation efficient?
- It should be emphasized that available technologies have to be used by IWT businesses and infrastructure operators as well, in order to achieve some higher level impact. The *real use in practice of the technologies* is, therefore, the key linking variable between outputs on the one hand and specific, intermediate and global impacts on the other hand.

- *Specific and intermediate* impacts refer to the short and medium term outcomes of an intervention that are also dependent on other policies, market and market environment factors.

Specific impacts refer to the impacts on the parties directly involved and affected by the intervention. In the case of the RIS implementation, the key RIS technologies directly affect two groups of stakeholders: (i) skippers/IWT operators and managers; and (ii) infrastructure (lock, ports and terminal) operators.

The innovations should improve vessel operations of IWT businesses. Specifically, all RIS technologies aim at improving voyage plans of skippers:

- Better infrastructure data in planning systems (IENC);
- Better information on weather and sailing conditions (NtS);
- Reducing delays in locks and in ports because of better information on traffic and communication(AIS);
- Less delays and more efficient processing of administrative information (ERI).

This should result in productivity improvements (e.g. better vessel utilisation), reduced fuel consumption and cost reductions of voyages. These variables are thus important indicators.

The use of AIS and ERI in particular should be a benefit to the authorities as well. Tracking and tracing of vessels and direct shore-ship communication will result in earlier and more reliable information on the arrival of vessels at locks and bridges which could be used to improve the planning of operations and loading/ unloading processes in ports. In addition, electronic reporting reduces the time needed for administrative procedures (e.g. at borders or when vessels enter waterway operating areas where reporting is obligatory).

Both improvements may thus result in cost reductions or service improvements (e.g. increase of time windows when the facilities are available). The authorities decide whether to keep these benefits themselves (e.g. for cost cutting or other budgetary purposes) or pass benefits on to the users of facilities in the form of service improvements. In the latter case an additional reduction of voyage cost of vessels for the skipper/ IWT operators could be expected.

Intermediate impacts, include the impacts on the two groups of stakeholders directly affected, but expands these with benefits to other groups in the society, which are affected in an indirect way. Such indirectly affected groups are: (i) customers/ shippers; (ii) other authorities; and (iii) general public.

At the level of intermediate impacts the key objectives of the RIS directive are relevant. This means enhancing:

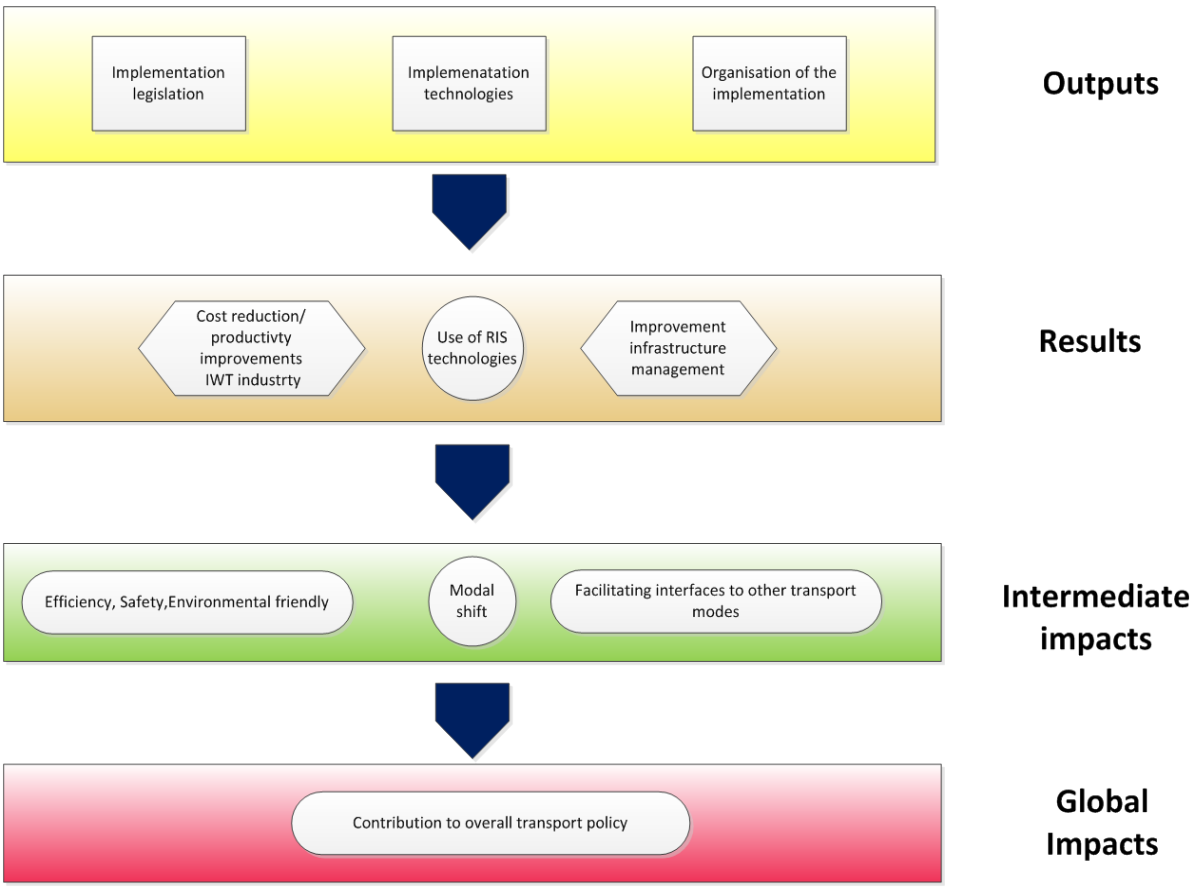
- Safety
- Efficiency
- Environmental friendliness
- Interfaces to other transport modes

The most important variable linking direct and indirect benefits of parties is the reduction in voyage costs of vessels. These cost reductions may be passed on to customers/shippers as price reduction of services and they may, therefore, lead to a modal shift. Modal shift will result in a number of external costs reductions which benefit the general public.

Global impacts are the long term policy outcomes. These impacts refer to the contribution of RIS to the White Paper[39] and overall EU transport policy objectives. A key variable for this is the modal shift.

In Figure 4.2 the four levels in the evaluation of effects are presented.

Figure 4.2 Hierarchy of objectives of evaluation



[39] WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport (EC, Brussels, 2011).

4.3 Data collection methods

On RIS (and in particular on RIS projects) there is considerable research literature. A range of reports on RIS has been published in the past decade. The information, required for the evaluation in the present study, was partly derived from these reports but a lot of information was also collected by means of targeted interviews with experts, stakeholder questionnaires and workshops.

The information which was produced during the project can be broken down into four main research categories:

1. Information on the legal implementation;
2. Information on the implementation of technologies;
3. Information on the higher level impacts of RIS;
4. Information on the best way forward with RIS (recommendations).

This type of data is not available in general IWT statistical sources. Such sources do not generally include specific statistics related to RIS technologies. It was, therefore, necessary to include in the project new fieldwork activities. The fieldwork did focus on two levels: individual Member States and on the international level.

The legal implementation can only be investigated on the level of individual countries. The implementation of technologies can be both investigated on the country and international level (corridors). For the analysis of impacts and policy recommendations the EU level is the most appropriate level.

The fieldwork was organised in various stages and divided among the partners in the project team per country and per corridor. Each of the MSs where the RIS Directive applies, as well as Serbia (not a MS) and Italy (applies RIS but has only a captive waterway network which is not connected to the IWT network of other countries) was visited by a partner and information was collected from experts, RIS authorities and policymakers.

The first part in the fieldwork effort was directed at getting the following types of information:

- The legal documents of transposition per MS;
- Supporting policy documents on the legal process and the transposition;
- An overview of implemented technologies and technologies not implemented in each MS;
- Problems in the implementation process;
- Information of the national organisation of the implementation;
- Information on TEN-T or other EC projects related to RIS;
- Opinions of policymakers on the RIS implementation and the recommended way forward from their perspective.

In each country interviews were held with several people and the information provided was, if that was possible, cross-checked with information of other sources (e.g. information of other Member States about neighbouring countries or information of RIS expert groups, information on websites etc.).[40] In the countries some information was also collected related to other countries and corridors in which IWT businesses of those country operate.

[40] The main findings of the visits in the countries were reported to the project manager. These findings were checked and brought in the uniform reporting format.

In the second phase of the fieldwork the efforts were more directed to the cross-country/ corridor level of the RIS implementation. In this stage also interviews with international organisations (RIS expert group representatives, River Commissions, UNECE, PIANC etc.) were held. The aim was, in particular, to get information on:

- Organisation of RIS across countries and in corridors in particular;
- The present status of the use of technologies per corridor;
- The main bottlenecks in the implementation;
- Cross-country TENT- and other European projects;
- Opinions and ideas of interview partners on the future of RIS.

Although the fieldwork efforts were rather extensive in this project, it was not possible to get directly all the data in all fields of interest that were needed for the evaluation. Interviews were used to collect information on opinions, identification of problems, intervention logic etc., but not on the quantification of effects. But in this study it was hoped that the interviewed parties could perhaps also provide some information on the size of effects. It should be remembered that the parties (amongst others) consisted of MSs authorities, which might perhaps have done some assessments of their own already at local level. Unfortunately, it turned out not to be the case. Often, however, the respondents could quote a number of practical examples when/ where they experienced benefits, but they could not give estimates of the size of these in a specific time interval.

The evaluator therefore also made extrapolations based on representative cases and statistics on the market figures (e.g. number of km waterways, number of vessels, etc.). Of course this is only viable for similar operating areas/ markets of vessels and Member States and needs to be substantiated.

The same issue occurred when respondents had been confronted with significant changes in the business environment in the past years. Since there were indeed quite significant changes (e.g. because of the financial and economic crisis) many skippers/ businesses were not able to provide unambiguous data with respect to the impacts of RIS in the business environment. Or, more precisely, data which allows to isolate the impacts from other impacts caused by other factors in the business environment.

In the cases when the direct estimation of the size of the impacts in the field was not possible, alternative ways to estimate impacts were considered. In some instance it was possible to estimate effects with a model based approach (e.g. by using voyage cost modelling)[41]. When effects could not be determined either way, this was reported.

Below the main research categories are listed and per research category the main sources are indicated.

Desk research

The RIS evaluation study started with an intensive desk research. Data for replying to a number of the evaluation questions was already available from existing sources, in particular of the TEN-T, PLATINA and 7RPF funded projects. The goal of this desk research was to make an inventory of useful evaluation material and to assess the quality of the documents. The collected information was also used to gain more knowledge of the RIS technologies and developments in the evaluation period 2006-2011.

[41] This approach was used in some analyses that are reported in chapter 9.

The most important reference documents used as input sources for the RIS evaluation are the following:

- Legal documents: RIS Directive and RIS regulations (see paragraph 2.2 for a complete overview of legal documents);
- Masterplan for the implementation of River Information Services in Europe (IRIS Masterplan), project number 2004-NL-91101-S – TREN/05/TENT/S07.41417, 17 November 2006, DGG Ministry of Transport the Netherlands and Ministry of Transport, Innovation and Technology Austria;
- Transport Research Knowledge Centre: River Information Services, Modernising inland shipping through advanced information technologies, European Union 2010
- Deliverable 12.1 Report on socio-economic assessment of RIS, Consortium; Operational Management Platform River Information Services, Contract No. GRD2/2000/30161, 30th March 2006;
- Consolidation report of the RIS Index and reference data, PLATINA Platform for the implementation of NAIADES, grant agreement TREN/FP7/TR.218362, DVS, 22 August 2010;
- RIS support structure workflows, PLATINA Platform for the implementation of NAIADES, grant agreement, TREN/FP7/TR/218362, DVS, 31 October 2012;
- RIS implementation support and assistance, PLATINA Platform for the implementation of NAIADES, grant agreement TREN/FP7/TR/218362, DVS, 31 October 2012;
- Report on working group European IWT structure, Concretisation of the EC transport policy for IWT infrastructure needs on the Rhine corridor - a first approach, PLATINA Platform for the implementation of NAIADES, grant agreement TREN/FP7/TR/218362, DVS, 31 October 2012;
- Measuring RIS implementation, Proposal for measurable progress, PLATINA Platform for the implementation of NAIADES, grant agreement grant agreement TREN/FP7/TR/218362, DVS, 1 November 2011 ;
- Policy Summary report, INDRIS, 2000;
- Awareness Paper international data exchange in the area of inland navigation, IRIS II, RWS, 20 December 2010;
- Paper on Opening governmental traffic management infrastructure for the mutual benefits of authorities and logistics – River Information Services in Europe, 19th ItS World Congress, via donau, 22/26 October 2012;
- RIS implementation issues: discussion note on the current status of RIS implementation in Europe, Rotterdam, Serendipity, 7 June 2011;
- RIS Index Encoding Guide v0.8; in cooperation with PLATINA, 7 December 2010
- Working Paper Assessment of the implementation of River Information Services in Europe (SPIN-TN Strategies to Promote Inland Navigation), via donau, 31 October 2006;
- The implementation status of River Information Services status 2010 (report no. 125-2011), PIANC The World Organisation for Transport Waterborne Infrastructure, 2011Expert Paper: RIS in Multi-Annual Financial Framework 2014-2020.

Country reports

The field research started a few weeks later than the desk research. First an overall impression of the RIS implementation was needed in order to develop a thorough framework for the country reports, to be used for the data collection in the (Candidate) Member States including Serbia. This framework specified the required data and information from each country and was developed in order to ensure a sound and common approach by each partner. Besides the legal implementation, the checklist also took into account the relevant economic, environmental and social impacts of the RIS Directive such as compliance issues and transparency issues. For

the transposition of the Directive into the national legislation a special table was being developed making it clear which articles of the RIS Directive were being transposed in which national legal framework[42].

The implementation of RIS throughout Europe was gathered by desk and field research which included a numerous of interviews with the main stakeholders of each country. The collected information of the field research was comprised in thirteen separate country reports. The results of the country reports allowed the preparation of conclusions on the extent to which the roll out of RIS was synchronised across Europe and what was the rate of implementation (legal compliance, technical availability, user uptake).

Involvement of stakeholders

The RIS Directive could not be implemented successfully without support of the national and international stakeholders, both on private and public level. The involvement of stakeholders in this evaluation is an essential requirement to create a solid basis for public and private support for the conclusions and recommendations with respect to the possible follow-up in the next programming period (2014-2020). Therefore it is important that stakeholders were consulted and asked to give their opinion on what are the problems, the alternatives and their interests with regard to the implementation of the RIS Directive 2005/44. Within this RIS evaluation project stakeholders were being involved by asking their opinion during interviews, workshops and meetings.

4.3.1 Workshops and Meetings (Decin/Czech Republic, Brussels)

During the RIS week in June 2013 a workshop was organised in order to inform the RIS Expert Groups about the first findings of the desk- and field research of the RIS evaluation. During this workshop the participants were given the possibility to comment on the findings. Besides the findings, also the preliminary conclusions of the evaluation were presented in order to discuss whether these were the main topics.

A second meeting with the RIS Directors and the experts of the European Commission took place in Brussels on July the 3rdof 2013. The main findings of the evaluation were presented and discussed with the participants of the meeting. After this meeting the RIS Directors also got the opportunity to comment on the draft report.

On February 11th of 2014 a “RIS Policy evaluation and review state of play meeting” was held in Brussels. Intermediate results of the study were presented by the project team and the results were discussed. The meeting was attended by staff of EC, Member States representatives and representatives of IWT-industry organisations. Comments at the meeting were noted and supplied in written form. They were processed by the project team and incorporated in the final report.

[42] See Annex 7 for such a form. All the filled correspondence tables for the countries that had to transpose the Directive are included in Annex IV (Country reports) .

PART 3: EVALUATION FINDINGS

5 Transposition and Implementation of RIS legislation

5.1 Introduction

In this chapter an assessment is be made of the degree of completeness of the transposition of the RIS Directive into national legislation and of the legal implementation of the RIS regulations. The Directive prescribes minimum requirements for the setting-up of RIS, data exchange and equipment and stipulates the definition of guidelines for the setting-up of RIS (RIS Guidelines), as well as of technical specifications in particular in the areas of electronic chart display and information system (Inland ECDIS), electronic ship reporting, notices to skippers and vessel tracking and tracing systems. The Directive applies to inland waterways of all Member States of Class IV and higher and interconnected by inland waterways of Member States of Class IV and higher including the TEN-T ports located on those waterways. Member States transposed the Directive pursuant to the 20 October 2007 deadline.

5.2 Sources and results, input for evaluation

In order to assess the degree of completeness of the transposition of the RIS Directive in the Member States a number of sub-questions can be formulated:

- Are all articles of the RIS Directive transposed effectively into national legislation and has this been notified to the EC?
- What are the main legal problems with the implementation of the RIS Directive?

Timely implementation of all legal aspects into the national legislation is required and therefore the final implementation date of 20 October 2007 is set as indicator. What needed to be exactly implemented within the set timeframe? For this purpose a transposition table has been developed in order to concisely assess all articles of the RIS Directive (see Annex 7). The main data sources for this assessment have been the national databases containing all national legislation and interviews with stakeholders. In addition it should be mentioned that most of the stakeholders took the opportunity to check the information described in the country reports (including also the transposition tables).

5.3 State of transposition into national legislation

Table 5.1 shows an overview with data, extracted from the country reports (see Annex 4) about the timing of transposition of the Directive into the national legislation.

Table 5.1 Timing of transposition of the RIS Directive

Country	*RIS Directive by 20th of October 2007*	*Transposed since*	*Transposed in*
The Netherlands	Yes	Transposed since 2 October 2007/	Besluit gegevens scheepvaart, Annex
Belgium			
> Flanders	No	Transposed since 19 December 2009	Decree 19 art. 4,1,2
> Wallonia	No	Transposed since 24 April 2008	Order 17 April 2008, art. 2
> Brussels	No	Transposed since 11 September 2008	Order 11, art. 3
Luxembourg	No	Transposed since February 2008	Order grand-ducal of 12 February 2008, art. 1
France	No	Transposed since 25 February 2008	Decree No. 2008-168 of 22 February 2008, art. 7
Poland	No	Transposes sine 10 June 2011 and coming into force 1 January 2013	Act of Inland Navigation art. 47a, (1), (3)
Germany	Yes	2006-2007	(non-public) decrees
Czech Republic	No	Transposed since 21 August 2008 and coming into force 1 January 2009	Decree 114/1995 paragraph 32a (1) and Decree 356/2009 paragraph 3
Austria	Yes	June 2008 completing first RIS regulations from June 2005	§5 and §24 of the Austrian Navigation Act (2005) including Amendment of 2008
Hungary	Yes	Transposed since 15 August 2007	Decree 219/2007 paragraph 1 (a)
Slovakia	No	Transposed since 1 June 2008	Act No. 179/2008 Amending Act No. 338/2000 on inland navigation
Bulgaria	No	Transposed since 23 October 2009	Ordinance for the provision of river information services
Romania	No	Transposed since 19 October 2007	Ordinance of MoT on the harmonization of river information services on inland waterways in the European Community
Croatia		Not applicable within set timeframe as Croatia became an EU Member State per 1 July 2013	
Serbia		Not applicable, Serbia is not an EU Member State	

Although most countries have, by now, transposed the Directive into national legislation, few of the countries did it within the time window that was given in the Directive. The evaluator will give an assessment of the degree of transposition of the RIS Directive into the national legislation in the following section.

5.4 Assessment of the Evaluator[43]

The present project only takes a snapshot (defined in January, 2013) of a still highly dynamic process. Mainly technical and to a lesser extent legal "RIS implementation" is in all countries still an on-going process. Technical changes and adaptions of regulations will remain on the agenda the coming years. The process of transposition of the RIS Directive however has been concluded since all countries have transposed the regulations into their national legislation.

In section 2.2 the requirements of the RIS Directive have been presented; in this chapter the extent to which these legal obligations are correctly implemented in the Member States will be discussed.

Table 5.2 Legal obligations of the RIS Directive

Article	*Requirements*
Art 4.1: MS shall take necessary measures to implement RIS on inland waterways falling within the scope of Art. 2.	RIS implementation on all inland waterways of the Member States of class IV and above which are linked by a waterway of class IV and above of another Member State, including the ports on such waterways.
Art. 4.3 (a): Member States shall supply to all RIS users all relevant data concerning navigation and voyage planning	In Annex 1 minimum data requirements are specified related to Article 4(3)(a): • waterway axis with kilometre indication; • restrictions for vessels or convoys in terms of length, width, draught and air draught; • operation times of restricting structures, in particular locks and bridges; • location of ports and transhipment sites; • reference data for water level gauges relevant to navigation.
Art. 4.5. and art.5:technical specifications for AIS	Implementation of technical specifications for vessel tracking and tracing systems by 13 September 2009; amendment 27 July 20131
Art. 4.3 (b) and art. 5: Ensure that for all their inland waterways of class Va and above, electronic navigational charts suitable for navigation purposes are available to RIS users	Implementation of technical specifications for the electronic chart display and information system for inland navigation (Inland ECDIS) by 29 March 2016.
Art 4.3 (c) and art. 5: Enable, as far as ship reporting is required by national or international regulations, the competent authorities to receive electronic ship reports of the required data from ships. In cross border operation this information shall be transmitted to the competent authorities of the neighbouring State before arrival of the ship	Implementing of the technical specifications for electronic ship reporting in inland navigation by 25 July 2012.
Art 4.3. (d) and art. 5: Ensure that notices to skippers, including water level and ice reports of their inland waterways, are provided as standardised, encoded and downloadable messages	Implementing of technical specifications for Notices to Skippers by 22 September 2009
Art. 12.1 and 12.2 Transposition: 12.1 Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive 12.2 Member States shall take the measures not later than 30 months after the entry into force of the relevant technical guidelines and specifications referred to in Article 5.	Implementation of RIS Directive by 20 October 2007

[43] The corresponding evaluation question or task is (see table 4.1) "Task 1.1 Assess the degree of completeness of the transposition of the RIS Directive into national legislation of the Member States".

Article 5 refers to the development of technical guidelines for the planning, implementation and operational use of the services as well as technical specifications. Member States shall, according to article 12.2, take the necessary measures to comply with the requirements set out in article 4 not later than 30 months after the entry into force of the relevant technical guidelines and specifications. The deadlines for this are presented in Table 5.2.

Article 4.1: Implementation of RIS on inland waterways of class IV and above
The legal obligations are only valid for the waterways of class IV and above and with regard to inland ECDIS only for waterways of class V and above (see figure 1.1 in chapter 1).

Article 4.3(a): Member States shall supply to all RIS users all relevant information concerning navigation and voyage planning
By article 4.3 (a) Member States are required to provide a minimal set of data on waterways, location of ports and locks, accessibility and service times. These data not directly related to a specific RIS Key technology but they are in fact important for all RIS key technologies, as well as for various other applications e.g. voyage planning systems. The set of data is specified in Annex 1 and is a core component of Fairway Information Services (FIS) a RIS service.

Art. 4.5. and art.5: technical specifications for AIS
Inland AIS (AIS stand for "Automated Identification System) is a standardised procedure for the automatic exchange of nautical data between ships and between ships and shore installations. The Automatic Identification System (AIS) is a ship borne radio data system, exchanging static, dynamic and voyage related vessel data between equipped vessels and between equipped vessels and shore stations. Ship borne AIS stations broadcast the vessel's identity, position and other data in regular intervals.

By receiving these transmissions, ship borne or shore based AIS stations within the radio range can automatically locate, identify and track AIS equipped vessels on an appropriate display like radar or Inland ECDIS[44].

The RIS Directive mentions AIS but in the setup of RIS (article 4) it is only required that the regional arrangement concerning the radiotelephone service on inland waterways concluded in Basel on 6 April 2000 in the framework of the radio regulations of the International Telecommunication Union (ITU) shall apply.

The regulation (EC) No 415/2007 specifies that AIS shall:
- Provide information – including the ship's identity, type, position, course, speed, navigational status and other safety-related information – automatically to appropriately equipped shore stations and other ships;
- Receive automatically such information from similarly fitted ships; monitor and track ships;
- Exchange data with shore based facilities
- User ID; Unique Station Identifier for inland AIS transponders.

With regard to the implementation of AIS regulation the following overview can be given:

[44] Leaflet Inland AIS Vessel Tracking and Tracing for inland navigation, CCNR, Edition 22 October 2008.

Table 5.4 Overview of the implementation of AIS

Country	Provide information	Receive automatically information	Exchange data with shore based facilities	User ID
The Netherlands	X	X	X	X
Belgium:				
Brussels	X	X	X	X
Flanders	X	X	X	X
Wallonia	X (not to shore stations)	X	-	X
Luxembourg	X	X	X	X
France	X	X	Does not cover yet all class IV and above waterways	X
Poland	X	X	X (achieve 100 % coverage at the end of 2013)	X
Germany	X (limited for facilitation of navigation by display of the tactical traffic image and ship-ship communication)	X	- (under preparation)	X
Czech Republic	-	-	-	-
Austria	X	X	X	X
Hungary	X	X	X	X
Slovakia	X	X	X	X
Bulgaria	-	-	-	-
Croatia	X	X	X	X
Romania	X	X	X	X
Serbia	X	X	X	X

From this overview it can be concluded that Czech Republic and Bulgaria have not fully implemented AIS yet. France, Belgium/Wallonia and Germany, do not always exchange data with shore based facilities.

Some other remarks can be made with regard to AIS implementation throughout the Member States. The Dutch Rijkswaterstaat concluded a so called “covenant” in November 2006 with the Dutch inland shipping sector covering the introduction of AIS in the Netherlands. With this covenant the sector agreed to cooperate voluntary with the Dutch government on two conditions: the government bears the costs of the implementation, and the privacy of the shippers is secured (meaning that only the position and identification of ships will be transmitted via AIS) which limits also the use of data by authorities. The sector agreed to cooperate voluntary already before the introduction of European AIS regulation due to foreseen safety benefits.

Hungary and Austria chose to make the use of the AIS transponder obligatory for vessels with a length of more than 20 meters and/or 12 persons on board. Slovakia is probably the next country to follow this initiative. This obligation goes beyond the

requirements of the Directive.

Belgium/Wallonia only implemented ship-ship data provision. Germany decided only to implement AIS for ship-ship communication meaning that shore-based stations for communication between shore and ship are not available. The installation of landside infrastructure at German inland waterways will start earlier than originally planned for after 2015. Public budget for installation of 100 AIS stations (including repeaters) at selected main waterways is provided by the infrastructure acceleration programme II. The AIS system will follow the vessel tracking & tracing standards defined by European regulation. The German AIS installations will complement existing infrastructure in adjacent countries such as the Netherlands and Austria and close the existing gap with respect to AIS coverage on main European waterway corridors.

There is no international data exchange of AIS data between Member States, although technically possible. But this formally not required by the RIS Directive. Germany considers that a more specific European legal basis is needed instead of working with so called Service Agreements or Administrative Agreements. Within the IRIS III project the exchange will be tested.

Article 4.3(b): Ensure that for all the inland waterways of class V and higher electronic navigational charts are available

The technical specifications for the electronic chart display and information system for inland navigation (Inland ECDIS) have recently been published (September 2013) and are defined in the Annex of the regulation. Inland ECDIS can be designed for both, **information mode** and **navigation mode**, or for **information mode** only. For the **navigation mode** as specified in Section 4 of these technical specifications, Inland ECDIS (Operating System Software, Application Software and Hardware) shall have a high level of reliability and availability; at least of the same level as other means of navigation.

If the chart is intended to be used for **navigation mode**, at least the following features shall be included in the ENC:

- bank of waterway (at mean water level),
- shoreline construction (e.g. groyne, longitudinal control dam, training wall – any facility that is considered a hazard to navigation),
- contours of locks and dams,
- boundaries of the fairway/navigation channel (if defined),
- isolated dangers in the fairway/navigation channel under water,
- isolated dangers in the fairway/navigation channel above water level, such as bridges, overhead cables etc.,
- Official aids-to-navigation (e.g. buoys, beacons, lights, notice marks),
- waterway axis with kilometres and hectometres or miles,
- location of ports and transhipment sites,
- reference data for water level gauges relevant to navigation,
- links to the external xml-files with operation times of restricting structures, in particular locks and bridges

Member States are not yet required to fully transpose the ECDIS regulation and to comply with abovementioned requirements. However, all Member States have already developed to some extend ECDIS charts, even for waterways lower than the required CEMT class V but due to the missing standards the quality of the current charts differs among Member States. The charts are available free of charge in all Member States.

Article 4.3(c): Member States shall enable the competent authorities, as far as ship reporting is required by national and international regulations, to receive electronic ship reports of the required data from ships

The purpose of the standard for Electronic Reporting in Inland Navigation is:

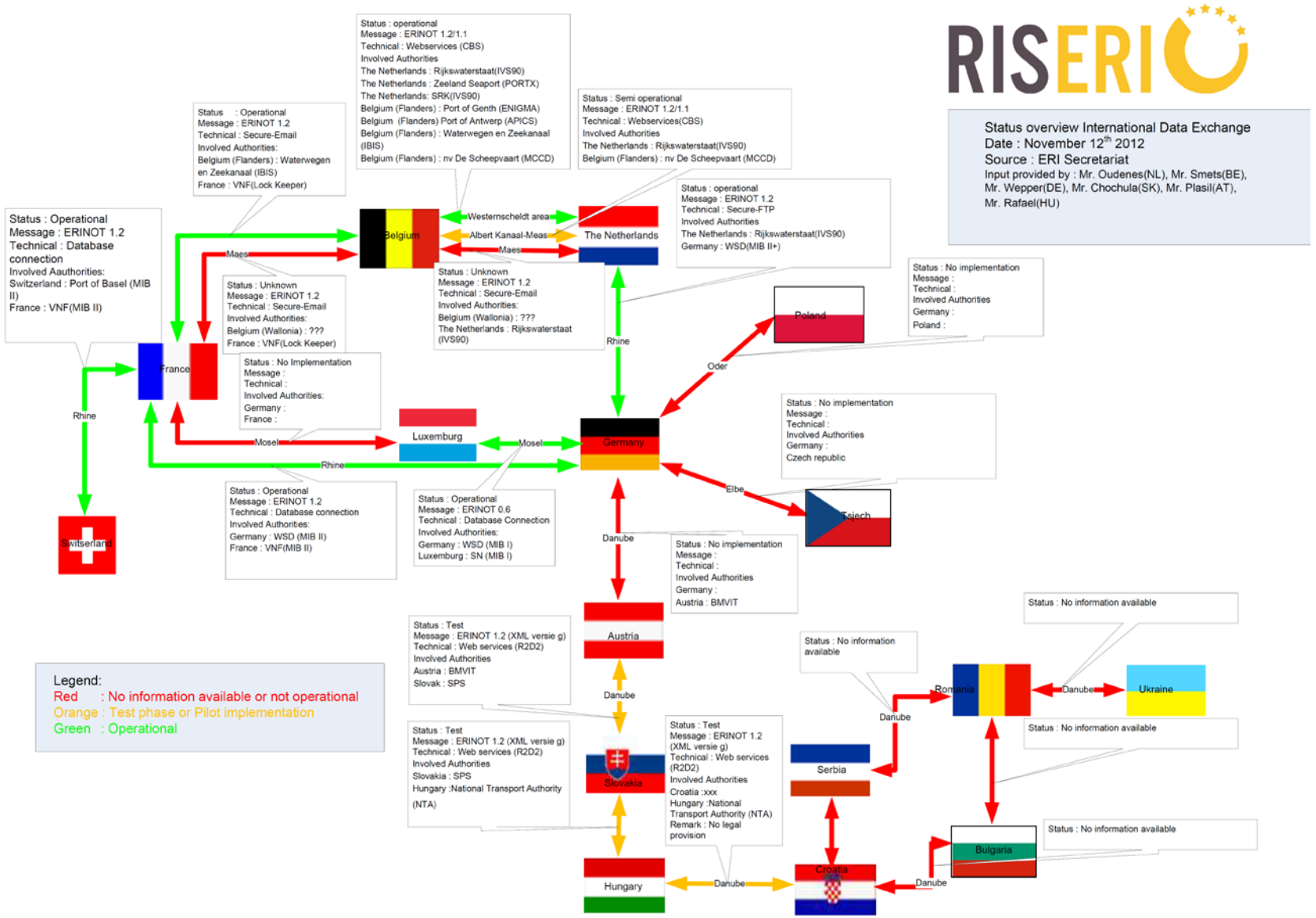
- To facilitate electronic data interchange (EDI) between partners in inland navigation as well as partners in the multi-modal transport chain involving inland navigation;
- To avoid the reporting of the same information related to a voyage several times to different authorities and/or commercial parties;
- To provide rules and standards for the interchange of electronic messages between partners in the field of inland navigation. Public authorities and other parties concerned (ship owners, skippers, shippers, terminals, ports) shall exchange data in conformity with these standards and rules[45].

There are several ERI messages defined:

- ERINOT: (dangerous) goods reporting
- PAXLST: passenger and crew list
- ERIRSP: ERINOT response and receipt message
- BERMAN: Berth management port notification

The following chart of the ERI Expert Group gives an impression of the implementation throughout the Member States and for various main waterways:

45 Leaflet "Electronic Ship Reporting in Inland Navigation", CCNR, Edition: 2008 - 22.10.2008.


RISERIC
Status overview International Data Exchange
Date : November 12th 2012
Source : ERI Secretariat
Input provided by : Mr. Oudenes(NL), Mr. Smets(BE), Mr. Wepper(DE), Mr. Chochula(SK), Mr. Plasil(AT), Mr. Rafael(HU)
Status : operational
Message : ERINOT 1.2/1.1
Technical : Webservices (CBS)
Involved Authorities
The Netherlands : Rijkswaterstaat(IVS90)
The Netherlands : Zeeland Seaport (PORTX)
The Netherlands: SRK(IVS90)
Belgium (Flanders) : Port of Genth (ENIGMA)
Belgium (Flanders) Port of Antwerp (APICS)
Belgium (Flanders) : Waterwegen en Zeekanaal (IBIS)
Belgium (Flanders) : nv De Scheepvaart (MCCD)
Status : Semi operational
Message : ERINOT 1.2/1.1
Technical : Webservices(CBS)
Involved Authorities
The Netherlands : Rijkswaterstaat(IVS90)
Belgium (Flanders) : nv De Scheepvaart (MCCD)
Status : Operational
Message : ERINOT 1.2
Technical : Secure-Email
Involved Authorities:
Belgium (Flanders) : Waterwegen en Zeekanaal (IBIS)
France : VNF(Lock Keeper)
Status : Operational
Message : ERINOT 1.2
Technical : Database connection
Involved Aauthorities:
Switzerland : Port of Basel (MIB II)
France : VNF(MIB II)
Belgium
Westerncheldt area
Albert Kanaal-Meas
Maes
The Netherlands
Status : operational
Message : ERINOT 1.2
Technical : Secure-FTP
Involved Authorities
The Netherlands : Rijkswaterstaat(IVS90)
Germany : WSD(MIB II+)
Status : Unknown
Message : ERINOT 1.2
Technical : Secure-Email
Involved Authorities:
Belgium (Wallonia) : ???
France : VNF(Lock Keeper)
Status : Unknown
Message : ERINOT 1.2
Technical : Secure-Email
Involved Authorities:
Belgium (Wallonia) : ???
The Netherlands : Rijkswaterstaat (IVS90)
Status : No implementation
Message :
Technical :
Involved Authorities
Germany :
Poland :
Poland
Rhine
Oder
France
Status : No Implementation
Message :
Technical :
Involved Authorities:
Germany :
France :
Luxemburg
Mosel
Germany
Status : No implementation
Message :
Technical :
Involved Authorities
Germany :
Czech republic
Elbe
Tsjech
Switserland
Status : Operational
Message : ERINOT 1.2
Technical : Database connection
Involved Authorities:
Germany : WSD (MIB II)
France : VNF(MIB II)
Status : Operational
Message : ERINOT 0.6
Technical : Database Connection
Involved Authorities:
Germany : WSD (MIB I)
Luxemburg : SN (MIB I)
Danube
Status : No implementation
Message :
Technical :
Involved Authorities
Germany :
Austria : BMVIT
Austria
Status : No information available
Status : Test
Message : ERINOT 1.2 (XML versie g)
Technical : Web services (R2D2)
Involved Authorities
Austria : BMVIT
Slovak : SPS
Status : No information available
Romania
Ukraine
Danube
Status : No information available
Status : Test
Message : ERINOT 1.2 (XML versie g)
Technical : Web services (R2D2)
Involved Authorities
Slovakia : SPS
Hungary :National Transport Authority (NTA)
Slovakia
Status : Test
Message : ERINOT 1.2 (XML versie g)
Technical : Web services (R2D2)
Involved Authorities
Croatia :xxx
Hungary :National Transport Authority (NTA)
Remark : No legal provision
Serbia
Croatia
Bulgaria
Status : No information available
Hungary
Danube
Legend:
Red : No information available or not operational
Orange : Test phase or Pilot implementation
Green : Operational

In case that ship reporting in inland navigation is required by national or international law, then also the Member State needs to support electronic reporting (article 4.3 RIS Directive). However, this article does not state that there is legal obligation to support electronic reporting when there is no obligation to report.

Electronic reporting for container vessels is compulsory since 1 October 2010 within the CCNR area. This implies that at least the ERINOT messages should be in place in the Netherlands, Germany, Belgium and France. The only other international framework for electronic ship reporting is the CEVNI from UN-ECE. However, this framework is only a recommendation on ship reporting and does not contain any legal obligations.

Within the ERI Expert Group a special Working Group on Comparison ERINOT messages versus applicable fairway regulations is working on an inventory of data, based on the used data in electronic reporting and the international requirements of reporting formalities in inland waterway transport and the respective applicable rules and regulations. The final aim of the Working Group is to define a minimum dataset based on the inventory to be used for electronic reporting and to make recommendations to the ERI Expert Group, the EU and River Commissions to ensure a harmonised dataset.

Based on the work done by this Working Group, the conclusion can be drawn that electronic reporting is only obliged for the Netherlands, Belgium, Germany, France (only Rhine river), Austria (only dangerous cargo) and Slovakia. What has to be reported differs among these countries and also the technical systems differ from country to country which hampers the international data exchange.

An overview of ERI implementation with regard to the Netherlands, Germany, France, Belgium, Slovakia and Austria is given in Annex 7. It should be noticed that the data gathering for this overview is still in progress and should be seen as a working document.

The overview of the ERI working group shows the mandatory fields according to the ERI regulation. For the countries with an obligation of electronic reporting it is mentioned in which system these fields can be found and also a reference is made to the relevant regulations.

In operating areas like the River Mosel already existing forms of electronic reporting are not yet replaced with ERI messaging in line with the ERI regulation. Brussels and Wallonia (Belgium), Luxembourg and France (CNR and French ports) do not support the ERINOT messages. CNR is even not authorised to demand cargo information. Within the Danube region reference is made to UN/ECE recommendations to electronic reporting but as these are only recommendations, there is no legal obligation.

In Belgium the RIS Directive was implemented on a regional level rather than on the federal level. The regions (Brussels, Flanders and Wallonia) have all transposed the Directive into decrees and orders. The result however is that the difference in speed hampers the data exchange between the regions as not all technical specifications are yet in place for electronic reporting. This same problem has been detected for France where different authorities are responsible for the operational implementation of RIS also leading to difficulties with national data exchange: VNF implemented ERI as where the CNR and French ports did not.

Austria is the only country which adopted the UN ECE CEVNI regulations in national legislation.

In practice there is a large variety of information to be reported to the local authorities (according to the national Police regulations) and not all countries closely follow the requirements of the ERI regulations. However, one of the purposes of the ERI regulation is to support international data exchange. As can be concluded from the chart of the ERI Working Group international data exchange has only been partially realised. Only the Netherlands, Germany, Luxembourg, France and Belgium exchange to some extent information on the Rhine and Moselle (mostly following the requirements of the CCNR.

Article 4.3(d): Ensure that Notices to Skippers are provided

Notices to Skippers (NtS) is a RIS key technology which provides in a standardized manner and which is language independent:

a) Fairway and traffic related information, as well as

b) Hydrographical information such as weather information, water level information and ice information

Provision according to technical specifications in the regulation 416/700 in XML-format downloadable via the Internet of:

- Fairway and traffic related messages;
- Water level related message;
- Ice messages.

Enabling specific downloads for sections of waterways, specific point or parts of a waterway, time of validity and date of publication of the notice.

Notices to Skippers are available throughout all the Member States although not for all Member States according to the required format. The data standard (XML message definition) is formulated in chapter 6 of the regulation. The XML message definition defines the structure of the XML message and the codes. Based on the interviews with stakeholders and the documentation of the Notices to Skippers Expert Group[46] the following table shows the availability of messages throughout Member States:

[46] Minutes of Meeting RISNTS, 30 November 2012, Rotterdam.

Table 5.5 Overview of implementation of Notices to Skippers

Country	*Messages*	*Format*	*According to format*
The Netherlands	FTM, WRM, ICEM, WERM	Online portal, e-mail subscription	Yes
Belgium: Brussels Flanders Wallonia	 FTM FTM FTM	XML, fax, e-mail, online	Yes
Luxembourg	FTM, WRM	E-mail, fax, online	Yes
France:	FTM, WRM, ICEM (VNF and CNR); French ports only FTM	Online portal and e-mail subscription	Yes
Poland	FTM, WRM, ICEM	Pdf	No, expected in 2014
Germany	FTM, WRM, ICEM,	Online portal and e-mail subscription	Yes
Czech Republic	FTM, WRM, ICEM, WERM	Online portal, e-mail subscription	Yes
Austria	FTM, WRM, ICEM,	Online portal, e-mail subscription	Yes
Hungary	FTM, WRM, ICEM	Online portal, e-mail subscription	Yes
Slovakia	FTM, WRM, ICEM, WERM	Online portal, e-mail subscription (XML)	Yes
Bulgaria	FTM, WRM, ICEM, WERM	Old format, new format will be available in 2014	No
Croatia	FTM, WRM, ICEM, WERM	Online portal, e-mail subscription	Yes
Romania	FTM, WRM, ICEM, WERM	Website	Yes
Serbia	FTM, WRM, ICEM, WERM	Online portal, e-mail subscription	Not relevant; Serbia is not a Member State

Note: FTM: Fairway & Traffic Messages, WRM: Water Related Messages, ICEM: Ice Message and WERM: Weather Related Messages

Bulgaria and Poland are the only Member States not fulfilling the regulation (EC) No 416/2007 with regard to Notices Skippers with regard to the proper format of messages. Both countries are however in the process of launching a new website in 2014 containing all the required information in the defined format.

Article 12: Member States shall bring into force laws, regulations and administrative procedures to comply with the Directive.

The Directive should be transposed by the Member States before 20 October 2007.

Table 5.6 presents an overview with data, extracted from the country reports (see Annex 4) about the timing of transposition of the Directive into national legislation.

Table 5.6 Overview of legal implementation of RIS Directive

Country	*RIS Directive by 20th of October 2007*	*Transposed since*	*Transposed in*
The Netherlands	Yes	Transposed since 2 October 2007/	Besluit gegevens scheepvaart, Annex
Belgium:			
Flanders	No	Transposed since 19 December 2009	Decree 19 art. 4,1,2
Wallonia	No	Transposed since 24 April 2008	Order 17 April 2008, art. 2
Brussels	No	Transposed since 11 September 2008	Order 11, art. 3
Luxembourg	No	Transposed since February 2008	Order grand-ducal of 12 February 2008, art. 1
France	No	Transposed since 25 February 2008	Decree No. 2008-168 of 22 February 2008, art. 7
Poland	No	Transposes sine 10 June 2011 and coming into force 1 January 2013	Act of Inland Navigation art. 47a, (1), (3)
Germany	Yes	2006-2007	(non-public) decrees
Czech Republic	No	Transposed since 21 August 2008 and coming into force 1 January 2009	Decree 114/1995 paragraph 32a (1) and Decree 356/2009 paragraph 3
Austria	Yes	June 2008 completing first RIS regulations from June 2005	
Hungary	Yes	Transposed since 15 August 2007	Decree 219/2007 paragraph 1 (a)
Slovakia	No	Transposed since 1 June 2008	Act No. 179/2008 Amending Act No. 338/2000 on inland navigation
Bulgaria	No	Transposed since 23 October 2009	Ordinance for the provision of river information services
Romania	No	Transposed since 19 October 2007	Ordinance of MoT on the harmonization of river information services on inland waterways in the European Community
Croatia	-	Not applicable within set timeframe as Croatia became an EU Member State per 1 July 2013	
Serbia	-	Not applicable, Serbia is not an EU Member State	

Although most countries have, by now, transposed the Directive into national legislation few of the countries did it within the time window that was given in the Directive.

5.5 Other legal issues

In this paragraph the legal issues for the articles with an impact (national implementation measures required) for the Member States will be discussed.

Article 3: Definitions

Although transposing the different RIS definition into the national legislation does not have any implication for national implementation measures not all countries did transpose all RIS definitions into their national legislation.

- France: lacking the definitions of RIS application and RIS centre
- Czech Republic: lacking the definitions of tactical fairway information, strategic fairway information, RIS application, RIS centre, RIS users, RIS interoperability
- Poland: lacking the definitions of RIS application and RIS centre

No conclusions can be drawn from these differences in RIS definitions as it does not affect the results of the RIS implementation. However, a complete transposition of this article would have been appropriate in order to avoid any misinterpretations.

Article 8: Competent authorities

All Member States have designated competent authorities for the RIS application and for the international data exchange. These authorities are:

Table 5.7 Overview of RIS authorities

Country	*RIS authority*
The Netherlands	Rijkswaterstaat
Belgium: Brussels Flanders Wallonia	Federale Overheidsdienst Mobiliteit en Vervoer NV De Scheepvaart NV Waterwegen & Zeekanaal Service Publique de Wallonie The agency for Maritime and Coastal Services (agentschap Maritieme Dienstverlening en Kust), The port of Antwerp (haven van Antwerpen, The port of Ghent (haven van Gent, http://www.portofghent.be/), The port of Ostend (haven van Oostende, The port of Zeebrugge (haven van Zeebrugge,
Luxembourg	La service de la navigation of the Ministry of Transport
France	Voies Navigables de France (VNF)
Poland	Inland Navigation Office of the Ministry of Transport, Construction and Maritime Economy
Germany	Federal Ministry of Transport, Construction and Urban Development, Waterways and Shipping Department
Czech Republic	State Navigation Authority
Austria	Via donau
Hungary	National Transport Authority
Slovakia	State Navigation Authority
Bulgaria	Ministry of Transport, Information Technology and Communications
Croatia	National RIS Centre
Romania	Romanian Naval Authority (RNA) and Administration of the Navigable Canals (CAN)
Serbia	Ministry of Transport, Directorate for Inland Waterways

Most of the Member States have designated one authority as RIS authority which is seen as most effective. Within the Netherlands there used to be two RIS authorities (Rijkswaterstaat and the Port of Rotterdam) but this situation changed in 2013 and now only Rijkswaterstaat is a RIS authority in the Netherlands. In Belgium the situation is quite different with five[47] official RIS authorities. In practice however more authorities are involved: the Flanders infrastructure manager Maritieme Dienstverlening en Kust is together with the Dutch Rijkswaterstaat responsible for the Scheldt area and the seaports of Antwerp, Ghent, Zeebrugge and Oostende are themselves responsible for RIS implementation in the port area. All these different RIS authorities hamper the harmonisation of RIS implementation in Belgium. The two RIS authorities in Romania are responsible for different parts of the inland shipping network. The division of tasks has a historical background but does not hamper the RIS implementation as both authorities cooperate closely together on implementing RIS in Romania.

Article 9: Rules on privacy, security and re-use of information

Article 9 of the RIS Directive refers to Community rules protecting the freedoms and fundamental rights of individuals as included in Directives 95/46/EC and 2002/58/EC. With regard to the re-use of information, Directive 2003/98/EC shall apply. As these Directives have a bigger impact than only on inland navigation, there is a difference in transposition of this article throughout Europe. Some countries (the Netherlands, Luxembourg, Czech Republic, Poland, Slovakia, Bulgaria, and Romania) choose to transpose this article in the relevant (inland) shipping regulation(s). Other countries refer to national privacy legislation such as Germany and Hungary or have a mix between privacy and inland shipping legislation such as Austria. Belgium (Wallonia and partially Brussels) did not specifically mention the privacy articles but as the Order of 17 April 2008 mentions that “this decree transposes Directive 2005/44/EG” an indirect reference to these privacy articles is made. France did not make any reference to articles 9.2 and 9.3 regarding the security measures and re-use of information. Croatia did not make any reference to article 9.3.

The different approaches of transposing this article into the national legislation are seriously hampering the international data exchange especially the national privacy legislation is for example in Germany and Hungary very strict with regard to this exchange. Moreover, without further legislation German authorities do not see a legal base for international data exchange and storage of AIS data in a central database. Data privacy is a major concern, as the scrambling of AIS messages is impossible (they are public) and authorities need to ensure that use of AIS data use is limited for certain purposes (e.g. safety, traffic management) only.

A solution can be found in concluding mutual agreements between countries for exchange of information. Such an agreement is also the basis of the information exchange between the Netherlands and Germany and also within the IRIS III project the participating countries are working towards this solution.

Other issues

Germany has transposed the RIS Directive by internal decrees which is different to all other Member States. Four decrees define the organizational measures within the administration to establish the required infrastructural measures, the implementation of technical measures and the approval of public budget for the implementation of the Directive.

[47] www.ris.eu/library/links /ris_authorities and ris.vlaanderen.be/html_nl/links/index.html.

As no objections were found against this transposition, it can be considered as sufficient.

Croatia became a Member State as from July 1, 2013 and did not have the legal obligation to implement the RIS Directive in 2007. The technical implementation of RIS in Croatia is on-going; there is no transitional period set for RIS implementation. The transposition of the RIS Directive into the national legislation has been finalised.

The Republic of Serbia is not an EU Member State but an important stakeholder of the Danube region. Serbia does not have any legal obligation to implement the RIS Directive. However, before the last election (May 2012) Serbia was very active. However, the winning coalition decided to cut the number of administrative bodies of the country which also affected the state-owned RIS operator PLOVPUT.

6 Implementation of RIS key technologies and services

In this chapter implementation of RIS key technologies and services will be evaluated, from the following angles:

1) The contribution of technologies to (multimodal) supply chains (interoperability and interfaces and communication with other modes of transport);
2) User uptake: extent of the use of the RIS applications and user experiences with functioning of technologies in practice (questionnaires and country studies);
3) State of the art of the applications: comparison of technology of RIS applications with technology of similar applications in other fields;
4) State of the art of the applications: comparison with new technological developments.

The chapter builds on the information from chapters 3, 5 and the Appendices. Further it adds to that, information on experiences of users with the application in practice. The latter information was collected in the fieldwork in Member States by means of interviews with national experts, stakeholders and desk research. The assessment by the evaluator is summarised in tables of strengths and the weaknesses for key RIS technologies and the RIS services.

Interoperability and quality, user uptake, state of the art compared with similar applications are presented in the first three sections. The fourth subject, new technological developments, will be addressed in section 6.4.

The key RIS technologies are (see section 3.4):

1. Vessel tracking and tracing systems (Automated Identification System (AIS));
2. Chart display and information system for inland navigation (inland ECDIS);
3. Electronic ship reporting (ERI);
4. Notices to skippers (NtS).

The key RIS technologies are meant to support the RIS services. RIS services are mentioned in the RIS Directive, but not specified in detail (except for a minimal data requirement in Annex 1) nor are there specific regulations for the RIS services. They are described in an abstract way in the RIS technical guidelines[48]. In this document the services are decomposed in functions. According to the RIS Guidelines, RIS services can be divided into eight categories[49] and all categories together contain about 75 distinct RIS functions (which are defined as contributions to RIS services[50]). The eight categories of RIS services are:

1. Fairway Information Service (FIS);
2. Traffic Information (TI);
3. Traffic Management (TM);
4. Calamity Abatement Support (CAS);
5. Information for Transport logistics (ITL);
6. Information for Law Enforcement (ILE);
7. Statistics (ST);
8. Waterway Charges and Harbour Dues (WHCD).

It should be observed that all the RIS services and functions which are listed in the RIS

[48] Commission regulation (EC) No. 414/2007.
[49] The eight service categories correspond with the service categories that were mentioned in the RIS Directive article 3a.
[50] Note that this is based on a functional analysis of services and is not equal to the contribution of the key RIS technologies.

Guidelines document, support activities that are currently accomplished without RIS technologies (so there are no completely new activities in the list). Therefore, the defining element for a RIS service is actually the use of RIS technologies for a particular purpose. However the fact that a particular RIS technology is available is by itself not a sufficient condition that the information service is available as well.

The RIS Guidelines document relates the RIS functions/ services to users of RIS information in order to obtain an overview of demand/ supply of information. This list was reproduced by PIANC and extended with columns that indicate the contribution of the Key RIS technologies to services/ functions. This list is contained in Annex 6 of this report. Table 6.1 relates information categories to the RIS services.

These key RIS technologies are briefly described below:

AIS stands for Automatic Identification System. It is an electronic device that broadcasts at regular times to other vessels its identity and position as well as other information with respect to ship and cargo. The AIS is also able to receive the same sort of information from other vessels. AIS was in the first place a ship- to-ship communication device to display position course over ground and its use was in the first place for collision avoidance. To better respond to the specific needs of inland shipping, Inland AIS has been developed. Inland AIS can also send information to shore-based installations (called AIS base stations). By receiving these transmissions, ship-borne or shore-based AIS stations within the radio range can automatically locate, identify and track AIS equipped vessels on an appropriate display like displays of radar systems or Inland ECDIS viewers.

Inland ECDIS stands for Electronic Chart Display and Information System for inland *navigation. Inland ECDIS is a system for the display of electronic inland navigation charts* and additional geographic related information. It is a navigation information system displaying selected information from an electronic Navigational Chart with positional information from navigation sensors and, if required, additional navigation-related information. Inland ECDIS may be used in navigation mode or in information mode. Navigation mode means the use of Inland ECDIS with traffic information by radar overlay (meant to support/add to navigation of the vessel) Information Mode means the use of Inland ECDIS without traffic information by radar overlay to directly inform the skipper only.

Electronic (Ship) Reporting (ERI) stands for Electronic Reporting International data interchange (EDI) between partners in inland navigation, as well as partners in the multi-modal transport chain involving inland navigation and avoids the reporting of the same information related to a voyage several times to different authorities and/or commercial parties. ERI involves the transfer of structured data by agreed standards from applications on the computer of one party to applications on the computer of another party by electronic means. In the ERI message standards the relation between private and public parties (waterway authorities, public ports) is addressed. The commercial relationship between private parties is not addressed.

Notices to Skippers (NtS) provides standardised, language-independent information to skippers, businesses, shippers and anyone interested about fairways, the traffic on the fairways as well as hydrographical information such as weather information, water level information and ice information. This type of message is also broadcasted via different media like radio messages, email and teletext information services. Users can also receive or download message in XML format for use in other applications. Only the latter functionality is the new element defined in RIS.

Table 6.1 RIS information categories and services

Information categorie		Information detail	Basic Services			Services					Ref. Data		
1st level	2nd level		Fairway Information Services	Traffic Information (STI and TTI)	Traffic Management	Calamity Abatement Support	Information for Transport Logistics	Information for Law Enforcement	Statistics (*)	Waterway charges and harbour dues	RIS-index	Hull Data	Other
Infrastructure related	Waterway related information	Provide basic routing data	X	X	X		X		X	X	X		
		Provide navigation-based information on fairway and/or navigable water area (incl. harbours)	X	X	X	X	X				X		
		Provide meteorological information	X	X	X	X	X				X		X
		Provide water level related information	X	X	X	X	X				X		X
		Provide information on obstructions and limitations	X	X	X	X	X				X		X
		Provide information on navigation rules and regulations	X	X	X		X			X			X
	Land related information	Provide information on land region	X	X	X	X					X		
		Provide information on harbours	X	X	X	X	X			X	X		
		Provide information on terminals	X	X	X	X	X				X		
		Provide information on locks	X	X	X	X	X				X		
		Provide information on bridges	X	X	X	X	X				X		
Vessel related	Dynamic vessel data	Provide actual position information of vessels		X	X	X	X	X	X			X	X
		Provide actual vessel dynamics (i.e. RoT, velocity, CoG, SoG, ...)		X	X			X					
		Provide historic position information of vessels							X	X		X	
		Provide historic vessel dynamics							X				
		Provide event based triggers for vessel position			X			X		X		X	
	Hull related information	Provide data for the identification of vessels (min. hull data set)			X	X	X	X	X	X		X	X
		Provide craft certificates						X				X	X
Voyage related	Location related information	Provide origin of voyage		X	X		X		X	X	X		
		Provide intermediate discharge locations					X	X	X	X	X		
		Provide passage points		X	X		X	X	X	X	X		
		Provide destination of voyage		X			X		X	X	X		
		Provide estimated date/time of arrivals		X	X		X	X			X		
		Provide requested date/time of arrivals		X	X		X				X		
		Provide date/time of actual arrivals		X	X		X		X		X		
		Provide estimated date/time of departures		X	X		X	X			X		
		Provide date/time of actual departures		X	X		X		X		X		
		Provide requested date/time of departures		X	X		X				X		
	Vessel/convoy related information	Provide overall convoy date		X	X	X	X	X	X	X		X	X
	Cargo related information	Provide origin of cargo					X	X	X		X		X
		Provide destination of cargo					X	X	X		X		X
		Provide cargo details		X	X	X	X	X	X	X	X		X
		Provide loading unit related information				X	X		X	X			X
	Persons on board related information	Provide number of persons (crew, passengers, ...) on board				X							
		Provide details on persons on board				X		X		X			

Source: Guidelines and recommendations for River Information Services Edition 3.0 (CCNR, 2011)

6.1 Interoperability of RIS

"Interoperability" is the ability of systems or organizations to work together (inter-operate). If two or more systems are capable of communicating and exchanging data they are interoperable. Open standards, therefore, imply interoperability by definition.

In the RIS Directive the term 'interoperability' is defined as the situation that services, data contents, data exchange formats and frequencies are harmonised in such a way that RIS users have access to the same services and information on a European level (RIS Directive article 3h). So, in the RIS Directive the more general concept 'interoperability' is relevant: interoperability does not only refer to the exchange of data but also to their interpretation (contents) and use (services). However, it does not in this description extend to the most general concept: interoperability of systems or organisations.

Interoperability is important in the context of RIS because:

a) The interrelationship between the RIS key technologies; they should effectively work together to provide/ support RIS services;
b) The IWT market is small in terms of the number of vessels while a large share of inland waterway transport operations is crossing national borders. By interoperability of applications the IWT market could benefit more from technical developments and increased competition in other markets;
c) Interoperability is also required to integrate IWT in multimodal supply chains.

Sources and results, input for evaluation

The four key RIS technologies are interoperable in the narrow sense that data can be exchanged, because they are based on open standards. This is demonstrated by the use of these in practice. More specifically:

- Vessel tracking and tracing systems (Automated Identification System (AIS))
  The basic information content of Inland AIS is compatible with maritime AIS[51], but some information specific to inland waterways is added. In view of their shared information content, Inland AIS and Maritime AIS are compatible. All data transmitted, can be received by both maritime and Inland AIS devices to be visually displayed and analysed. Therefore the system regulations for maritime AIS apply, they are:
  1. IMO Resolution MSC.74(69) annex 3: Recommendation on performance standards for AIS;
  2. ITU Recommendation ITU-R M1371: Technical characteristics for an universal shipborn automatic identification system, using time division multiple access in the VHF maritime mobile band;
  3. IALA Technical clarifications on recommendation ITU-R M.1371-1;
  4. IEC 61993-2 Automatic identification systems (AIS) part 2: class A ship-borne equipment of the universal ship-borne automatic identification system (AIS);
  5. IALA Guidelines on the automatic identification system (AIS).

  AIS is in practice often linked to Inland ECDIS in various applications. In chapter 3.5 it was observed that AIS is frequently linked to geographical maps (table 3.6) based on Inland ECDIS. Samples in traffic in Germany indicate that in 76% of the cases where AIS is used it is linked with Inland ECDIS[52].
- Chart display and information system for inland navigation (inland ECDIS)
  Inland ECDIS is compatible with maritime ECDIS: Inland vessels sailing in maritime waters with Inland ECDIS equipment get all maritime ENC information. Seagoing vessels sailing in inland waters with maritime ECDIS equipment get all information being equal

[51] Inland AIS and Maritime AIS are compatible. All data transmitted can be received by both maritime and Inland AIS devices to be visually displayed and analysed. However, the specific Inland AIS information is only transmitted and assessed by Inland AIS devices.
[52] See table 3.13 in chapter 3.

to marine information (e.g. river banks), but they do not get the additional inland information (e.g. inland notice marks).
The Commission Regulation No. 909/2013 is based on edition 2.3 of the standard. Member states have to produce Inland ENCs in accordance with this standard within 30 months after the entry into force of the Commission Regulation.
Inland ECDIS provides as one of the key RIS technologies the information basis for other RIS technologies. AIS data and standardised Notices for skippers are often displayed on the maps and used for correction of planning and/ or loading (water depth data!).

- Electronic ship reporting (ERI)
  One of the purposes of the standard for Electronic Reporting in Inland Navigation is to facilitate electronic data interchange (EDI) between partners in inland navigation as well as with partners in the multi-modal transport chain involving inland navigation.
  The standard for electronic reporting in Inland Navigation is based on internationally accepted trade and transport standards and recommendations. It complements these for inland navigation. The standard describes the messages, data items, codes and references to be used in electronic reporting for the different services and functions of River Information Services (RIS).
  The message standard currently in use is UN/EDIFACT and XML messages derived from these.
- Notices to Skippers
  The NtS service is compatible and can be integrated with inland ECDIS, so that skippers can immediately update voyage plans. The NtS can be provided by pull or push services[53]. Providing NtS in the open XML-format, allows them to be included in all kinds of applications.

The second level of interoperability is the level of contents and the interpretation of messages. Considerable efforts have been undertaken (e.g. in developing the RIS index) to extend the RIS technologies to this level of interoperability.
In order to keep the interpretation of messages unambiguous a system of reference database (ERDMS) has been proposed. ERDMS comprises amongst others the RIS Index (harmonised description of infrastructure objects) and the Hull database (with unique vessel number). Although these reference databases are frequently used in practice they do not yet have the status of an accepted standard and in practice discrepancies arise between Member States in the interpretation of data.

The third level of interoperability is the level of RIS services. This is the level where synchronization and quality and performance measures are relevant. This level includes also harmonisation of training of personnel that has to work in providing services.

Except for sailing with AIS in navigation mode (for which stringent norms and certification are required for AIS equipment and charts) this level of interoperability is not operational yet for RIS services.

In the IRIS II project recommendations for service performance and service level quality have been formulated[54]. In this project it was found that it is not easy to define minimal service level requirements and the quality of data provided to users. It was recommended that Quality of River Information Services should become a permanent agenda item at each meeting of the various RIS Expert Groups and that this subject should possibly be approached per corridor.

[53] "Push", describes internet-based communication where the request for a given transaction is initiated by the publisher or central server. It is contrasted with "pull", where the request for the transmission of information is initiated by the receiver.
[54] IRIS Europe II. Implementation of River Information Service in Europe. Final Technical Report .Part IV (2012).

In 2013 with the ECDIS regulation and a proposal to harmonise water depth measurements/provision of information additional, steps were taken in this area, but interoperability of services is still an area that is unexplored.

Assessment of the Evaluator[55]

So, interoperability in the exchange of data to/from RIS technologies has been achieved. Further, at the level of interpretation of messages there is now considerable more uniformity thanks to the efforts to establish reference data bases in particular. But this can still be improved by making the reference data standard. At the level of services there is currently no high level of interoperability. There are only a number of plans to increase the level so far.
In Table 6.2 a list of strong and weak points of the key RIS technologies and RIS services related to the subject of interoperability is provided.

Table 6.2 Assessment of strengths and weakness of key RIS technologies and services on interoperability

Strengths	*Weaknesses*
Interoperability	
• Integration with maritime vessels/ transport • Standardised technologies possible to use in all EU Member States. • Open standards • The possibility to integrate/combine Radar, AIS, ECDIS and NtS has a considerable added value	• Not integrated with tracking/tracing and mapping applications in other land based transport modes • Privacy problems related to AIS because it is open to anybody and the related legal problems

Source: Panteia

6.2 User uptake of RIS

The uptake of the implementation of each of the four key RIS technologies and the RIS services will be assessed in this section. In chapter 9, where the economic and social impacts will be evaluated, the impact of the present uptake by users will be described and evaluated.

Sources and results, input for evaluation

In chapter 3 four indicators are proposed and calculated per corridor, which measure the extent to which the key RIS technology in a particular corridor is technically available and supported. Furthermore, figures on the actual use of technologies and services from surveys were presented in chapter 3. These indicators combined with the experiences from the country visits (see Annex 4) will be used in the next pages.

Vessel tracking and tracing systems (Automated Identification System (AIS))

In chapter 3, section 3.4, the percentages of the length of waterway network with supporting shore installations per corridor were 92%, 79%, 89% and 43% for the shore station services along the Rhine, Danube, North-South and East-West corridor respectively (see table 3.3).

[55] Evaluation question 5: Which *quality standards for RIS* are in place/being developed and to which extent does RIS implementation comply with these standards and to which extent are RIS services *technically interoperable*?

For on-board equipment the installation rates are high; the level of 100% of the active self-propelled fleet is almost reached in three countries in Western-Europe (Germany, Netherlands, and Belgium-Flanders) with a lower percentage at present in France (about 55% in 2013). On the Danube 100% rates are reached for Austria and Hungary. Currently only Austria and Hungary have the obligation of carrying AIS transponders on vessels navigating on their sections of the Danube River waterway. The usage of AIS was facilitated by the successful AIS equipment programmes in most countries (however, there were no such programmes in Croatia and Bulgaria). The estimated rate of installation for the entire Danube fleet is 62% (2013).

The total number of self-propelled freight and passenger transport[56] vessels in the IWT industry equipped with on-board AIS equipment in the EU was about 10,450 in July 2012. This is more than 90% of the entire fleet of self-propelled vessels of the RIS implementing countries.

In section 3.5 it was found that skippers are actually using the systems although Dutch skippers switch systems off in about 10% of the cases. AIS works well and is easy to use[57].

So, the technology is widely accepted by businesses in the IWT industry. The acceptance is however not unconditional. There are concerns about privacy (e.g. the use of vessel locations by certain websites[58]) and about the use of data by authorities[59] for enforcement purposes and also by freight forwarders and shippers in case there has not been an approval by the IWT company. The professional IWT organisations in the Netherlands representing the vessel owner/operators have even concluded an agreement with the Dutch authorities in which the use of AIS data by authorities is restricted to specific purposes only (traffic management, improving safety etc.).

Another group of users of AIS technology are infrastructure providers. It is clear from a comparison between the rate of installation of on-board equipment (see second paragraph above) and the percentages of the length of waterway network with supporting shore installations (see first paragraph of this subsection) that the implementation of supporting shore infrastructure lags behind the level of on-board installations, except on the Danube. Even on the Rhine corridor, with high transport volumes, there are still a number of “blank spots” with respect to the coverage of shore stations, for example along the Rhine in Germany.

Because of data privacy concerns and the (perceived) lack of regulations, authorities in some Members States are quite reluctant about exchanging data, in particular across borders. At present this is a major factor hindering the uptake of a number of RIS applications (AIS, ERI, European Hull database).
The High AIS uptake does not contradict with the privacy concerns. The uptake could only have been achieved because there was an agreement in The Netherlands between the government and the IWT industry about limiting the uses of the data to specific purposes (traffic management, safety primarily). Further, in Germany the authorities chose not to use

[56] There have also been AIS installations on board of vessels which are active for other purposes (like waterway construction work).
[57] Source: Promotie Binnenvaart Vlaanderen “: results survey: Use of ICT on board”, page 21. Only 20% find it is difficult.
[58] Some Member States (e.g. Austria and The Netherlands) investigated this and found that the use actually is illegal; however the websites are located outside the EU and little could be done to stop this.
[59] According to a questionnaire among Flemish shippers about 44% of the skippers would like to exclude data on position and direction of the vessels from customs, police and other authorities (“other” than infrastructure providers to which only 11% objects). About 46% does not want freight forwarders to receive this type of data.

AIS data at all! So without making AIS obligatory the uptake increased to almost 100%. It is however true that an obligation to use AIS in a particular operating area (like the Antwerp seaport or in Austria and Hungary) helps[60] to achieve a high uptake.

The exchange of AIS data across borders is a problem for the IWT industry but also for the authorities, in all corridors. For example, on the Danube a RIS service provider has access only to the AIS information broadcasted on their national stretch, hence, if fleet operators want to have the position information of their vessels from foreign countries they have to register with all country's RIS provider, where an application for displaying AIS data is available. Currently this is possible only in Austria, Hungary, Slovakia and Croatia.
In Hungary and Austria and also in the Antwerp seaport AIS is obligatory for ship owner/operators by law or regulation. Similar regulations will be applied in Croatia, Serbia and Slovakia in the coming years[61]. In December 2013 the CCNR proposed an AIS obligation on the Rhine. Elsewhere, in domestic transport in the Rhine corridor[62] and North-South corridor, on the lower Danube (Romania and Bulgaria) and in the East-West corridor, AIS is (still) voluntary.

Chart display and information system for inland navigation (inland ECDIS)
Inland ECDIS is widely used in the industry. Table 3.3 indicates that IENC coverage of the waterway network is at present at 89% for the length (in Kms) of Rhine corridor, 88% for the Danube corridor, 82% North-South corridor and only at 60% of the East-West corridor. So coverage is not complete and there are still a number of blank spots. In practice these spots are filled with non-ENC maps of the suppliers.

Inland ECDIS is often used in combination with AIS and Radar systems and/or is used as a background for the display of NtS. On the Rhine 76% of the vessels use inland ECDIS, but only about 15% use the maps in navigation mode[63]. Navigation requires very reliable, high quality maps and a DGPS[64] receiver and is therefore also more expensive[65]. In fact the ENCs must be certified. The additional costs explain why the use of maps in navigation is still limited. Although the ECDIS maps are free downloadable, the main suppliers add features to these and sell them to users. So rarely will the individual skipper get the charts for free. Inland ECDIS can also be used in voyage planning systems on board of vessels.

An important problem with the current supply of maps is the significant difference in quality (reliability, accuracy, maintenance, update frequencies). For example in the Danube corridor the following points were identified during the studies that were made on country level with regard to quality of map data:

- The charts for Hungary, Slovakia and Serbia are rather old while the other Danube countries worked much more recent maps (version 2.0 or 2.1[66]);
- The charts are not updated regularly or if they are, the frequency of update is insufficient in most of the countries – exception: Austria;
- The time between fairway measurement and the issuing of the charts is often too long for optimal use of the charts;
- Most of the charts do not contain depth data, some of the charts give indication where

[60] Or forces to achieve a high uptake; for those vessels that are mainly active in the operating area
[61] See country reports of these countries in Annex 4.
[62] It is however likely that the countries in the Rhine corridor will follow-up a decision to make AI obligatory by the CCNR, by broadening the obligation to domestic transport as well.
[63] Survey: "Umfrage Ausrüstung" by WSV on various German Waterways among skippers of all nationalities (from 1.04.2012 until 30.6.2012) June 2012.
[64] Differential General Positioning System: system using GPS signals of various satellites to improve the accuracy of the original GPS (from 15-meter nominal to 10cm for the best implementations).
[65] In Chapter 9 indicative costs are given for various configurations of on-board AIS and Inland ECDIS applications.
[66] Between the publication of these versions there is at least a decade of time.

the water depth is sufficient (2.5m or 3.5m, depending on the stretches);

Although the entire Danube is covered by ENCs and they are available for free, because of the points mentioned these charts give currently little or no additional information to the skipper than printed charts. Skippers frequently still use their own paper-based charts and notes. About half of the Danube fleet (474 vessels) has an ECDIS viewer.

A significant step towards solving the quality problem was taken, by the adoption of the ECDIS standard and the publication of the EC regulation on inland ECDIS, on the 10th of September 2013. The Commission Regulation is based on edition 2.3 of the standard. This is the newest version. Member States have to produce Inland ENCs in accordance with this standard within 30 months after the entry into force of the Commission Regulation. However, skippers will have to be prepared to pay for updating maps that are used in systems (see the remarks earlier). Furthermore, it may take 30 months before all Member States have updated their maps. Finally the quality of maps also depends on natural circumstances. In some stretches of the Danube the river bed changes so frequently that the proper update of ENCs is practically impossible. Hence, navigation in the stretches always needs the knowledge and experience of the skipper. It is not uncommon that a kind of "pilot" is used (either another vessel in front of, or a local skipper). So, in some cases, even accurate electronic charts are not helpful because the accuracy is quickly reduced in time.

For geographic referencing the RIS index is important. This list of (ISRS) location codes with additional information on the objects like their characteristics (name, fairway….), restrictions (available depth, clearance etc.) operating times etc. A common understanding of data exchanged on the waterway infrastructure requires a European standard. Currently the RIS index is not yet a standard, and there is, no obligation to apply the RIS index. Only a few countries apply it correctly (see country studies Annex 4) but the other countries support it and plan to use it in the future.

The RIS Directive applies to waterways of Class IV or higher and ports on those waterways. This geographic criterion is, however, much more restricted for IENCs, which should, according to the same RIS Directive, be available for waterways only of Class Va and higher waterways (and ports are not mentioned anymore). This difference of scope can be a problem in practice because in some countries ports are also covered while in other countries they are not covered by RIS, since they are not considered to be Class IV or V waterways.

When different authorities are responsible for the RIS implementation in ports this can cause gaps in the coverage of the network between waterways and ports and possibly also between different ports. E.g. in Germany[67] port authorities are responsible for the provision of RIS applications related to inland ports. However, inland ports rarely fulfil the requirements arising from the EU RIS directive. Mannheim and Cologne are among the positive exceptions with some services. Obligations for inland ports include amongst others the provision of electronic navigation charts. For the mapping problem in German ports efforts are underway to solve this problem through agreements with the waterway authorities[68].

[67] See the country report of Germany, Annex 4.
[68] Waterway offer inland to include the port area in aerial picture used for maps (Communication by EFIP February 2014).

Electronic ship reporting (ERI)

In Table 3.3 an overview is given of the present status of Electronic Ship Reporting in various corridors. The percentages of the length of waterway network with support for ERI per corridor was 92%, 62%, 88% and 11 % for along the Rhine, Danube, North-South and East-West corridor respectively.

This table refers to the technical implementation status of RIS and only to the ERINOT[69] message. The figures in tables 3.4-3.7 only indicate that ERI systems and software are available and that authorities are able to process ERINOT messages along waterways, it does not tell whether or not ERI is in fact used. Similarly, tables 3.14 and 3.15 indicate that 40-50% of the Rhine and North-South skippers have the software on-board to send/ receive ERI messages.

Four types of standardised messages (ERINOT/ ERIRSP, PAXLST, BERMAN are referred to in the RIS Directive. Only the ERINOT/ ERIRSP messages are mandatory, the last two are not mandatory.

However the mandatory use of ERINOT is conditional on the requirements of port and waterway authorities. When reporting of cargo and voyage data is required, ERINOT is mandatory. In practice in the IWT industry reporting of voyage or cargo data is only required for special types of cargo and specific waterways or stretches of waterways. Reporting of these data is not a common procedure and in many parts of the waterway network there are no reporting requirements at all.

Two conditions should be fulfilled for the implementation of ERI in cross-border supply chains from the technical point of view:

a) The ability to produce and receive messages in the required formats: is ERI supported on the side of the authorities and on the side of skippers and barge operators?
b) The ability to exchange messages with commercial partners and authorities in the corridor. This depends not only on the ability to produce/ receive messages on one point but also on the possibility of international data-exchange.

If only a) is realised, the geographic scope of ERI is restricted to domestic transport.
With regard to a) the status in July 2013[70] was as follows:

- ERINOT: Supported by the authorities in all countries, except Bulgaria, Romania, Poland, Czech Republic, Belgium- Wallonia and Brussels regions, Luxembourg, Slovakia and France;
- BERMAN and PAXLST: Supported only by the authorities in the Netherlands, Hungary and Serbia.

The BERMAN message type is not used at all, and PAXLST[71] is only used (by a small group of operators) in the Netherlands and Hungary.

With regard to b) the status in July 2013 was as follows:

- Only on waterways between Flanders, the Netherlands and Germany is there at present a continuous area where ERI is implemented and can be used without problems;
- International data exchange at borders between Germany and other countries (other than the Netherlands) along waterways is not implemented. There is no exchange of

[69] For an explanation of the meaning of the ERI message acronyms, see: Annex 2.
[70] The information on ERI support and the international exchange of messages is based on tables per corridor in chapter 3 and the specific country reports in Annex 4.
[71] Message communicating Passenger and crew information to authorities and from a Customs, Immigration or other designated authority in the country of departure to the appropriate authorities in the country of arrival of the means of transport.

ship's voyage reports with Austria at the Danube, with the Czech Republic at the Elbe and Poland at the Oder;

- Exchange of messages with France (and even within France itself72) is not implemented;
- On the Danube the international exchange of data is an important problem. Neither is this possible on the upper Danube (between Austria and Germany) nor on the Lower Danube (with Bulgaria and Romania). See also the remarks in this in the text on the uptake of AIS above. The recent agreement between RIS service providers is a partial solution here as well.

In practice non-electronic reporting practices still exist on the Danube, which stem from the pre-ERI era. These were not replaced by ERI but must still be adhered to. In that case electronic reporting is not useful for skippers and to avoid having to report voyage data twice to authorities and/or commercial parties, skippers, choose not use ERI. As a consequence reporting (also for dangerous goods transport which is obligatory) continues in its traditional way using paper, fax, etc. Currently, no or very little use is made of the availability of ERI on the Danube corridor at all.

Reference data, in particular the RIS index and hull database, are essential to ERI, because they provide code-formats for data-elements in the messages. In section 6.1 it was emphasized that also the interpretation of the contents of messages should be unambiguous.

Notices to skippers (NtS)

While the use of Notices to skippers in publicly broadcasted form in is widespread, only 40-55% of Dutch and Flemish skippers use software applications on-board that can process such messages (see chapter 3 Table 3.16).

Table 3.5-3.7 show that many countries offer some message service but the range of messages that is sent, differs among the countries. For example, a group of countries (Belgium[73], Germany, Netherlands, Austria, Hungary, Luxemburg, Poland and Romania) did not include the (non-mandatory) weather report messages (WERM) because very good and detailed messages in their countries are already available by other suppliers (e.g. meteorological institutes) and the added value of the WERM is considered small by them[74]. The alternative weather messages, however, do not conform to the formats defined in the NtS regulation. So, if user would like to incorporate these messages in computer programs in the same way as the other Nts messages, they will need separate (non-standard) interfaces.
However, other countries have a different opinion and they do provide the WERM message.

The messages are available free of charge and should be language-independent. Furthermore the national supplier of NtS often includes links to the websites of other national suppliers. The direct international exchange of the NtS between authorities across countries is however currently limited[75].

[72] The national exchange of ERI data between VNF, the ports and CNR is currently not yet possible (see country report France, Annex 4).
[73] In Belgium Flanders implemented all NtS messages except WERM; Wallonia and Brussels did not implement WRM and ICE as well; only FTM is implemented throughout Belgium .
[74] The states are not required to provide the WERM message.
[75] This is not required by the RIS Directive2005/44.

Of course all the authorities using this standard can integrate notices to skippers of other authorities and countries in their own services.

The provision of NtS via a number of national distribution points (websites) is nevertheless found inconvenient for skippers and barge operators who operate in the market for international transport. Also system suppliers of mapping and voyage planning prefer one central European distribution point, where all messages could be downloaded.

Notices to Skippers contain important information for sailing/ the loading of vessels and the management of traffic and locks. The most IWT-specific and, for skippers one of the most important, service is the information on water levels and the draught of waterways. This directly determines the maximum payload at the expected water level conditions, the possible load rate of vessels and therefore, the revenues of transport. Furthermore, messages regarding delays and blockages on the network are important for skippers that plan to sail on waterways in areas where the events are reported. This type of service was already widely used in the industry prior to RIS by means of e.g. radio broadcasts, websites etc., but not in standardised electronic form. The standardisation across countries and its distribution in XML-format allowing the data to be easily used in planning systems is the really new element, introduced within the RIS framework. The messages can be used/ translated into 21 languages of Member States of the EU and 3 other languages.

RIS Services

The RIS technologies support the eight RIS services which were outlined in chapter 3, and specified in RIS functions in the RIS Guidelines[76]. In Annex 6 per RIS service/ function tables are given which allocate key RIS technologies to the functions[77].The implementation of RIS technologies is a necessary condition for providing the RIS services.

In some cases the relation between technologies and services is very close. When for example Inland ECDIS is deployed it automatically means that **fairway information** is provided. Many of the RIS functions of this particular RIS service are provided via Inland ECDIS, but also via NtS and AIS. Only FIS16 (charges) and FIS 17 (pleasure navigation) are usually not provided by a key RIS technology. This RIS service is implemented and provided in all Member States where the RIS technologies have been implemented.

For **Traffic Information** Services tactical and strategic traffic information are distinguished. This distinction was already made in the RIS guidelines. *Tactical traffic information* refers to the immediate traffic surrounding a vessel or confronting a traffic manager on shore; *strategic traffic information* refers to all information affecting the medium and long term decisions of RIS users. Tactical traffic information is provided by AIS both for skippers and traffic managers on shore (if there are shore stations). So, this basic information service is also almost directly provided by AIS. But Inland ECDIS and Nts contribute to the realisation of functions as well. For Strategic traffic information one needs also statistical information about e.g. incidents/ accidents in the area (STI 7) and possibly also traffic models or GIS models (STI, STI2). These tools and additional data are typically used by infrastructure managers. Strategic traffic information is less relevant for skippers.
One can conclude that this Traffic Information Services are implemented and also widely used in the IWT industry and by infrastructure managers.

[76] See RIS guidelines (Commission regulation (EC) No. 414/ 2007, 13 March 2007), Table 4.6.
[77] The source of this allocation is the IRIS II project .

The RIS service **traffic management** is primarily relevant for authorities. It contains a number of functions (lock and bridge management) for which RIS key technologies (in particular AIS) are certainly relevant, but currently only used in pilot projects.

For other functions of this RIS service the contribution of key technologies can be operational, however. These are the functions in the group vessel traffic services (VTS) and Navigational support (NS) for which RIS key technologies could be used. However, this only occurs in countries where the authorities want to use RIS for traffic management, and this is not generally the case (Germany does not want to use AIS for traffic management). This RIS service is only partly provided.

Unfortunately, for all the remaining RIS Service groups: **calamity abatement support**, **information for transport/ logistics management**, **law enforcement, statistics**, **waterway charges** and **harbour dues** the judgement has to be negative: the services are not provided at present or are currently only in an exploratory phase or pilot study.

There is only one exception in the group **information for transport/ logistics management**: Inland ECDIS, AIS and NtS contribute already to the subgroup Voyage planning. Although the present level of this contribution can be called basic (much more is possible) it can be assumed that the uptake of this is large since voyage planning is very important for skippers and fleet managers, and better information on the use of vessels is always useful for them.

In table 6.3 this assessment of the current uptake of RIS services is summarised.

Table 6.3 RIS services provided by the current RIS implementation

RIS service	*Status*
Fairway Information Service (FIS)	Provided by inland ECDIS, NtS and AIS
Traffic Information (TI)	Provided by AIS (tactical traffic information), NtS and ERI
Traffic Management (TM)	Partly provided
Calamity Abatement Support (CAS)	Not provided
Information for Transport logistics (ITL)	Partly provided
Information for Law Enforcement (ILE)	Not provided
Statistics (ST)	Not provided
Waterway Charges and Harbour Dues (WHCD)	Not provided

Source: own assessment

Assessment of the Evaluator[78]

In a list of strong and weak points of the key RIS technologies is given related to the uptake of the technologies by users.

AIS and Inland ECDIS have already obtained a very high user uptake in the industry.
There are three reasons to expect a higher uptake in the next years:
1) Further growth is expected to occur in the corridors where the market penetration was

[78] Evaluation question 12: To which extent does the *geographical distribution of take-up of RIS* corresponds to the geographical distribution of market needs/opportunities? What are the main factors that determine the level of take up of RIS?
Evaluation question 13: Is there any differentiation of *RIS uptake by different market segments*? Can such differences be rationally explained from a cost/benefit point of view?

relatively low so far because partly this is the consequence of a later start or delays;

2) The outcome of the possible decision of the CCNR to make AIS mandatory on the Rhine River might spark off a wave that could persuade the last remaining operators to adopt the systems;
3) Influx of a younger and more e-literate group of skippers and barge operators in the next years, who are familiar with modern electronic equipment which will remove the (modest) resistance which is still present.

In contrast ERI has not reached a high rate of user uptake in IWT. This innovation could potentially have much higher revenues than all the other key RIS technologies combined. Possible reasons, why it lags behind the others are:

- ERI is an innovation which is less observable, more abstract and requires much more stakeholder involvement and participation compared to technologies such as AIS and ECDIS;
- ERI is an innovation which depends on the reaching of a critical mass (the benefits have the increasing to scale structure). This is also true for AIS but less so for Inland ECDIS and NtS;
- ERI requires more actions by authorities and business partners in the market environment to succeed than the others.
- Relatively limited geographic areas of application. This means that the benefits have been limited as well;
- Legal problems regarding differences with respect to interpretation of privacy regulations and data protection hindering cross-border data exchange.

Few of the list of RIS services are currently provided. Only basic information services are provided. The main reason for the low uptake of the RIS services is that most of the services require a high uptake of the key technologies. Since this has only very recently been achieved (for some technologies at least), the diffusion process has still to begin.

The low uptake is not a sign that the RIS services have a limited potential. On the contrary, in the next sections (e.g. section 6.4) some of these are identified as “untapped potential”.

Table 6.4 Assessment of strengths and weakness of key RIS technologies in the uptake by the market

Strengths	***Weaknesses***
Uptake	
AIS • Suited well for the purposes of safe sailing and provision of a tactical traffic image for traffic management on shore • Integration with electronic charts and radar • Fairly easy to use	**AIS** • Different regimes with respect to mandatory use • Gaps on some parts of the network related to absence of shore based infrastructure (this could affect traffic management, navigational aids safety, and services on shore like providing positioning information) • Legal problems related to data exchange across borders
Inland ECDIS • Integration with other on-board technologies like AIS, radar and NtS and • Support of both navigation and voyage planning;	**Inland ECDIS** • Relatively expensive • Not full coverage of the IWT waterway network while in road transport even each street is covered • Not available for small waterway classes (obligation: class Va or higher). • Legal status of RIS index

Strengths	Weaknesses
Uptake	
ERI • Potential for decrease of administrative burden • Integrated with EDI in private sector and with EDI in maritime transport • Higher level of safety and security of transport	**ERI** • Data exchange between countries limited and subject to legal problems • There is no uniformity in reporting requirements in corridors except on the Rhine River • Reference data are essential to ERI, but less firmly established in the legal framework
NTS • Essential information for businesses, their customers and infrastructure providers • Availability in various languages • Direct integration with applications like ECDIS maps and voyage planning applications • NtS messages are generally used • The use of various types of distribution media	**NTS** • Water level depth measurements are essential information but usually only available on a few marking points per fairway • Provision via a number of national distribution points (websites) instead of a single distribution point for corridors in Europe

Source: Panteia

6.3 Comparison with ITS in other modes and links to RIS

The current RIS concept was originally conceived in the period prior to the exponential growth of smart phones and mobile internet. The technological environment for RIS in the next decade will be determined by new developments like this. In particular it is interesting what will happen with/ around social networks, the expected innovations in internet itself (WEB 2.0) and GALILEO.

It is not expected that the key RIS technologies, and many of the standards, will have to be re-defined because of the development of technology. But quite likely new types of applications will emerge on the market and properties of existing applications might change and be enhanced. It will be important to keep monitoring these developments and be prepared to update standards to the changed market supply of systems. Furthermore, it is also possible that new key RIS technologies will have to be added to the existing ones.

In this section new types of applications will be assessed. This will be done by comparing the technology of RIS applications with technology of similar applications in other fields, in particular the use of ITS in other transport modes.

Sources and results, input for evaluation

Vessel tracking and tracing systems (Automated Identification System (AIS))

The technologies for localisation- and mobile communication services are key technologies, which are at present available in smart phones and tablets as well. These technologies are frequently directly integrated with the Internet. The widespread use of Mobile internet and Smartphone technology occurred long after AIS appeared on the market (AIS developments in maritime transport started around 2002).

In comparison to AIS the advantages of the new technology are: it is cheaper, more flexible with regard to privacy (users can make themselves visible or invisible to other groups) and it offers easy access to the internet; it is, moreover, already the case that all kinds of smart phones and/ or tablets are used on-board of many IWT-vessels.

So the threshold for market entry of a new technology cannot be high. In road freight transport the new technologies used already extensively in transport and logistics and in the IWT industry many companies use mobile communication services as well.

At first sight, one could conclude from this that AIS is a technology, which is technically outdated. However, AIS has in contrast to these new services, the objective of increasing safety (in addition to facilitating navigation), and this function has been systematically developed in the past years. Furthermore, the openness of AIS could be seen as strong point as well for some purposes (e.g. safety)[79].

So there are very good reasons to continue using AIS in the near future. The main reasons are:

- It is embedded in the existing institutional framework;
- Integration with RADAR systems and Inland ECDIS;
- The integration with AIS in maritime transport;
- The coverage of IWT waterway network with Wi-Fi (ports or resting places) or 3G communication networks is still far from optimal. The rate of coverage of AIS network is better;
- AIS is self-organising system which also works without supporting shore-based infrastructure. This is an important property of the system especially for the performance on the safety criterion[80].

In the medium and long term, however, it is expected that the functionality of new types of applications, based on mobile internet, will gradually catch-up with the present AIS functionality.

When, at that time, seamless wireless data networks will be available throughout Europe, the use of AIS for the purpose of tracking and tracing of vessels and cargo could be phased-out and be replaced by other technologies (e.g. GPS/GALILEO, CCTV for location positioning and 4G/Wi-Fi internet for interactive communication). However, the property to be able to function independently from shore support in case of emergencies is attractive and not easy to replace; this may keep AIS in the market long after the tracking and tracing functions have been superseded by other systems. But then AIS will be reduced to a nautical system only.

Chart display and information system for inland navigation (inland ECDIS)

Digital mapping is a very labour-intensive and expensive process. Nowadays maps are increasingly produced, using crowd-sourcing techniques (compare OSM- Open StreetMap). OSM maps are already used in road vehicle navigation applications (in particular in passenger transport on the road).

Given the relatively high cost of map production, and the high rate of change of some riverbeds using crowd sourcing in waterways mapping may be an interesting production model to look at in the future. However, maps for inland navigation need to be of much higher quality than maps for road transport. Fairways and objects need to be displayed much more accurately to allow safe navigation, also during night and bad weather conditions (fog, snow) and given the waterways where the river beds can change due to changing water levels, erosion and floods. This is a significant difference compared to road transport where the infrastructure is more stable.

Another problem is that because the “crowd” in IWT is relatively small, one could lack

[79] Some shippers who would like to systematically compare the performance of skippers and barge operators are also very positive about the transparency of system.
[80] This property also applies to the mariphone communication system of the vessels.

a sufficient volume of data on stretches of the waterway network that are not frequented often enough. So one gets then not enough data for a reliable update or an update of the main routes only.

Electronic ship reporting (ERI)

The widespread availability and use of mobile data communication applications lowers the threshold for the development and use of ERI-message "apps" for tablets and mobile telephone.

ERI is the RIS key technology with the highest potential benefits, both for businesses as well as the authorities. The introduction of one system through which inland waterway transport participants can submit electronic reports and receive electronic information to and from the various competent authorities in the framework of River Information Services (via a "Single Window") will, furthermore, enable authorities to increase the efficiency of controls and take the right measures in case of emergencies and or calamities. On the other hand stakeholders in inland navigation will receive information back from the competent authorities, supporting them in short- and mid-term decisions with respect to the logistics process.

The Single Window concept thus facilitates the information- and communication processes between the governmental and the commercial stakeholders, not only for safety and security reasons, but as well for an increase in efficiency of the whole supply chain.

Notices to Skippers (NtS)

The most important information for the industry is the information on water levels/ depths. Water level predictions are the key element in this. On the Danube they are available only in Austria via the DORIS website ("Donau River Information Services"-the existing RIS system in Austria). Information on shallow sections is supplied in Austria via DORIS and in Hungary via VHF marine communication. For the Rhine, predictions are available for key reference points ("pegels") for the Upper-, Middle and Lower Rhine.

Traffic information in road transport is currently also provided in forms in which can be directly used in navigation systems (e.g. through RDS-TMC and the internet). Moreover this provision has been turned into a two-way information provision: Some suppliers of navigation systems use the vehicle parameters (like speed) of the information receiving fleet also as another source of traffic information. This information from vehicles is collected and analysed in traffic models and the results broadcasted again to the vehicles.

So, actually this is crowd-sourcing type of application as well. Recently it has been proposed[81] that such a two-way system would also be advantageous to the IWT industry. In particular the collection of real-time information by a fleet of participating vessels equipped with geographical positioning and waterway depth meters would be very interesting. This also gives information on trajectories of the Rivers between the key reference points and this information could significantly improve the accuracy of prediction of water levels. Such information could result in higher payloads of vessels and reduced fuel consumptions for transport by inland waterways.

The use of NtS for weather dependent routing, which is used in maritime transport, is not relevant to IWT, because there are few parts in the network where there is a real choice of different routes. In voyage planning in IWT, routing is not so important but scheduling and loading of vessels are the key factors in improving the planning. The uncertainty regarding sailing and waiting times during the voyage as well as predicting water depths are the key elements where better information may perhaps be helpful.

[81] The CoVadem project: http://www.covadem.eu/en/.

RIS Services

In the road freight transport industry there are many applications that correspond to RIS services which still have to be developed in the IWT industry or which are still only in a pilot phase. For example: supporting systems for tolling and infrastructure payment , digital tachograph systems and on-board computers , advanced fleet planning and routing systems etc.

Although in the past decade the IWT industry increased and intensified the use of ICT rather dramatically (see section 3.4) IWT will always lag behind road freight transport in this area, because:

- The market in road freight transport is more attractive for investors and innovators because it is much bigger;
- The level of complexity of operations is much higher in road freight transport than in IWT (because of the higher density of the road network, the intensity of the use of the network and more stringent timing of activities). This means that the benefits of the use of ICT in road freight transport are higher than in IWT.

Assessment of the Evaluator[82]

In the next table a list of strong and weak points of the key RIS technologies is given and compared to ITS in other transport modes.

Table 6.5 Assessment of strengths and weakness of key RIS technologies en services as derived from comparisons to new developments in other transport modes

Strengths	*Weaknesses*
Comparison with other ITS	
Quality of the map production IENCs Transparency(openness of data communication) of AIS Level of harmonisation across the EU (because the IWT industry is limited) Potential for improvement and additional services based on key technologies of RIS	Costs of map making are high The crowd of the crowd sourcing group is relatively small in particular compared to road transport Privacy concerns

Source: Panteia

The key RIS technologies have from the technical point of view a strong historic link with maritime transport. They may help to bind IWT stronger in transport chains to/ from seaports. The technologies are, technically, rather distinct from the systems presently used in road freight transport and rail freight transport. However, because open standards are used, integration in multimodal planning systems should be possible. Compared to the other land transport modes, IWT may achieve through RIS a higher level of uniformity in system development and services to the customer than other transport mode because the IWT industry is smaller in terms of the number of transport units and the number of stakeholders involved. This makes it less complex compared to other land modes.

As a comment on crowd sourcing it should be noted that it will be a real challenge to

[82] Evaluation question 11: What is in broad terms the *state of the art of ITS implementation in other transport modes* and to which extent have or can opportunities for modal transport interconnection between RIS services and ITS services of other modes be(en) exploited?

find a 'crowd' that has a sufficient size, because of the small population in the IWT industry. There are each day many more users and, consequently available crowd data for each trajectory of the highway network of each of the EU countries then there are data on the most intensively use trajectories of the Rhine River.
It should be investigated in practice whether or not (and if so, to what extent) this limits its application in IWT. However, it has recently been proposed for the sharing of actual information of available water depth on the fairways which determines the maximum payload and the advice on the best position of the vessel at a fairway to reduce resistance and related fuel consumption[83]. A crowd sourcing service will primarily be interesting for owners/ operators who each day are confronted with high/ low water situations, i.e. owners of large vessels that operate on the Rhine and/ or Danube or on other rivers where there will be sufficient dataflow to feed a crowdsourcing application.

Finally, it is recommended to investigate producing IENCs for all IWT sailable waterways and ports. In road transport much more detailed maps are available (e.g. for car- and truck navigation) than in IWT.

The costs of creating IENCs are relatively high and the market in IWT for these maps is limited compared to the road transport market. Countries with a large, dense IWT network like France, Germany and the Netherlands, would have to invest a lot of money to reach 100% coverage.

However, huge investments (e.g. the use of planes and satellites)[84] go each year in the production of detailed maps of the surface and atmosphere of the earth, and in producing and the maintenance of detailed topographical maps.
Compared to these investments in mapping for other purpose and other transport modes the costs of producing the IENCs for the IWT industry are modest.

Because RIS technologies and services are interoperable (see section 6.1) they can be, without many problems, integrated in multimodal planning systems of supply chain integrators, forwarders or the systems of shippers. In such planning systems mainly the following RIS services will be useful:

- Providing information on the waterway network and information about the actual availability of waterways (including water depth);
- Providing voyage planning information;
- Providing information on ports and terminals.

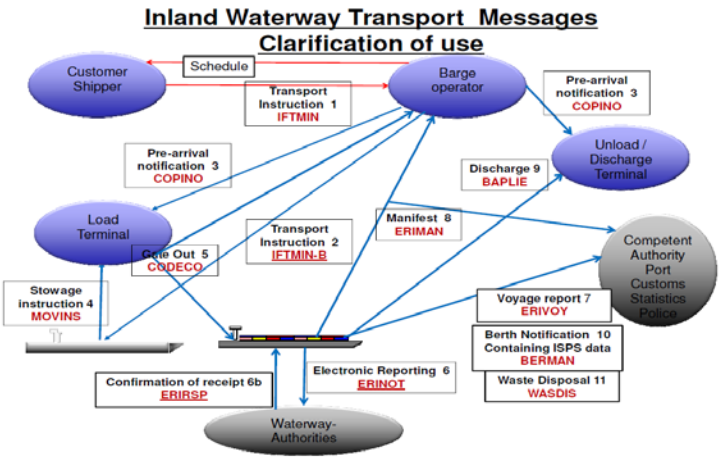
Although other RIS information services could be useful in multimodal transport like vessel characteristics, positions of vessels, cargo information, these are probably supplied by other systems (for position information the mobile information systems mentioned earlier and for cargo and vessel information databases from private parties). With regard to RIS key technologies primarily Inland ECDIS and the NtS will be useful in such planning systems.

The other key technology which is useful in multimodal transport is of course ERI. Although the particular messages specified in the RIS legislation are primarily directed at communication of vessels with infrastructure managers, the point of using electronic message standards is to be able to exchange voyage and cargo related data with recipients who can use this information in their own information processing

[83] IDVV, Covadem (Rijkswaterstaat, Netherlands 2014).
[84] A crowdsourcing approach may be helpful in creating maps as well; however the level of quality of such maps is doubtful; they very likely are not as accurate and comprehensive as ENCs.

systems. For the commercial partners in multi-modal transport chains this of key importance and the RIS messages are in fact embedded in a framework of commercial standardised messages, see figure 6.1.

Figure 6.1 Various transport message standards



Source: Inland Waterway Transport with Paperless Trade ERI awareness paper (2009)

6.4 Identification of untapped potential and possible further applications

In this section new types of applications and new application areas for RIS services will be assessed.

Sources and results, input for evaluation

In the research literature a number of publications can be found in which the future of RIS is discussed and even more publications that deal with the consequences of various technology trends for the IWT industry. Some sources that are relevant to RIS are:

- The FP7 project RISING (RIS Services for Improving the Integration of Inland Waterway Transports into Intermodal Chains) RISING focuses exclusively on the present and future needs of the European transport and logistics sector;[85]
- A publication produced by the Transport Research Knowledge Centre (TRKC) "RIVER INFORMATION SERVICES. Modernising inland shipping through advanced information technologies";[86]
- The RIS strategy of CCNR;[87]
- A number of project reports and policy documents of Member States.[88]

Furthermore, the question has been raised whether or not there should be a closer link with maritime transport in the reporting requirements. Since this will in particular relate also to ERI (en possibly AIS as well).

[85] "Rising Enhanced RIS and IT Services supporting multimodal Transports involving Inland Waterways "- Oliver Klein, Prof. Dr. Frank Arendt, Arne Gehlhaar (e-Freight 2012 conference - 9 / 10 May in Delft, the Netherlands).
[86] EU, 2010with a.o. a chapter on "A vision for 2025 and beyond".
[87] More information on RIS Strategy CCNR: see http://www.ccr-zkr.org/13020700-en.html .
[88] See Annex 4 in the sections of the country report on RIS related projects .

Assessment of the Evaluator[89]

Various types of new applications look very promising. At least three fields are selected and it is recommended to further investigate the prospects and test their feasibility:

- A field where RIS technologies could be applied effectively is the use of the RIS environment and functions for enforcement of sailing and resting times. Although this subject is bound to generate some controversy, it is an important subject.

  The electronic registration of voyage times and working hours combined with the ability of the authorities to track and trace ship movements would make checks more efficient and expand these. This could be realised by a digital tachograph as in road freight transport. Alternatively, one may think for instance of registration of the times "on distance", and using smart cards to "check- in" and "check out" individual crew members on board of vessels.

  In practice many companies find it difficult to work with the present regulations on resting and sailing times. Many doubt the possibility of a proper enforcement of the legislation and it is believed that non-compliance in practice is fairly widespread. Companies that strictly adhere to the rules feel that companies which do not, and which are prepared to take risks of being caught out, are unfair competitors. New technologies may offer new opportunities for more transparent and effective enforcement of legislation and may also reduce administrative cost. This possible use of RIS should of course respect the ownership of voyage and vessel related data of skippers and barge operators. Furthermore, it should be applied with caution and should not risk diminishing the acceptance of RIS technologies which would make it counterproductive.
- Another field to investigate, is the integration in RIS of electronic payment systems technologies. At present a new generation of those systems integrated with mobile telephones is expected to spread through the market.

  Payment of port dues, services in ports (e.g. for bunkering or the use of electricity, resting) will be much easier when one could use one payment card or a mobile phone app throughout many ports. But one could also use such systems for the purpose of payment of infrastructure tolling, lock passage etc..

  This technology is so basic to all kinds of services it could be a candidate for another key RIS technology.

- As a final example, existing RIS applications and new applications might be used to introduce more pro-active support of the carrying out of voyages. A term used in this respect is "corridor management".

  In the most wide ranging variants one could, prior to starting a voyage, send a complete voyage plan to the corridor manager which reserves time slots with locks, resting-ports, terminals where cargo is loaded/ unloaded etc., and which subsequently (during the voyage) will monitor the adherence to the time-schedule of the voyage. The corridor manager acts as a kind of "buddy" of the skipper and the skipper is able to save fuel costs during the journey by means of avoiding waiting times (smart steaming). Of course this field of innovation will require a lot of organisational changes as well. E.g. it should be possible to make a reservation of time slots and preferably also the private operators of ports and terminals shall be involved to optimise the loading/unloading processes at terminals.

[89] Evaluation task 1.8: Evaluate in qualitative and quantitative terms the "untapped potential" of RIS.

One could also combine this with the payments systems innovation discussed above.

Linkages with maritime transport

ERI is considered not attractive enough to IWT operators in the current market. This is strange because ERI is one of the technologies which could provide high benefits to the industry. Although reporting requirements in IWT are relatively modest compared to other modes, avoiding duplication of reporting by means of “single windows” provides efficiency benefits. The uptake of ERI is however hampered by factors on the side of authorities: problems with international data-exchange between countries, the refusal to exempt operators from existing old reporting requirements in paper-format (or via VHf) or simply not being able to process messages in parts of corridor because they are still not implemented in countries, regions or ports in the corridor.

The reporting requirements in IWT are not uniform across the EU and sometimes differ even across countries or regions in the same corridor/ operating area (e.g. North-South corridor or Danube). A more uniform business environment would be attractive for companies that have to work in cross-border transport. A critical investigation of the reporting requirements aiming to create a uniform structure for the EU would be desirable. Possibly an extension of the maritime reporting framework to IWT could be is realised. Such an extension should be considered seriously. There are of course some structural differences between maritime transport and IWT. Maritime transport warrants a more stringent control and reporting than IWT. Therefore, IWT could be exempted from certain reporting requirements and/or subjected to a “lighter” reporting regime. Such exemptions are already included in the Reporting Formalities Directive. In such a market environment framework ERI would become an even much more powerful tool.

7 Governance of RIS

7.1 Effectiveness and efficiency of implementation of governance

In the present chapter the organisation of the RIS implementation will be evaluated. An important question in this respect is to what extent the organisation of the RIS implementation is functioning efficiently and effective and whether there is a potential for making improvements in the organisation. Two criteria are guiding this evaluation:

- The effectiveness of the organisation: to what extent have plans and tasks actually been realised?
- The efficiency of the organisation: were plans and tasks realised in an efficient way looking at the resources and efforts?

A distinction is made between the coordination on national level within the Member States (subsection 7.1.1) and the international coordination that takes place between Member States (subsection 7.1.2).

Sources and results, input for evaluation

The organisation of the RIS implementation in specific countries is described in detail in Annex 4 of this report. This description includes: the parties involved, their roles, interests, objectives, powers and available instruments to influence the policy and decision making processes. Based on these country reports the main factors (barriers and drivers) were identified which determine the organisation of the RIS implementation on national level. The factors are:

- The level of parties involved in the governance of infrastructure management and transport regulations and their specific roles. In some countries with a more fragmented organisation with strong involvement from regional and local authorities made the implementation more difficult and complex compared to countries with less parties involved. In particular in countries where ports (sea ports or inland ports) and/ or regions have the status of separate RIS authorities the situation was more complex. This is for example the case in France, Belgium and Germany[90];
- Cultural, political and legislative differences between Member States regarding the interpretation of data protection and protection of privacy regulations. This factor was important in the Danube corridor, in Germany and important in the Netherlands as in the use of AIS data is restricted while in other countries the degree of freedom is much higher. It resulted in barriers to arrange data exchange between countries and data collection on international level sources from Member States;
- The size of the RIS waterway network[91] size of fleet, the availability of financial resources, the level of availability of knowledge and expertise. These are all factors which have an influence on the complexity and the available resources for the organisation of the implementation of RIS technologies;
- Policy choices to involve or not involve the IWT industry in the implementation process affected the pace of the implementation process as well (e.g. agreements between authorities and Dutch ship owner/operators regarding AIS[92]);
- The interests of stakeholders regarding the various types of RIS technologies and services. For those technologies and services that have a high user uptake, the organisation was less challenging and complex. An example is the large scale use of AIS signals and Inland ECDIS even beyond the mandatory;

[90] See Annex 4.
[91] See Chapter 3.
[92] See Annex 4, Dutch country report.

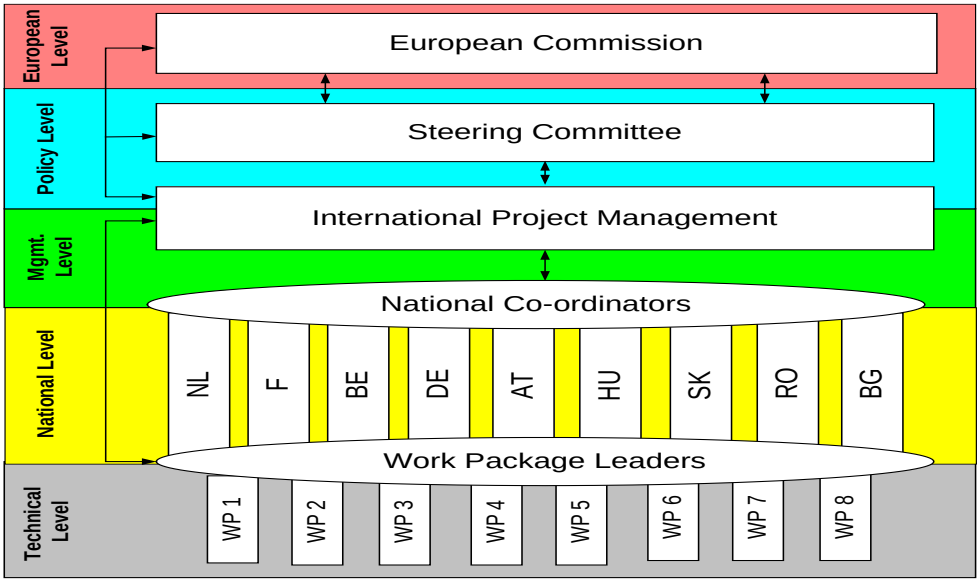
- Removing or not removing existing technologies which do not comply with the new RIS technologies (e.g. other electronic reporting procedures which were in use).

In the period 2006-2012 the RIS implementation could be characterised as a primarily bottom-up driven process. The RIS authorities at country level determined the activities and decided about what was done and when it was done. This process took place in close cooperation with the RIS Expert groups. The implementation process was also frequently dependent on the availability of funding on national and international level.

This bottom-up organisation model was not originally intended. This is clear from the IRIS Masterplan (see Figure 7.1). This Masterplan proposal took article 11 of the RIS Directive into account about the role of a committee assisting the EC.

In the first phase of the roll-out the main goal was on getting the key RIS technologies implemented as quickly as possible. Therefore, the bottom-up approach, although not intended, is understandable.

Figure 7.1 Proposed structure of the organisation of RIS deployment



Source: IRIS Masterplan (2006)

Assessment of the Evaluator[93]

In previous chapters a mixed picture was painted of the immediate results (outputs) of the RIS implementation process in the period 2006-2012:

- On the one hand key RIS technologies, like AIS and Inland ECDIS are widely implemented on vessels and applied in practice, in the Rhine corridor in particular[94]. Even beyond the user groups and the required areas where the RIS Directive applies the technologies are used. For example, many countries provide IENCs for waterways lower than CEMT class Va and AIS on-board equipment is installed on vessels that mainly sail on waterways lower than class IV.

[93]Evaluation question 3: What is the *effectiveness* and *efficiency* of *RIS implementation governance*? Are all relevant actors involved in RIS implementation? Has there been duplication of activities? Should the governance of certain activities in relation to RIS be more streamlined?
Evaluation question 4: To which extent is RIS implementation *effectively coordinated* and driven by its objectives? Have there been implementation activities for RIS which contribute only to a lesser extent to its objectives?

[94] See for this and the next bullet point section 6.2 on the uptake.

- On the other hand there are also key technologies (ERI in particular) which are not used intensively. Moreover, there are stretches of the waterway network where the required technologies or the support of the technologies are not yet implemented.

Overall, it can be concluded that that the RIS implementation took much more time than was originally expected by the experts. This can be made clear based on reports, written shortly after the publication of RIS Directive. For example in the IRIS Masterplan project report (2006) it was stated in subsection 2.5 on "The envisioned status in RIS Deployment in Europe as by 2013 that:

"When all projects are executed according to the plans that have been provided to this Master Plan, one can expect that these will have a rather comprehensive implementation of RIS on the European interconnected waterway network."…. Not only the mandatory applications according to the EU RIS directive will have been installed, but many other RIS functions as well…"[95]

According to chapter 6 only a few services have actually been realized to a significant extent. Most services have not, or have only partly been realised (e.g. by means of pilots).

Effectiveness

The effectiveness of the organisation of RIS at country level should be judged by the achievement of the objectives of the tasks which were to be accomplished. In case of the RIS organisation at country level there are two main tasks: a) transposition of the RIS Directive into national legislation and 2) creating the conditions for the use of key RIS technologies and RIS services[96].

Looking at the implementation of legislation and key RIS technologies (see chapters 5 and 6 and section 3.4) at country level the conclusion is that, despite the longer than expected duration of the process, the national RIS organisation in most countries operated effectively. Although the implementation process is still on-going and there are considerable differences in the status of realisation of key RIS technologies and timing of activities across the various countries, there are usually valid reasons (see factors of the previous page) why the process has been faster or slower compared to other countries or other regions. However, when the slow implementation is related to non-compliance with legislation this is of course not a valid reason.

With regard to the realisation of the range of RIS services envisaged in the RIS Directive there are significant differences between countries or regions: some countries like Austria and the Netherlands are actively exploring new services and applications while other countries are rather passive in this respect.

It can be concluded that for a subset of the eight RIS service groups (see chapter 6.1) applications have been implemented in practice. In particular the categories Fairway Information Services, Traffic Information and Traffic Management are covered. The other service categories are addressed only to some extent (e.g. by pilot projects and studies), or hardly at all. The organisation of the implementation of the RIS services is, therefore, ineffective so far. However a final judgement on this should be postponed until the implementation of the key RIS technologies has progressed further.

[95] Page 7. Master Plan for Implementation of River Information Services in Europe (Master Plan IRIS, 2006).
[96] Notice that these objectives are (in the terminology of chapter 4.1) related to "outputs".

Efficiency

It should again be emphasised that judgments on efficiency, at this stage, only refer to the legal- and technical environment of RIS at country level (see first paragraph under effectiveness earlier in this section). It does not refer to the organisation at international level (which will be discussed in the next section) let alone the overall impacts of the Directive.

The RIS implementation in the period 2006-2012 is a process which is unique because it affects the entire IWT industry and because of its innovative character. There are no benchmarks for RIS implementation to compare with. Without the possibility of external comparison the implementation process in countries must be judged by internal criteria. The question is then: could the process of the implementation of legislation in country X have been achieved much quicker or less costly than it actually did? A negative judgment requires the identification of activities that failed (or had to be repeated) or was duplicated in the accounts of the process for countries. In the country reports, where the organisation of the implementation per country is described, no examples can be found of major inefficiencies.

7.1.2 Coordination between MS

Sources and results, input for evaluation

The RIS implementation process in the past period was primarily driven by Member States. The advantage of this decentralised implementation was proximity to users taking into account the national conditions. This was important because, in the first phase of the RIS-implementation, a swift rolling-out of hardware of RIS in the member states was the most important activity in order to have the basic components to enable to operation of RIS technologies. The disadvantage however was some lack of coordination across member states and a focus on national level and to a lesser extent on the issues of cross border interoperability of services conditions and data exchange. Instead of the seamless, interconnected EU-wide Rivers Information Services which were intended, the current situation is a “patchwork” of local services and applications.

The divergence in implementation of technologies in the market has adverse effects: it is more difficult to benefit from economies of scale, and there are higher costs of operation and higher costs for applications (because system suppliers have a smaller market as well).

The picture of a diverging process of implementation with a longer duration across countries and corridors can be explained by simple, practical factors at the country level (see subsection 7.1.1.) that are caused by specific situations and circumstances in the countries. The observed divergence raises however also the question to what extent such divergence could have been prevented by international cooperation efforts. During the implementation, various parties are involved in the international coordination of activities via different bodies. It has to be remarked in this respect that the international coordination was not limited to Europe. Experts and information were brought together through the platform PIANC in their RIS working Group 125, that developed documents such as the common RIS definitions and the RIS Guidelines that were important technical documents for the uniform introduction of RIS.

RIS Committee

The EU established the RIS Committee, on the basis of article 11 of the RIS Directive.

It is clear from the text of the RIS directive[97] that the committee was not meant to be a policy setting body, but a quite technical committee. As it turned out, the RIS Committee only was involved on an ad hoc basis and leeway was given to expert groups and other parties.

River commissions

In the Rhine corridor the involved river commissions are the CCNR (The Central Commission for the Navigation on the Rhine) and the Mosel Commission. In the Danube corridor this are the Danube Commission and the Sava Commission but only the Danube Commission has legislative power. The role of the CCNR in the co-ordination of the RIS implementation in the Rhine corridor is very active and important as the CCNR focuses on the main market of IWT in Europe in terms of transport performance by inland navigation. Moreover, the CCNR has a longstanding history as an international platform for discussions on streamlining IWT operations and regulations on the Rhine corridor. The CCNR technical specifications and guidelines are also applied in the North-South corridor. Large rivers in the North-South corridor have their own river area commission. These river area commissions, however, are not involved with the application and development of RIS. The two important river area commissions in the North-South corridor are the International Scheldt Commission and the International Commission of the Meuse.

There are no river commissions established along the East-West-corridor. There the international co-ordination is achieved via bilateral agreements.

Bi- or multilateral arrangements

In the absence of central coordination in a corridor bi- or multilateral agreements could be concluded. Such arrangements in the context of RIS implementation are quite common in many corridors.

For example on the Danube legal barriers are still hindering the full exploitation of AIS information by cross-border data exchange. Differences between countries regarding data privacy is an important issue here and there is not yet an international agreement in place to defining the rules of position data exchange.

After a long period of discussion a solution was worked out to facilitate the international data exchange between Danube-riparian countries: the RIS providers agreed to cooperate on the information exchange related to the use of to AIS and ERI. Hence they will have possibility to share AIS information legally for those companies and vessels that want to participate. RIS providers will have to make an agreement with the ship owners/fleet operators, who approve the data-exchange. This international agreement between RIS providers has been created and signed by all countries from Austria to Bulgaria. Other national agreements with ship owners are prepared as well.

Arrangements and cooperation between Member States in the North-South corridor exist mainly between the Netherlands and Flanders. There is relatively limited cooperation regarding RIS between France and Belgium. Bilateral coordination structures between Belgium and France on RIS activities are limited and of an informal nature, there is no formal bilateral structure. A specific example of cooperation between the Netherlands and Belgium is the established Common Nautical Authority for the Scheldt area. Given the complexity and importance of navigation in the Scheldt area between the Netherlands and Flanders (multiple large ports nearby and both inland as well as maritime vessels in this area), effective cooperation between

[97] E.g. see considerations point 8 of the RIS Directive.

Flanders and the Netherlands is necessary. For this reason the Common Nautical Authority was established. Its mandate is the management of the Scheldt area which comprises parts of Flanders and of the Netherlands. On the Scheldt, Flanders and the Netherlands have successfully cooperated together on multiple projects related to maritime traffic but also related to RIS, such as RIS Westerscheldt area I and II. During these projects various RIS elements were implemented along the Scheldt such as Notices to Skippers, AIS infrastructure and ERINOT messages.

In the East–West corridor the involved countries (Germany, Czech Republic and Poland) regularly hold bilateral meetings. Interaction exists mainly on regional level between regional authorities. They are meetings between German and Polish officials at least biennial. German and Czech authorities coordinate work in the Elbe workgroup. However, RIS is usually only a minor issue in these meetings, as other issues are more important. Main objective with respect to RIS is to exchange information on RIS achievements and experiences.

UNECE

The United Nations Economic Commission for Europe (UNECE) deals with a wide range of issues, amongst others on River Information Services. This is coordinated by "The UNECE Working Party on Inland Water Transport" (SC.3), which is an intergovernmental body which ensures maintenance of relevant legal agreements. It also adopts UNECE resolutions on the inland water transport issues listed above. SC.3 meets once a year. With regard to RIS the main role of the SC.3 is to ensure the development of RIS outside the EU Member States is running in the same way outside the EU area. The technical descriptions are mostly in line with the EU resolutions and include existing technologies. The UN resolutions have the character of recommendations meaning that these need to be adopted through national legislation.

RIS Expert Groups (EGs)

The technical work towards European standardization is carried out by RIS Expert Groups (EGs). The RIS Expert Groups produce the standards including updates, but also technical clarification documents and other relevant documentation. The developed standards are delivered to the EU, CCNR or other international bodies in order to make the standards legally binding.

Participants of the expert groups are representatives of governmental bodies, branch organisations, research institutes, consultants and the industry. All expert groups operate a non-governmental, independent body of advising experts (a platform) without any legal status.

Currently there are four RIS expert groups:

- Electronic Chart Display and Information Systems (ECDIS);
- Electronic Reporting International (ERI);
- Notices to Skippers (NtS);
- Vessel Tracking and Tracing (VTT).

River Information Services (RIS) standardisation contribute to the harmonised implementation of RIS throughout Europe. Under the RIS Directive the European Commission is assisted by the RIS Committee. The RIS Committee is informally assisted by the Expert Groups (EGs) in preparing and updating technical guidelines and specifications for the fields mentioned.

RIS Expert Groups meet every six months during the so-called RIS week. Besides discussing the proceedings for every Expert Group there is also a common issues meeting which can be joined by all Expert Group members. In the period in-between the chairmen together with the Member States work on the development of the standards.

The EGs have been very important and actually indispensable in the RIS implementation so far. The various EG meetings and contacts have been very important to the coordination across borders. The EGs members have high levels of technical and legal expertise, practical experience and knowledge of industry business practices and are independent.

In 2011 the PLATINA project produced a report for the European Commission which contained advice on structural support for the RIS Expert Groups in the future[98].

The main recommendations of the PLATINA project were:

- The EC officially should recognise the importance of the Expert Groups to the successful implementation of RIS throughout Europe;
- The EC should allocate budget for structural support to the work of the Expert Groups covering structural secretarial support for a minimum 6 year period covering human resources, travel expenses, website maintenance and development;
- The EC should develop a procedure on how to incorporate the Expert Groups into its RIS implementation policy process. This includes formal procedure how to deal with Expert Groups' proposals, also in relation to the EU RIS Committee and the issues addressed above;
- The Expert Groups acknowledge that a financial contribution of the EC implies limitations to its agenda setting and the need for a clear representation of the EU Member States and possible EU neighbouring countries in the Expert Groups;
- Discussions should be held between the EC, RIS Committee and Expert Groups on the further developments.

Assessment of the Evaluator[99]

Effectiveness

The relevant question for the judgement on the effectiveness of the international coordination of the RIS implementation is: to what extent are skippers and barge operators able to work in a business environment with uniform RIS-services in cross-border transport? Has a streamlined international working environment with RIS services been realised?

Unfortunately, the international co-ordination of the RIS implementation is not effective. As has been pointed out above, the implementation between 2006 and 2011 resulted in many systems and services that are regionally effective (in a country or in a corridor) and implemented according to the regulations. However, seen from a broader perspective, the systems are not yet fully connected with each other. There is not the streamlined market environment in which IWT businesses and their customers can fully benefit from the innovations that are expected from the RIS services. On the contrary, businesses in cross-border transport (and in some instances even in domestic transport between different regions) have to work in a market environment which is not uniform and sometimes badly connected (e.g. not allowing data exchange between countries). For potential investors, e.g. suppliers of hard- and software, this

[98] RIS support structure workflows Advise on EC support for the RIS Expert Groups (PLATINA 2011; D. 5.6)
[99] Evaluation question 8:To which extent is the *roll out of RIS across the EU synchronised* and what are the consequences of any possible lack of synchronisation?

is not an attractive market environment either. It is, therefore, not unreasonable to expect that the benefits could be higher in a more harmonised market environment with uniform and interconnected ICT systems and EU-wide functioning applications. Barriers such as the differences in privacy culture and regulations between countries may have been underestimated causing also delays and a focus on further development of national information systems rather than the cross border issues.

Efficiency

It should again be noted that in this chapter the criterion of efficiency refers to efficiency of the implementation process, which is an *output variable* and should be distinguished of efficiency in the IWT market performance, which is an *impact variable* which will be discussed in chapter 9. The question that needs to be answered is: was the process of implementation of RIS efficient, looking now to it from the overall, international perspective efficient or not?

At first sight the answer is clearly negative. A stronger international approach could have achieved higher benefits of scale: e.g. the costs of software and organisation could have been lower if the procurement would have been done on international level. Generally costs of system and service suppliers will be smaller when the size of the markets is bigger.

However the benefit of the decentralised approach of the implementation is that one can better take the specific circumstances of various countries into account. Disregarding these circumstances would very likely have taken much more time. Thus the choice for reduced costs of investment needs to be balanced against the benefit of realising a large scale implementation and uptake by users on a shorter term.

But a third factor should be considered as well. If the implementation process had been more effective, the uptake would have been faster. As has been noted above, the process did not yet succeed in creating a uniform business environment for businesses. Such an environment would have provided an important extra trigger for IWT companies to use the innovations. So efficiency is not entirely independent of efficiency.

Weighing the factors, the final conclusion on efficiency is that the RIS-implementation process could have been more efficient.

Many organisations are active in the international coordination of RIS policies (PIANC, UNECE, River commissions etc.). Related to the efficiency of the RIS implementation process one could pose questions about the efficiency of all the coordination activities as such; could there be duplication of activities? The answer is that there is no hard evidence for duplication of activities. Probably the answer to the question is negative because: although many organisations are involved, there is a core group of active people (a.o. some members of EGS) who participate in the RIS activities of multiple organisations. So the knowledge about RIS among the different organisations will be quite uniform.

<u>Looking forward</u>

In the next period 2014-2020, the integration of all the existing RIS services into EU wide services that were originally envisaged, should have a high priority. Completion of the RIS implementation should have a high priority. Instead of letting “pioneering” countries get further ahead, the emphasis should be more on letting countries that lag behind catch up. In the second phase the scope of the work will, therefore, be different and the approach

more top-down. The efforts should be directed at the EU- and/or corridor level on the integration of the services across borders and in corridors, making RIS services more useful for businesses.

This implies that the organisation of the implementation of RIS should be reoriented as well and adapted to the changed field of tasks and changed working environment. This organisation should have a stronger central/ international coordination of the activities. Furthermore, there is a need to re-orient RIS more towards the needs of business and market parties.

In the organisation of the implementation one could distinguish:

- Policies (agreements over the objectives of RIS, its limitations, legal framework, approval of regulations);
- Technologies ((proposals for) standards, adherence to standards, maintenance and improvements of specifications, rules and regulations). It is proposed that at a high-strategic and political level an organisation composed of the EC and Member State representatives should monitor and supervise the implementation process. This body could include members/ representatives of the IWT industry as well as shippers & forwarders, because in the second phase of the implementation one needs to direct actions much more towards the market and business interests.

It is now important to consolidate the RIS and more particularly to look at their scope as well as their implementation at the critical sections of the inland navigation network. Accordingly, it will be needed to

- Take a proactive approach on the basis of medium-term plans and projections;
- Create a capability to evaluate the RIS and their implementation;
- Coordinate the strategic and technological levels in order – among others – to ensure a better fit between needs and resources.

The maintenance / adaptation of technical standards and specifications should be a central task at the EU level. Since this requires specialised knowledge and expertise, it is recommended to outsource technical support for this task. Specifically the organisation, to which the task is outsourced, should provide technical support for the maintenance and development of the standards, including accompanying documents, supervision of the proper (decentralised) implementation of RIS technologies. This organisation should be subordinated to the political body which is formally responsible for the maintenance and development of standards. Furthermore, the support- organisation could also be involved in the organisation and co-ordination of the future Expert Groups and supervise the efficiency of the work of the EGs. The EGs should, however, for the contents of their work only be subordinated to the political body. In the political body all member states of the EU (who are affected by the RIS Directive) should be able to participate with equal rights.

Various organisations could be a candidate for the technical support work.
Relevant selection criteria to consider are:

- Knowledge and long-standing experience with the IWT industry;
- Knowledge of RIS since is early conception (and RIS standardisation in particular);
- Vast experience with standardisation in many other IWT related fields (vessel, crews, cargo all kind of supporting equipment used on-board or in transhipment etc.);
- Experience with working with technical expert groups;
- Close contacts with businesses and enforcement authorities;
- Experience with ITS in other modes of transport.

One of the organisations to look at is certainly CCNR. Many of the selection criteria above are strong points of the CCNR. Another candidate would be EMSA (European Maritime Safety Agency) which has a lot of experience with the RIS Key technologies.

CCNR has its own RIS decision making and decision support structure and supervises the implementation in the Rhine operating area. The technical support work for the maintenance of standards and the organisation of the technical part of the work could be delegated to the CCNR, which is well equipped for this. The CCNR would then be responsible for organising the work and secretarial support to the various RIS Expert groups as well. Then could CESTE (the new committee that will be installed for the technical directive and Rhine inspection Rules) perhaps be used as the international body, provided that all countries are able to participate with equal rights. Finally, the CCNR, with its IWT Market observation facility, is also in a good position to monitor at the EU level the progress of the implementation

EMSA could provide an RIS interface for IWT to the much larger market of maritime transport, which is very important, since most of the transport in IWT is seaport related. Establishing interfaces to other modes is also one of the main RIS policy objectives.

Perhaps the maintenance and operation of the Hull database and the ERDMS (European RIS Reference Data Management System) could be hosted by the supporting organisation as well, or by an ICT-company, supervised by the organisation. These tools are currently provided on a project basis[100] and a more permanent solution should be worked out for the long term.

7.2 Relevance of implementation activities for RIS

Sources and results, input for evaluation

The criterion of "relevance" of the implementation activities is related to the criterion of "effectiveness" discussed in the previous chapter. Activities are relevant when they directly or indirectly aim to contribute to the RIS policy objectives. In this framework relevance is the extent to which the (original) objectives correspond to the needs within the EU. "Irrelevant activities" are activities which are either completely useless or which are pursuing quite different objectives than the (original) policy objectives.

An example of irrelevant activities would be an activity funded with RIS budget, but otherwise completely unrelated to RIS.

Assessment of the Evaluator

No evidence was found for activities that were irrelevant.

7.3 Adequacy of communication of RIS policy and supported projects

Sources and results, input for evaluation

While almost all skippers and barge operators who operate self-propelled vessels are affected by the RIS implementation process in 2006-2012, the term RIS and RIS policies is not known by large groups of these actors.

[100] DG Move: Lot 2 "Provision and maintenance of RIS support tools" Marco Polo accompanying measures for IWT; for two years until March 2015, with a possible extension for another year.

In a recent survey Dutch[101] only 52% of the skippers knew about RIS. Since most of the actors operate on the international market (mainly in Western Europe) it may safely be assumed that RIS is not a subject which is frequently discussed in all groups of the population of Western European skippers.
But the size of the group which has no knowledge of RIS reduces substantially when asked about a particular key RIS technology (it becomes almost 0% in case of AIS, 25 % inland ECDIS, 15% ERI and 20% Nts messages). So the ignorance of RIS is mainly ignorance of the term RIS as such and the wider context of RIS applications, but not of the applications as such.

In contrast RIS and the RIS concept are very familiar terms among infrastructure managers and IWT policymakers. Mainly due to efforts of PIANC (in particular the PIANC RIS guideline and various dedicated conferences), RIS and the added value of RIS are known throughout the world. After the initial conception in Europe many other countries in the world have started with their own RIS projects, some of which are in the implementation phase as well.

One of the means to communicate about RIS policies is the EU RIS website, which is well-known and appreciated in the RIS community. However national websites, the German ELWIS-website is particular, are more popular and widely used by skippers and barge operators and other parties working in the IWT industry. Beyond the RIS community the EU website is not much used.

Assessment of the Evaluator[102]
The communication at the international level among authorities, engineers and system suppliers is clearly much more adequate than the communication to the main group of (envisaged) users of RIS.

This might seem strange, but could be explained by the distinction between practical and theoretical knowledge. RIS and the RIS concept are terms which are mostly used by policy makers while the more technical and practical terms for major components of RIS such as AIS and ECDIS are well known by the users. Another reason is that many of the policy makers (in particular also members of EGs) participate in multiple international bodies. Such direct communication lines between organisations ensures that knowledge about policies and the RIS implementation is widespread and of a high quality.

[101] Survey among Dutch skippers in December 2012 by Panteia aimed at investigating the demand and information available for resting places (1843 survey forms were send via the Internet to Dutch skippers; the response rate was 29%).
[102] Evaluation question 15: What is the *adequacy of communication* on the RIS policy and on the results of the supported RIS projects?

8 Provision and use of Financial Resources

The funding of the RIS implementation will be assessed in this chapter. The following subjects are treated:

8.1 Coherence and interrelationship EU funding/ MS funding/ private funding
- a) Extent to which the roll-out across the EU was synchronised and the resources were made available in due time, in appropriate quantity and quality;
- b) Extent to which the possibilities of EU funding support been taken up in full extent and barriers for the full uptake;

8.2 Impact of economic crisis on funding

Impact of the economic recession and budgetary crisis on funding and possibly on the RIS policy itself;

8.3 Effectiveness of support programmes

8.3.1 EU support programmes;

8.3.2 National investment and support programmes;

8.4 Identification of financing needs.

These subjects will be treated in the four sections of this chapter (sections 8.1 to 8.4). It should be pointed out that in this chapter time periods are used which sometimes slightly differ between sections. This cannot be avoided, unfortunately, and it is caused by the following circumstances:

a) The original, official time period of the evaluations project is 2006-2011;
b) Because the evaluation project had a late start (November 2012) is was decided to include results for 2012, if that would be possible;
c) The framework funding period for TEN-T was 2007-2013 (next period 2014-2020).

Thus, when comparing financial data sources in tables or figures, time periods will be explicitly mentioned.

8.1 Coherence and interrelationship EU funding/ MS funding/ private funding

Sources and results, input for evaluation

The main funds for the RIS implementation came from three sources:

a) EU funding programmes;

The EU funding was primarily provided by:
- TEN-T multi-annual work programme 2007-2013 ;
- Structural and Cohesion Funds, Instrument for Pre-Accession;
- The Seventh Framework Programme.

b) National funds and programmes

The national funding contribution mainly consisted of the co-financing contributions to EU projects and, to a much smaller extent, of other national funding sources of the authorities;

c) Private sector

The private investments were insignificant at the start of the period but increased gradually and in the end steeply as a result of the uptake by the market of AIS and Inland ECDIS.

So five different funding sources can be distinguished:

1. Projects with TEN-T funding 2007-2013

The TEN-T funding for RIS projects has been a large contributor to the financial resources in the period 2006-2012. The funding was made available through the framework of the multi-annual work programme for 2007-2013[103]. The Commission Decision C(2007)3512 of 23 July 2007 established this multi-annual work programme for the period 2007 - 2013 for grants in the field of the Trans-European Transport Network, which includes River Information Services (RIS). At the time of writing of this report, 15 projects were receiving or had received funding from this programme (see Table 8.1). In chapter 3, table 3.8, an overview is given of the main projects, with a short explanatory description of the main objectives of the on-going projects at 31st of December 2012.

Following the TEN-T Calls in 2008, 2010 and 2011, RIS projects with a volume of approximately **€100.5 m** (TEN-T grant: **€33.6** m i.e. 33.4 %) are finished or currently still on-going.

Table 8.1 Project budgets and funding contribution TEN-T (2007-2013)*)

Country	*Name project*	*Total eligible costs*	*EU-grant*	*End date*
Poland	Pilot implementation on the Lower Oder RIS (2010-PL-70206-P)	€ 7,280,000	€ 1,600,000	31/12/2014
France	River Information Services II (SIF II) (2010-FR-70204-P)	€ 4,714,100	€ 1,160,080	31/12/2013
EU	Deployment of Inland AIS transponders in Flanders and the Netherlands (2010-EU-70201-P)	€ 3,885,000	€ 777,000	31/12/2012
Belgium	Implementation of RIS in Flanders II (2010-BE-70202-M)	€ 2,258,100	€ 597,120	31/12/2012
Netherlands	Study and implementation of AIS monitoring network (2008-NL-70001-P)	€ 8,030,000	€ 3,166,000	31/12/2013
Netherlands	Implementation of Fairway Information Services (2008-NL-70000-P)	€ 1,990,000	€ 398,000	30/04/2011
EU	Implementation of River Information Services in Europe IRIS II (2008-EU-70000-S)	€ 11,627,384	€ 5,810,000	31/12/2011
EU	Full deployment of inland AIS transponders (2008-EU-70000-P)	€ 20,990,000	€ 4,950,000	31/12/2012
EU	Implementation of RIS on the Westerscheldt river (2008-EU-30001-P)	€ 2,100,000	€ 490,000	30/06/2012
Belgium	Implementation of RIS in Flanders(2008-BE-30000-P)	€ 8,889,504	€ 1,929,731	30/09/2011
EU	VTMC of the future (2011-EU-7002-S)	€ 7,745,000	€ 3,872,500	1/10/2014

[103] Four others were at that time in contract negotiation; but these would only start to work in 2013.

Country	Name project	Total eligible costs	EU-grant	End date
Italy	RIS along the Northern Italian waterway System (2010-70203-S)	€ 5,060,000	€ 2.530,000	1/12/2013
EU	Implementation of River Information Services in Europe IRIS III (2011-EU-70001-S)	€ 10,460,000	€ 5.230,000	31/12/2014
EU	Implementation of RIS on the Westerscheldt river II (2011-EU-70003-P)	€ 2,650,000	€ 530,000	30/06/2014
Belgium	Implementation of RIS in Flanders III (2011-BE-70001-P)	€ 2,875,000	€ 575,000	31/12/2014
	TOTAL	**€ 100,554,088**	**€ 33,615,431**	

**) Remark: Situation as registered in the spring of 2013. Actual funding until December 2012. Budgeted funds for 2013 and later periods. Note that the annual duration (actual or planned) can be inferred from the four digits year indicator in project code and end date.*

Source: information provided by TEN-T EA

2. European Structural and Cohesion Funds and FP7

In the framework of the Structural and Cohesion Funds, financial support is granted to Romania and Bulgaria for the setting up of RIS, approximately €15.3 m and €10.2 m respectively.

With the financial support from the Instrument for Pre-Accession (IPA) the programme for the introduction of RIS on the Serbian Danube started in 2009 and will lead to full-scale implementation of RIS in Serbia in 2012. EU funding amounts to approximately €10.5 m Furthermore a RIS IPA-funded project of €1.6 m runs until 2014.

Finally, one project has been identified exclusively in the field of RIS receiving FP7 funding of €5.3 m In Table 8.2 the projects are listed.

Table 8.2 Project budgets and funding contribution other EU programmes (2007-2013)

Country	Name project	Total eligible costs	EU-support	End date
Bulgaria	Implementation of River Information System on the Bulgarian part of the Danube River (BULRIS)	€ 18,000,000	€ 15,300,000	2013
Romania	Traffic vessel management and information system on the Danube, Danube–Black Sea Canal and Poarta Alba–Midia Navodari Canal (RORIS)	€ 15,900,000	€ 10,230,000	2012
Croatia	Full implementation of River Information Services on the Sava River Waterway	€ 1,600,000	€ 1,600,000	2014
Serbia	Implementation of River Information Services in Serbia	€ 10,500,000	€ 10,500,000	2012
EU	RIS Services for Improving the Integration of Inland Waterway Transport into Intermodal Chains (RISING)	€ 7,500,000	€ 5,300,000	2012
	TOTAL	**€ 53,500,000**	**€ 42,930,000**	

Source: public information from project-fiches

The total volume of budgets is €**53.5 m** (Other EU-support: €**42.9 m** i.e. 80.2%).

It should be observed that the relative level of EU co-financing in this group of other EU programmes (80.2%) is significantly higher than for the TEN-T projects.

3. National co-financing of EU projects 2007-2013

The extent of co-financing of the EU projects by national sources follows directly from the figures above: 100.5-33.6= **€66.9 m** (TEN-T co-financing) and 53.5-42.9=**€10.6 m** (co-financing of other EU programmes).

The total national co-financing of EU projects= 10.6+66.9=€**77.5 m**

4. Other national funding sources of national and regional authorities

Apart from administrative costs for authorities etc. a number of Member States provide funds for RIS by national programmes. Examples of such activities could be found in Austria, Belgium-Flanders, France, The Netherlands and Germany. Some other countries only fund RIS activities by participating in EU-supported projects only[104]. Unfortunately, it was not feasible to determine the total national investments that are linked to RIS. RIS in dedicated national programmes is entangled with other types of projects, like innovations in engines, terminals, loading- unloading equipment, fairway maintenance, construction works, internal efficiency improvements of authorities, etc. Not being known precisely, these investments will be considered as a pro memory item (PM).

5. Private funding

Private funding in the RIS implementation was at the start of the period limited to the participation of system suppliers in Expert groups and participation in a few development projects. The participation of the IWT industry was however very modest.

This changed towards the end of the period when the markets for two key RIS technologies increased significantly. This happened as a result of the uptake by the users of AIS as a result of the large scale deployment of AIS transponders (in particular through a TEN-T co-funded programme in Germany and the Netherlands), with substantial financial incentives for skippers and barge operators. The increased uptake of AIS also stimulated the uptake of inland ECDIS.

In chapter 9 it is estimated that the average annual investment per (self-propelled) vessel is €1168,-(table 9.3). Because it is estimated[105] that in 2012 about 90% of the European fleet was equipped with AIS, the total contribution private investments becomes significant. In chapter 9 a calculation is made of the total contribution of these investments in the period 2006-2011 of **€34.2 m** (sum table 9.4)

Notice, that for the slightly longer period (2006-2012)[106] which was considered in the present chapter, another year with high market penetration will have to be added to this estimate, resulting in an estimate of **€46.9 m** by the private sector. The high market penetration in 2012 was mainly caused by the impact of large scale AIS deployment projects in the Netherlands and Germany (see also table 8.1 where they are labelled “EU project” as multi-country projects)[107].

[104] See country reports in Annex 4 the parts about RIS related projects.
[105] See on the uptake of AIS section 6.2 .
[106] At the start of the present chapter the reason is explained why the periods slightly differ.
[107] For the investments in 2006-2011 per year see table 9.5 (the row with private investments).

Concluding overview of all the funding sources

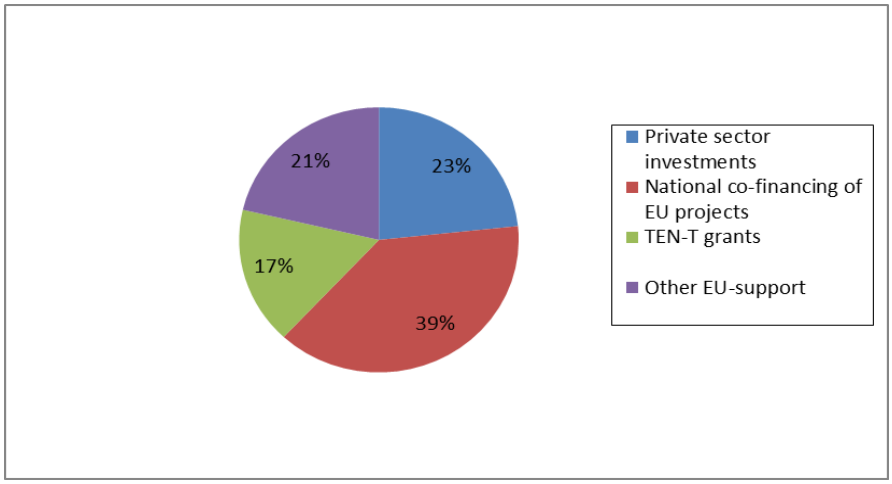
So the various funding sources if the RIS implementation funding in 2006-2012 are:

- TEN-T grant: €**33.6 m**;
- Other EU-support: €**42.9 m;**
- National co-financing of EU projects: **€77.5 m;**
- Other national funding by authorities: PM;
- Private sector investments: **€46.9 m.**

So the total funding from (known) sources is **€200.9 m.**

In the pie chart in figure 8.1 the breakdown of the funding to different sources is given. Within selected EU co-financed programs (TEN-T, Structural and Cohesion Funds, Instrument for Pre-Accession) and the current financial framework, a total project volume amounts to approximately **€154.0 m**, of which a total of approx. **€76.5 m** was co-financed by the European Union. This is approximately **38%** of the total investment costs.

Figure 8.1 Breakdown of RIS implementation funding to various sources (2006-2012)



Source: public information from project-fiches and calculation of Panteia

Assessment of the Evaluator[108]

In order to judge the availability of funds and the type of funding in the period 2006-2012, one should relate the funding to the needs of the RIS implementation process. In the first years the actual use of applications was low and the emphasis was still on creating the environment to roll out the key RIS technologies. Only in the last years, the emphasis shifted. Corresponding to this, the structure of funding the private sector contribution became only significant towards the end of the evaluation period, while the funding from public parties was much more evenly distributed over the time period.

This may seem unbalanced, at first sight, but this is not unreasonable. For example, the introduction of AIS depends on the presence of a legal and organisational framework which first had to be in place and had to be planned and prepared for. The deployment of these, including supporting shore infrastructure, took place during the first part of the evaluation period and concerns only public parties to invest such as the waterway managers and port operators. So the funding provided by market

[108] Evaluation question 8: To which extent have resources been made available in due time, in appropriate quantity and quality?

parties is closely integrated with the investing of authorities.

The extent of the funding by support programmes and national projects was generally sufficient. Budgets were, however, not always efficiently spent. As was indicated in previous chapters: too many activities went into individual Member States and too few into projects in cross-border transport.

In many projects of (national) authorities private companies are included (as a subcontractor or partner). However, generally the overall project design, the project objectives and agenda are closely linked to the core objectives of authorities. This is of course reasonable, because the authorities have to operate within their publically circumscribed tasks. When in the future RIS support should be more aiming at the interests of the IWT industry and supply chains, the present funding structures need to be re-examined.

In many projects the funding of national sources consisted of co-financing of EU-projects, and the national funds were therefore directly linked to funding at the EU level. A remarkable aspect related to the funding, concerns the independent funding by authorities. Although the size of this could not exactly be determined, it was observed that a few countries provided funding for the RIS implementation for national projects without a direct link to EU co-funding instruments. In particular Germany provided funds based on their own national funding instruments and Germany did not significantly apply for co-funding from European funding programmes. Based on the country report of Germany[109] in the period 2006-2012 this amounted to about 20 million euro. So, apparently Germany did not see much added value of the EU-funding instruments while a few Member States (in particular Austria, Belgium/Flanders, the Netherlands) frequently used these European financial resources.

Total RIS investments

In order to complete the picture about RIS financing in Table 8.3 some key EU co-financed RIS-related projects of the period prior to 2007 are presented.

It should be remarked that those projects were mainly projects in the pioneering and exploratory phase of RIS and laid the foundations of the present RIS. In contrast the projects in tables 8.1-8-2 are projects aim at the implementation of RIS technologies and services.

Table 8.3 Key RIS related Project budgets and funding contribution in EU programmes prior to 2007

Country	Name project	Total eligible costs	EU-support	End date
EU	IRIS Masterplan	€ 600,000	€ 300,000	2005
EU	IRIS I	€ 4,146,000	€ 1,998,787	2008
EU	INDRIS	€ 3,941,000	€ 2,003,000	2000
EU	INCARNATION	€ 1,222,000	€ 700,000	1997
EU	RINAC	€ 527,000	€ 527,000	1999
Danube	DANewBE	€ 2,091,000	€ 1,433,375	2007
EU	COMPRIS	€ 9,537,465	€ 5,021,052	2005
	Total	***€ 22,064,465***	***€ 11,983,214***	

Source: public information from project-fiches

[109] Annex 4: country report Germany,

So for these projects an additional **€22.0 m** could be identified as definitively RIS related investments, from which **€12.0 m** consisted in EU-support.

8.2 Impact of economic crisis on funding

Sources and results, input for evaluation

The financial and economic crisis had a severe impact on the Inland waterways transport market. The freight volumes in the dry cargo market started to decrease in the fourth quarter of the year 2008 and the liquid cargo market followed half a year later. Price levels in the dry cargo and tanker market and business profitability decreased dramatically. That was the start of a period of deep recession in the supply side of the IWT market, with very low revenues for ship owner/operators and overcapacity of the fleet. This period still continues and freight volumes are still below the levels seen in 2008[110].

Given this economic background, it might be asked to what extent these circumstances affected the funding of the RIS implementation.
From a theoretic viewpoint, there are at least four different ways in which the RIS implementation might have been affected:

1) Reduction of funding because at the level of EU, the Member States or private sector money was needed for different purposes or expected revenues were not realised;
2) Increase of available funds because of a policy to counter the effects of the crisis, the additional spending by public organisations to compensate for the decrease in spending by private organisations;
3) No increase or reduction of funds, but RIS funding helped to counter cuts that would otherwise have reduced budgets or staff;
4) No increase or reduction of funding, but RIS activities by increasing productivity, made cuts easier to realise elsewhere.

The four points make clear that if various such effects occurred, determining the net nature and direction may be difficult because, the effects indicate opposite directions.

Is there evidence that 1-4 occurred?

1) There is some evidence for this. At least in four country reports (Czech Republic, Hungary, Serbia and Poland) RIS budget reductions were mentioned[111];
2) While TEN-T budgets for infrastructure projects were moved forward in 2009 because of the financial and economic crisis there is no evidence that this affected RIS projects.
3) There is no evidence for this;
4) No evidence for this, though this is a real possibility in the near future. When infrastructure management processes (e.g. lock management) can be realised more efficiently one may choose not to increase the service level for customers (e.g. reduce waiting times for waterway users) but choose to diminish opening times (and reduce resources).

[110] See also Market Observation Report 2013, CCNR/Panteia October 2013, http://www.ccr-zkr.org/13020800-en.html .
[111] See Country report Annex 4.

Assessment of the Evaluator[112]

Based on the research done through interviews and desk research, it is concluded that the economic crisis did not significantly affect the funding of the RIS implementation process. It is remarkable that an industry which suffers from a deep recession, in the midst of the economic crisis invests massively in a tool such as AIS.

Of course the conditions to obtain AIS were very attractive by means of subsidies from authorities; but it also points out that the expected benefits of the use of the tool, in the Rhine corridor at least (where the large scale AIS deployment action took place) are positive in the long run. Also the mandatory use of AIS in Port of Antwerp had a positive impact on the user uptake of AIS.

Beforehand, one might have expected that the IWT industry, given the bad economic situation of many businesses, would have chosen not to invest in RIS and that the roll-out AIS would have been a failure. But this did not occur.

8.3 Effectiveness of support programmes

The criterion of effectiveness of support programmes relates the support measures to the RIS objectives. The question that needs to be answered is:

> *To what extent contributed the support measures in achieving the RIS objectives or to what extent contributed support measures to increase the expectation that the benefits will be achieved?*

Sources and results, input for evaluation

The evaluation regarding the effectiveness of support programmes depends on:

- The importance of the programmes in the funding of the RIS implementation (see section 8.1)
- The impacts of the RIS evaluation are the subject of chapter 9 and are there presented within the overall framework of assessment of costs and benefits.

In the exploratory phase of RIS, EU support programmes were indispensable. In this phase the programmes in fact provided, together with the national co-financing of EU projects, the only available sources of financing (see table 8.3 with the key projects that were important in defining RIS in this phase).

In the period 2007-2013 RIS entered the implementation phase. As was pointed out in section 8.1 (and depicted in figure 8.1), by far most of the RIS funding still stems either directly from EU support programmes or consists of national co-funding of those programmes. Only in the past years (since 2008) a new source of financing, namely financing by private parties, became gradually more important (see table 9.4 for a time series with the estimated size of investments in the Netherlands). Although the funding from national sources as such has surpassed the grants and other EU funding (see figure 8.1), the EU support programmes were important for initiating activities and realising cross-border activities in particular.

Because the EU support programmes were critical for the realisation of RIS they contributed significantly to all the impacts of the RIS implementation as well.
Although the implementation is not yet complete and many improvements are still possible, progress has been made in realising the RIS objectives and creating a more

[112] Evaluation question 16: What is the *impact of the economic recession and budgetary crisis* on the projects supported by the various instruments and on the RIS policy itself?

harmonised IWT market environment.

In table 8.4 an overview is given, extracted from the country reports, of RIS related national projects per country, combined with the important cross border projects in which countries participate.

Table 8.4 Overview projects extracted from country reports

Country	Project name	Project description
The Netherlands	National RIS projects	**FIS**- Fairway Information Services **VOS** – The IVS90 system will be replaced by the Traffic Management Support System VOS. **IDVV** – Impulse dynamic waterway traffic management
	Cross-border projects	**Tracking and Tracing**: AIS on board and AIS shore infrastructure. Jointly with Germany **VCM** – Vessel Traffic Management Centre of the Future **IRIS 1 and 2** – studies and pilot projects concerning new enhanced RIS services and technologies **Westerschelde** – Dutch/Belgium Vessel Traffic management on the Westerschelde
Belgium	National RIS projects	**RIS Flanders I, II, III and IV**: implementation of AIS base stations and IT infrastructure **AIS pilot** in the port of Antwerp **Future projects**: expansion of Flaris, VISURIS (involving smartphone technology) and single Belgian RIS Index
	Cross-border RIS projects	**AIS subsidy programme** together with neighbouring MSs
Luxembourg	National RIS projects	-
	Cross-border RIS projects	**Luxembourg** cooperates with France and Germany in rolling out and testing the

Country	Project name	Project description
		AIS infrastructure on the Mosel. La service de la navigation had organised **a subsidy program** which encouraged skippers to invest in an AIS transponder
France	National RIS projects	**SIF I and II -** Both (Services d'Information Fluviale) SIF projects are TEN-T co-financed projects aimed at the implementation of RIS in France. **PAM** – plan for modernization of the fleet **InfoSaone** - construction of a website which shows the name of the vessel after it has passed a lock. **Moselle Intelligente -** a high speed network with glass fibres are installed between locks to improve communication **InfoSeine –** Aims at improving bridge clearances
	Cross-border RIS projects	**IRIS I, II and III**: focused on harmonised implementation of RIS in Europe
Poland	National RIS projects	**EU TEN-T project RIS on the Lower Oder**
	Cross-border RIS projects	**IRIS III**
Germany	National RIS projects	
	Cross-border RIS projects	**IRIS II and III** **RISING –** aims to deploy RIS for logistic applications **AIS** – full deployment of AIS transponders (together with the Netherlands) **VCM** – Vessel Traffic Management Centre of the Future **Strategy for the Danube Region** – implementation of harmonised RIS
Czech Republic	National RIS projects	**LAVDIS** for RIS applications on Labe and Vyltava.

Country	Project name	Project description
		Installation of **DGPS reference station**
	Cross-border RIS projects	**IRIS I and III**
Austria	National RIS projects	**DORIS** **i2 key project – innovative inland navigation**" **–** as pilot implementation of value added services **IV2Splus** "Intelligent traffic systems and services plus" **DoRIS + IALA (Beacon) DGPS Performance Monitoring** Technology oriented and research studies: **NAVWAT, SATVeC and ARIADNA**
	Cross-border RIS projects	**COMPRIS –** operational test platform of RIS **Several projects RIS harmonised RIS implementation Danube IRIS I, II and III** **RISING –** RIS services for Improving integration of Inland Waterway Transports into Intermodal Chains **NEWADA –** development Danube FIS portal
Hungary	National RIS projects	No national RIS related projects in Hungary
	Cross-border RIS projects	**COMPRIS** **IRIS I, II and III** **RISING** **PLATINA** **DANewBE Data –** feasibility study for navigational purposes **NEWADA –** increasing efficiency of the Danube by intensifying cooperation **NEWADA Duo** **WANDA and CO-WANDA:** RIS key services investigated on how RIS can support waste management procedures **DAHAR** Capitalisation of RISIN, IRIS II, NEWADA and PLATINA **GYŐRIS - "**The Cross

Country	Project name	Project description
		Border Development of Inland Navigation Information Infrastructure" **CB RIS** improvement of cross-border mobility and accessibility DATRAM – Dangerous cargo transport monitoring on inland waterways
Slovakia	National RIS projects	No national RIS related projects
	Cross-border RIS projects	**COMPRIS** **IRIS I, II and III** **RISING** **DANewBE** **NEWADA** **NEWADA Duo**
Bulgaria	National RIS projects	No national RIS related projects
	Cross-border RIS projects	**IRIS III** **NEWADA Duo**
Romania	National RIS projects	**VTMIS on the Danube** **RIS-COSAR:** developing a platform for monitoring, warning and electronic reporting
	Cross-border RIS projects	**NEWADA** **IRIS II and III** **NEWADA Duo** **NELI –** cooperation network **RISING**
Croatia	National RIS projects	**CroRIS :** R&D and implementation project of RIS on Croatian part of Danube and Drava Rivers **Detailed design and prototype installation for the Sava River Waterway**
	Cross-border RIS projects	**CB-RIS and CB-RIS 2** **NEWADA** **NEWADA Duo**
Serbia	National RIS projects	**RIS implementation Serbia (3 parts)**
	Cross-border RIS projects	**IRIS II and III** **RISING** **DANewBE** **NEWADA** **NEWADA Duo**

Assessment of the Evaluator[113]

While the full potential of RIS has not yet been achieved, the EU support programmes were critically important. Without these programmes RIS would not have been conceived and implemented.

The national RIS related projects are for a number of countries indispensable as well. In some cases these projects are very advanced and aim to implement RIS services which have not been implemented so far.

8.4 Identification of financing needs

For the next financial period (2014-2020) much more can be expected from the private sector in terms of the source for funding. It should be observed that the commercial benefits will increase by means of increasing fuel savings, increasing payload and revenues and/or decreasing waiting times. For those applications that bring direct incentives and gains for the users, the uptake will need less involvement of EU financial support programmes.

Sources and results, input for evaluation

In a recent study[114] a number of proposed policy measures were presented for 2014-2020. This included policy measures in the field of support of the further RIS implementation (they were included in a separate policy package of the proposal).

The proposed actions are listed in table 8.5. The package was motivated in particular by the need for activities in the following categories:

A. Unfinished technical regulations;
B. Unfinished implementation and co-ordination of RIS in Europe;
C. Unused potential RIS for logistics.

The overall estimated budget of this package amounts to €21.5 m.

In an unpublished expert paper[115] the budget needs for national plans related to RIS deployment in the period 2014-2020 were estimated at €137 m. This estimate was made by experts in Member States (civil servants, RIS authorities and/ or RIS providers). The experts identified budget needs for individual Member States for the period 2014-2020 and the Ms budget were subsequently added for the EU.

Table 8.5 Proposed measures presented in the study "Medium and Long Term Perspectives of IWT in the European Union"[116]

Problem	*Measure description*	*Indicative costs 2014-2020 (EUR)*
A. Unfinished technical regulations	1. Update and further develop technical specifications for River Information Services (RIS)	1,700,000
B. Continued need for European coordination	2. Support and promote harmonised implementation and deployment of RIS	1,500,000

[113] Evaluation question 2: What is the *effectiveness* and *efficiency* of the *support measures for RIS*?
[114] Medium and Long Term Perspectives of IWT in the European Union. Final report- Main Report. Panteia (December, 2011).
[115] Expert Paper: RIS in Multi-Annual Financial Framework 2014-2020 (2011, unpublished). The paper also presents a possible breakdown between countries and provides in an Annex some background information about the estimates.
[116] Medium and Long Term Perspectives of IWT in the European Union. Final report- Main Report. Panteia (December, 2011).

and harmonisation in implementation	3. Operate and maintain European Position Information Service	3,700,000
	4. Organise compliance and progress monitoring in the field of RIS	750,000
	5. Operate and maintain Reference Data Management system	2,200,000
	6. Operate and maintain Inland ENC Register and digital parts of the ENC Standard	1,300,000
	7. Support RIS expert groups	2,600,.000
	8. Operate and maintain single RIS portal	1,.600,000
	9. Operate and maintain European Hull Database	2,500,000
C. Unused potential RIS for logistics	10. Stimulate the commercial and logistics use of RIS	2,200,.000
	11. Support creation of eFreight and seamless handling formalities	1,500,000

Assessment of the Evaluator[117]

A first indication of the budget needs for 2014-2020 based on the desk research carried out gives a figure of €160 m.

However, it is essential that the RIS implementation requires a further completion and improvement in the current implementation of the key RIS technologies. In particular the interoperability and the international data exchange issues need to be resolved on European level.

In 2014-2020 more attention for public private partnerships and enabling funding from private organisations and the IWT industry should be given. The involvement of the IWT industry in RIS projects should be increased. This will imply a considerable change, because the biggest part of funds which have been invested in RIS implementation in the past years consisted of funds that were either allocated to or owned by the infrastructure management authorities of countries.

The large size of the present TEN-T supported projects and the substantial requirements regarding co-funding are not interesting for businesses which operate in a small scale market. In many projects of (national) authorities private companies are included (as a subcontractor or partner).
If the private sector should obtain a bigger amount of the funding of RIS related activities in the future, one may have to change the parameters of the funding arrangements for RIS (or RIS-related projects).

[117] Evaluation question 10: What are the *financing needs* for RIS for the period 2014-2020 and how are these investments spread over time? Which investments should be borne by the public sector and investments should be borne by the private sector (i.e. the operators)? How should support to RIS be organised taking into account the instruments that will become available under the Multiannual Financing Framework 2014-2020? Have the co-financing rates for RIS deployment been effective in the past? Do they need to be changed for period 2014-2020?

9 Impacts of RIS

In this chapter, the impacts of RIS implementation during 2006-2011 will be assessed. The analysis of impacts will distinguish between private and public parties and the relationship between both types of impacts, and the contribution to RIS policy objectives. In addition the extent to which ex-ante evaluations have been realised will be assessed. In chapter 4 the RIS policy objectives were presented and related to the overall EU transport policy is discussed.

Broadly speaking, the impacts of the implementation of RIS can be divided into effects that can be considered either a benefit or a cost (or are neutral). The benefits are determined by the effects that result from the implementation of RIS technologies. The implementation of RIS technologies and services has been evaluated in chapter 6. The costs are determined by the investments and the operational expenditures that have been done in order to implement these RIS technologies. Financial resources have been evaluated chapter 8. Both costs and benefits depend on the uptake of the technologies by the IWT industry. In chapter 3 and chapter 6 the uptake has been evaluated.

This chapter is divided into two parts. In the first section 9.1, the impacts of RIS implementation during 2006-2011 will be assessed. The analysis will be done on EU level. Although Member States each invest in the implementation of RIS, the benefits that follow from their investments accrue to all vessels sailing on the territory of a Member State, irrespective of the flag under which they are sailing. The overall assessment will be of a qualitative nature. Where possible, effects will be described quantitatively.

In the second section 9.2, the SPIN study[118] will be evaluated. This ex-ante study brings together and builds on the results of several studies in which the impact of RIS has been assessed. The results of the SPIN study are considered very important in the formation of expectations of the impact of RIS[119]. Further, this subject is important in the assessment of potential revenues of RIS. In addition the COMPRIS study will be evaluated[120], which was a major study and not included in the analyses of previous studies in the SPIN study.

A key problem in the assessment of the impact of RIS implementation during 2006-2011 is how to isolate and determine the exact effects of the measures that have been taken. This requires access to detailed and specific data, which are not available in EU Member States, except for the Netherlands.

For this reason, the analysis will for a large part be based on data from the Netherlands. Given that more than 30% of European IWT performance measured in tonkm takes place on Dutch territory[121], the situation in the Netherlands describes a large part of the impact of RIS implementation in the EU. This does not mean that the Dutch situation is representative for other EU Member States. The degree to which the Dutch situation compares to the situation in other EU Member States depends on many factors, however, as RIS is implemented in different ways.

[118] Assessment of the implementation of RIS in Europe, SPIN-TN, WG2 Systems & Technologies, 2006. http://www.ris.eu/docs/File/386/Strategic_Performace_IndicatoSPINS_assessment_implementation_ris_2006.pdf
[119] SPIN is quoted in various reports and papers. For example in " Expert Paper :RIS in Multi-annual Framework Program 2014-2020 ", 2011 page 6
[120] Report on socio-economic assessment of RIS, COMPRIS Deliverable 12.1, 2006. http://www.ris.eu/docs/File/386/compris_deliverable_12_1_socio_economic_assessment_final.pdf
[121] Statistical Pocketbook 2013 - Performance freight transport 2011

In the Rhine corridor, North-South corridor and the Upper Danube the situation is not expected to differ radically from the situation in the Netherlands. However, in operating areas where the RIS implementation is less advanced (Lower Danube, Elbe and Oder) the situation may deviate considerably from the situation in the Netherlands.

9.1 Impact of RIS implementation 2006-2011

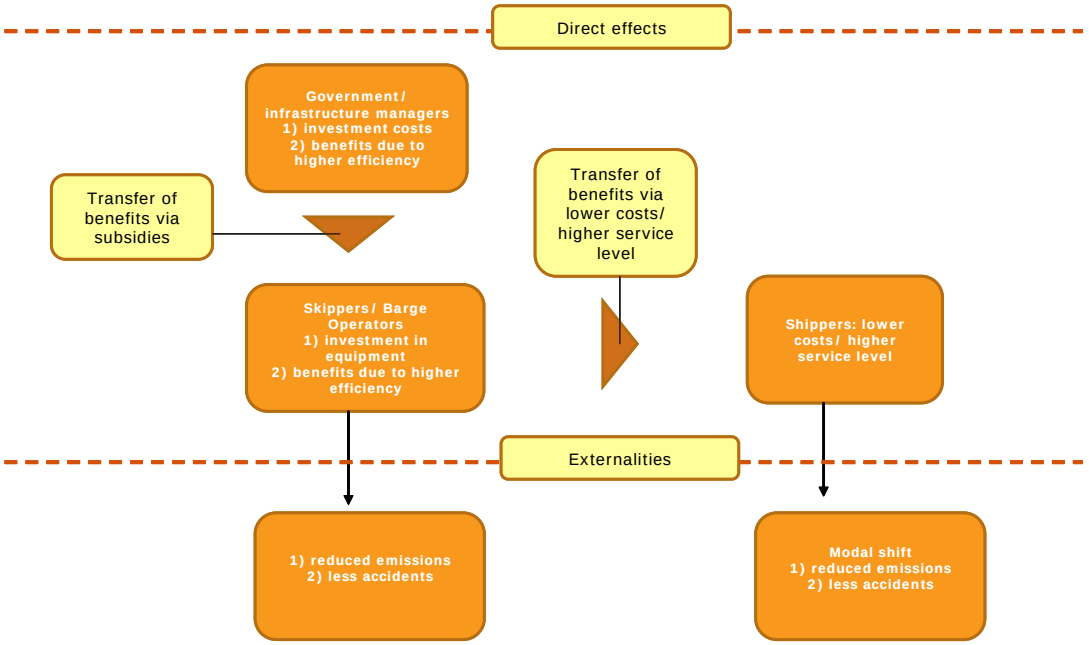
Input to the assessment

The impacts of RIS implementation are related to the following factors:

1. Investments and operational costs of RIS equipment and services:
2. Fuel consumption due to fleet operations;
3. Service level of IWT;
4. Shift between transport modes;
5. Safety on IWW;
6. Emission of air pollutants due to fleet operations;
7. Climate change due to fleet operations.

Figure 9.1 shows the various impacts, how they interrelate and the stakeholders that experience these impacts.

Figure 9.1 Relation between impacts for various stakeholders



Source: Panteia

The impacts are further described below. Public and private investments and revenues are separated in the analysis because the commercial viability of the innovation is a necessary condition for users. Therefore, the benefit/ cost ratio for private investment needs to be positive in the long term.

Public investments in RIS and maintenance of onshore equipment

Both EU support programmes as well as national programs help to realise the RIS implementation. The supply of hardware and services is a necessary condition for the

benefits to be realised. This counts for onshore equipment as well as on-board equipment.

The estimated amount of public investments in RIS implementation in the EU between 2006 and 2011 amounts up to 154 million euro[122] (see chapter 8). Therefore, the estimated average public investment per year between 2006 and 2011 is 25.67 million euro (see table 9.1). The public investments were partly financed by EU support programmes (38% of the total investments see figure 8.1).

This estimate is derived from actual and budgeted project data in chapter 8. Note that this source refers to the period 2007-2012, which overlaps but is not identical with the reporting period in the present chapter (2006-2011). So it is assumed that the average annual investment level in 2006-2011 equals the amount in 2007-2012.

On average over 2006-2011, each year the public sector investments have been made as listed in table 9.1. In practice, the average budgets fluctuate with the time schedules of programme calls. By averaging, the annual fluctuations are smoothed out.[123]

Table 9.1 Public investments per year (2006-2011)

Year	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
Expenditure (million euro)	25.67	25.67	25.67	25.67	25.67	25.67

Included in the public investments are also (direct) subsidies for companies which were part of large scale deployment projects in Germany and the Netherlands.

Private investments in service and on-board equipment

Investment in on-board equipment is made by skippers and barge operators. The total amount of on-board investments required in order to implement RIS in the EU12+1 countries can be calculated as the number of self-propelled vessels in these countries (both passenger and transport vessels) multiplied by the average investment costs in on-board equipment. The number of self-propelled vessels in the EU 12+1 countries (both passenger and transport vessels, 2012) amounts to 10,880[124]. In order to estimate the investments that were actually done, only the proportion of vessels that made the investment in on board equipment during 2006-2011 should be taken into account.

For the use of on board equipment, the market penetration of AIS is the driving key RIS technology. Inland ECDIS and Nts are also used on board of vessels, but usually as supporting AIS and vice versa (see chapter 6: AIS is usually linked to ECDIS as is NtS). AIS is also a comparatively "new" development. While IENCs and NtSs in the official RIS format did not exist either, digital maps and notices to skipper in other forms were used to some extent. The market penetration of AIS started at 0% and primarily occurred within the period 2006-2011. As indicated in previous chapters, AIS penetration reached a very high level, even up to 100% for some countries in the Rhine corridor (Belgium, Germany, and The Netherlands). For the EU12+1 the average

[122] This amount is equal to the amount listed in the previous chapter.
[123] This reduces therefore the influence of factors which do not depend on the market or industry but are purely of an administrative nature.
[124] EICB, based on EICB, based on CCNR/EC, Market Observation 2012-I, IVV registered fleet 31/12/2011, Danube Commission 2010, Instituut voor het Transport langs de Binnenwateren (Belgium), Voies navigables de France (France), Zentralstelle SUK/SEA/ Elwis fleet database 2010 (Germany).

market penetration rate in 2011 is put at 90%. While in some countries the market penetration of AIS was very steep (see for the Netherlands figure 9.6), for the EU12+ a more gradual, linear uptake is assumed.

The investments concern the net additional cost of purchase and operation of equipment for the use of RIS services including training cost[125].
Therefore, only the additional costs of the equipment are allocated (by a percentage of time) to RIS usage. Equipment (e.g. radar, computer) that is also used for applications that are not required for RIS is only partly attributed to the costs. For the usage of RIS, two different hard- and software configurations can be distinguished, corresponding to the use of ECDIS in navigation mode (integration with radar, offering more functionalities and accuracy; "advanced") or in information mode ("basic") only. These are shown in Table 9.2 with indicative cost data for 2012. The cost data were obtained from various hard- and software suppliers[126]. Training costs are included in these figures.

Table 9.2 Two configurations of equipment used for RIS based on supplier data (2012)

Cost component	*Allocation factor*			*Unit*		*Unit*
	Adv.	**Bas.**	**Advanced**		**Basic**	
AIS						
Hard- en software	100%	100%	2650	€	2650	€
License	100%	100%	50	€ / year	50	€ / year
Personal computer						
Hard- en software	90%	90%	500	€	500	€
Communication costs	90%	90%	300	€ / year	300	€ / year
Inland ECDIS						
Hardware	100%	100%	2000	€	500	€
GPS	100%	100%	400	€	75	€
Maps	100%	100%	250[127]	€ / map	0	€ / map
Software	100%	100%	1000	€	395	€
Update costs	100%	100%	340	€ / year	50	€ / year
Radar mapping						
Investment radar	15%	0%	12000	€		
Additional software ECDIS	15%	0%	4000	€		
Heading device	15%	0%	3300	€		
Surplus hardware	15%	0%	2500	€		

Source: Estimates Panteia based on data from suppliers

In table 9.3 a calculation of the annual cost of RIS equipment per vessel is made for both equipment configurations. The following assumptions are used:

[125] From a business economic perspective, specific financial support by government programs would need to be subtracted from the gross purchase of the equipment. From a societal point of view, the award of a subsidy is merely a matter of re-allocation of the costs. Since financial support is included in the public investments (table 9.1) it has to be deleted in the private investment calculation.
[126] Product prices of the following suppliers are used: Alphatron, Noordersoft, Periskal and Tresco
[127] In principle IENC's are free. However, these are stand-alone maps. Maps that are integrated in other on-board systems are not free.

- 4 Maps (IENC) are used[128];
- Life span of a personal computer and IENC: 3 years[129];
- AIS and Radar mapping hard- and software 5 years[130];
- AIS grant of € 2,200 was subtracted in both configurations[131].

Survey data point out that roughly 20% of the vessels use ECDIS in navigation mode and 80% in information mode (see chapter 3 and 6). Based on this, a weighted average is calculated (see table 9.3).

Table 9.3 Annual cost of RIS equipment on board of vessels (2012) *)

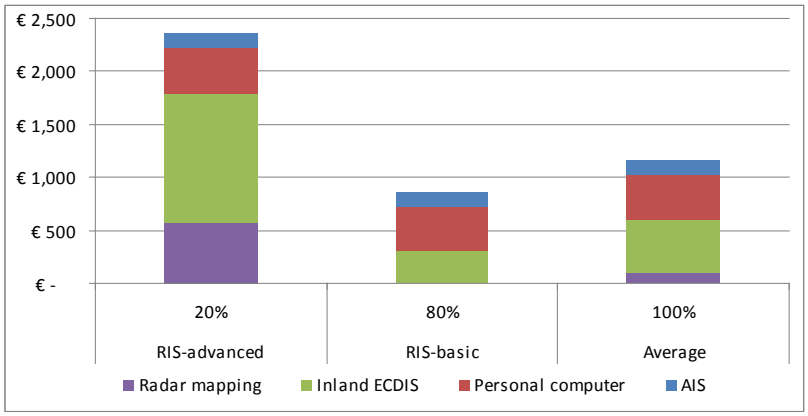
	RIS-advanced	*RIS-basic*	*Weighted average*
AIS	140	140	140
Personal computer	420	420	420
Inland ECDIS	1,220	311	493
Radar mapping	579	-	116
Total	**2,359**	**871**	**1,169**

**) Figures in the weighted average column are calculated as 0.2* RIS-advanced+ 0.8* RIS-basic*

Source: calculation Panteia based on data from hard- en software suppliers

In Figure 9.2 the cost data are displayed graphically. It can be seen that the cost of the personal computer and the inland ECDIS maps are the largest components in the annual average costs.

Figure 9.2 Annual cost of RIS equipment on board of vessels and a breakdown in cost components (2012)



Source: calculation Panteia based on data from hard- en software suppliers

Given that there is an estimated number of 10,880 self-propelled vessels in the EU, the total investment costs in on-board equipment to fully implement RIS amount to 12.7 million euro in 2012. In the period 2006-2011, the uptake of RIS in 2011 was 90%. Expenses due to this partial uptake are therefore estimated as 11.4 million euro, in 2011.

Assuming a gradual uptake from 2006 to 2011, table 9.4 lists the annual private

[128] Checked with system suppliers.
[129] Checked with system suppliers.
[130] Checked with system suppliers.
[131] Checked with system suppliers and skippers. The present on-board AIS equipment in the EU fleet was in almost 100% of the cases obtained with financial support in the past years.

sector expenses in the time period. [132]

Table 9.4: Annual private sector investments in RIS equipment on board of vessels (2006-2011)

Year	2006	2007	2008	2009	2010	2011
Expenditure (million euro)	0.00	2.28	4.56	6.84	9.12	11.40

Impact on fuel consumption

RIS provide information that can be used to improve the voyage planning and anticipate traffic situations. In addition, information on draught and Inland ECDIS inform skippers more precisely about the geographic location of shallow and deep stretches of waterway. This will allow skippers to better stabilize cruising speeds and optimize the fuel consumption of engines.

A reduction of fuel consumption due to the implementation of RIS in the period 2006-2011 is very difficult to prove, because many factors influence the fuel consumption of vessels in IWT. This means that even if a reduction is found, it is hard to isolate the impact of the implementation of RIS.

In general[133], fuel consumption and emissions from a vessel are roughly related to the square of a vessel's speed. Reducing ship speed is an efficient way of cutting energy consumption. Given the same distance, a reduction in speed of 1 knot will result in an 11% increase in efficiency[134]. CCNR reports about possible reduction of fuel consumption[135]. Smart Steaming, just in time-sailing, optimization of speed with decision support systems, optimization of voyage planning etc., may all contribute to a 5-30% efficiency gain when combined[136]. These considerable efficiency gains can potentially be realised when RIS services have been implemented that enable the aforementioned techniques, a situation that has only been reached to some extent.

The experiences from the programme "Voortvarend Besparen" [137] that was carried out from 2007-2010 may offer practical experiences with respect to possible efficiency gains. The programme used several different methods which aim at influencing the behaviour of shipping crews and causing them to use methods which result in more energy efficient sailing[138]. These methods include:

- Training and education: learn how to sail energy efficiently;
- Technical assistance tools: development and subsidisation of tools for fuel monitoring;
- A competition for the ship which saves the more fuel.

"Voortvarend Besparen" reported considerable fuel savings (see table 9.5).

[132] Note that the table appears to be incremental (showing an aggregation over previous years), but this is not the case! The size of annual investments increases because of the assumed gradual increasing market share. The private investment costs in table 9.3 are indeed the costs per year,
[133] In specific situations other factor are important as well: cargo-weight, load factor, characteristics of fairways (like draught).
[134] Regulating air emissions from ships, the state of the art on methodologies, technologies and policy options, JRC Reference Reports, November 2010, page 59.
[135] Mogelijkheden om het brandstofverbruik en de broeikasemissies in de binnenvaart te reduceren. Verslag van het Comité Reglement van Onderzoek voor de najaarsvergadering van 2012. (Bijlage 2 bij protocol 2012-II-4 van de Centrale Commissie voor de Rijnvaart, 29 november 2012).
[136] Literature review based on various studies. See report CCNR Table 3 and Annex 8.
[137] Monitor Voortvarend besparen. Eindmeting (Ecorys 2011).
[138] http://www.naiades.info/fast-facts/success-stories/voortvarend-besparen.html.

Table 9.5 Fuel consumption savings Dutch fleet 2007-2010

% reduction	Average	Lower boundary	Upper boundary
Vessel class (tonnage)			
< 1000	3.9%	1.1%	6.7%
1000-3000	6.6%	4.0%	9.3%
> 3000 ton	9.6%	5.6%	13.7%
Average	**6.7%**	**3.6%**	**9.9%**

Source: Report "Monitor voortvarend besparen eindmeting", Ecorys, 2011

The experiences from "Voortvarend Besparen" can be used to estimate the effect of the implementation of RIS on fuel consumption. Note that these figures refer to a period of 3 years, so the reported annual fuel saving percentages between 6.6% and 9.9% would be vary between 2.2%-3.3%. The experiences provide support to the positive impact of RIS on fuel consumption. However, the experiences were gained, based on a small group of inland waterway transport operators that took part in the programme. It is therefore questionable if this group would be completely representative for a larger population of operators. Moreover, it is noted that during this period there were significant changes in the level of economic activity. The economic downturn that started for IWT from September 2008 onwards could also explain part of the reduction of fuel consumption. Therefore, the reduction of fuel consumption that was reported should be used with caution. Moreover, although the use of AIS may offer more efficient vessel manoeuvring in relation to other waterway users, RIS services have not yet been developed up to a level where they can assist in a more efficient voyage planning, for example by optimizing vessel speed and waiting time. Therefore, the size of annual fuel of the RIS implementation is assumed to be lower and to lie between 1 and 2%.

The average fuel consumption per year per vessel amount to between 50,000 and 60,000 litres. For the EU total of 10,880 self-propelled vessels and a fuel price of 0.60 euro per litre[139], yearly fuel costs amount to 326 to 392 million euro. Yearly benefits of 1 to 2 % fuel savings would then amount to 3.3 to 7.8 million euro. Taking into account an uptake of 90% in 2011, the benefits would then be 2.9 to 7.1 million euro. On average, this is 5.0 million euro.

Again assuming a gradual uptake from 2006 to 2011, the following benefits (see table 9.6) have been experienced by the private sector.

Table 9.6 Estimated annual savings of fuel costs by the private sector (2006-2011)

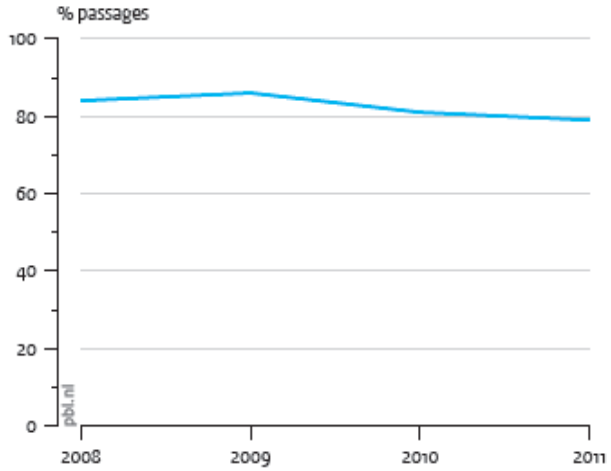
Year	2006	2007	2008	2009	2010	2011
Benefit (million euro)	0.00	1.00	2.00	3.00	4.00	5.00

Impact on level of service

RIS services allow skippers and barge operators to offer clients a faster and more reliable transport service. They are able to improve the planning of lock passages and synchronize activities with lock management. Therefore, RIS is expected to result in a reduction of waiting times for terminals and locks (or bridges).

[139] Centraal Bureau voor de Rijn- en Binnenvaart.

Figure 9.3 Performance indicator: percentage of lock passages remaining within the service norm time (waiting times of vessels remaining within the normal, acceptable time intervals)[140]



Source: Monitor Infrastructuur en Ruimte 2012: nulmeting, Planbureau voor de Leefomgeving (PBL) in samenwerking met Kennisinstituut voor Mobiliteitsbeleid (KiM), Centraal Bureau voor de Statistiek (CBS), 2012

However, a reduction in waiting times for locks cannot be confirmed, based on data from the Netherlands. Figure 9.3 shows that in the period 2008-2011 no significant changes in passage times occurred. There is an explanation for this. During the early years 2006-2011 AISs were not yet used on a sufficiently large scale to make it interesting for lock managers to change procedures. Now that the use of AIS has become almost universal, it is expected that management of locks will change[141].

Similarly, there is no support yet for a reduction in terminal times. Waiting times in container transport at deep sea terminals in Rotterdam and Antwerp are monitored by organisations of container transport operators since 2005[142]. Time series until 2012 show no significant improvements. The presence or absence of RIS is a factor of minor importance; commercial interests and other factors are dominant in the processes[143].

Impact on emissions and climate change

Fuel savings reduce environmental damage due to the emission of harmful pollutants and greenhouse gases. External costs due to emission of pollutants amounts about 2 euro per vesselkm[144]. For climate change this is 0.25 euro per vesselkm[145].

Based on an EU total of 228 million km[146], savings of 1-2% (see the assumption which is used to calculate fuel savings in table 9.6) and an uptake of 90% in 2011, the total benefits would amount 4.6-9.2 million euros. On average, this is 6.9 million euro. Assuming a gradual uptake from 2006 to 2011, the following benefits have been realised.

[140] This is one of the key performance indicators for the Dutch transport and infrastructure Ministry
[141] Note that lock management is a RIS service category.
[142] Alcotrans Port Stay Index, The port stay index for container transportation by barge is published weekly by the CBRB. It shows the average duration of the stay per move and can be used as indicator for the performance (of the container terminals) in the seaports of Rotterdam and Antwerp.
[143] 'Impulse for Dynamic Traffic Management Fairways' (IDVV), Part 3, Rijkswaterstaat, 2013.
[144] Handbook on estimation of external costs in the transport sector, produced within the study Internalisation Measures and Policies for All external Cost of Transport (IMPACT), Version 1.1, CE Delft, et al, 2008.
[145] Contribution to impact assessment of measures for reducing emissions of inland navigation PANTEIA et. al June 2013.
[146] Source: Annex 8 of the present report.

Table 9.7 Estimated annual reduction of emissions and climate change impact (2006-2011).

Year	2006	2007	2008	2009	2010	2011
Benefit (million euro)	0.00	1.38	2.76	4.14	5.52	6.90

Impact on safety

The implementation of RIS may contribute to the reduction of the accident rate on EU waterways. In addition to this, RIS may contribute to an adequate emergency response once an accident has occurred. Damage can then be avoided or mitigated. In this way, increased safety, due to the implementation of RIS, contributes to the overall benefits.

With the implementation of RIS, skippers have a more up-to-date and complete overview of the traffic on waterways. The combination of RIS applications (AIS, ECDIS and also NtS) can significantly improve the performance of radar systems. This will contribute to a safer situation and consequently, the number of accidents will be reduced.

In many EU Member States, the availability of accident statistics in IWT is very limited. A survey among EU Member States led to the country data with respect to accident numbers included in Table 9.8.

Table 9.8 Number of accidents in IWT for various EU countries (2004-2012)

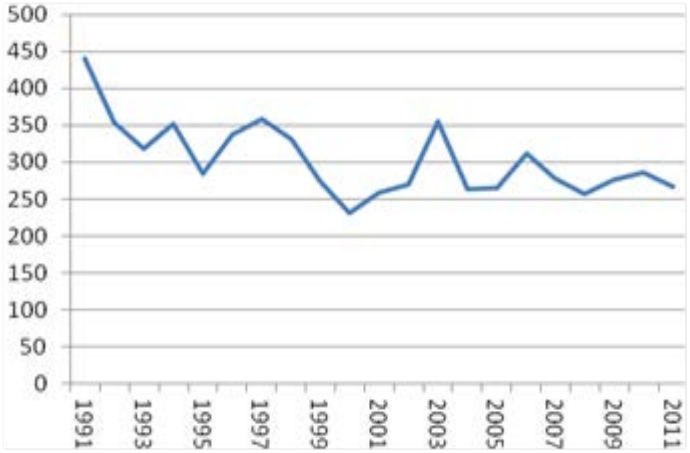
Year	NL	DE	FR	CH	AT	SK	HU	UK
2012	161	N/A	26	N/A	40	2	7	N/A
2011	1072-159	767	26	7	38	2	7	36
2010	987-164	866	37	N/A	48	15	13	27
2009	903-121	838	39	N/A	33	8	6	30
2008	982-127	832	23	N/A	36	3	12	42
2007	795-150	890	34	N/A	37	3		49
2006	710-123	875	36	N/A	172 ≤ 2006	7		
2005	686-96	875		N/A				
2004	678-117	825		N/A				

Source: questionnaire sent to Expert Group E01036 Recognition and modernisation of professional qualifications in inland navigation

In particular, the number of accidents on the Rhine River is shown in figure 9.4.

The graph shows that for the past decade, the number of accidents on the Rhine has been fluctuating around 250-350 per year.

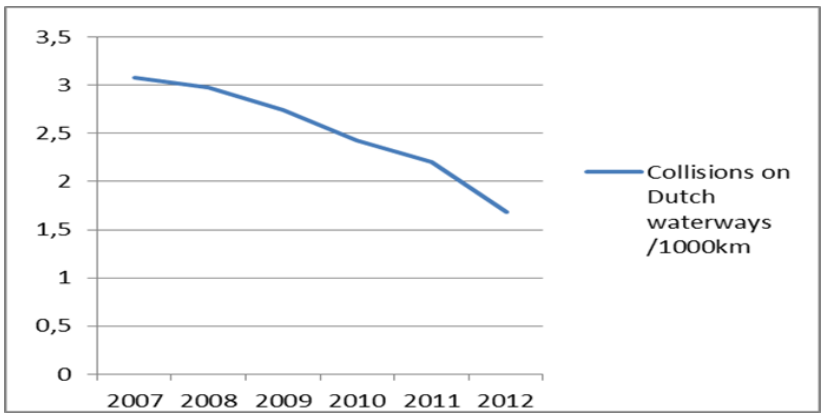
Figure 9.4 Accidents on the Rhine River (1991-2011)



Source: Bundesministerium für Verkehr, Bau und Stadtentwicklung

The use of AIS by Dutch skippers started to increase in 2007 and reached in five years to almost a complete uptake by the market. Data from the vessel accident database from the Dutch Ministry of Transport[147] shows that the accidents related to collisions of IWT vessels with other IWT vessels or with sea vessels[148] on Dutch waterways decreased in the period 2007-2012. The average number of ship-ship collisions per year was 101 for this period. In Figure 9.5 the number of collisions per year per vesselkm is shown[149]. Figure 9.5 demonstrates a decrease in the yearly number of collisions. Apart from the introduction of AIS, there were no known policies or measures in the Netherlands during the period of analysis, aimed at improving safety that could be the reason for this decline.

Figure 9.5 Number of collisions in Dutch waterways between IWT vessels per 1000 vesselkm (2007-2012)



Source: SOS-database Rijkswaterstaat/ Panteia

[147] SOS-database (ScheepsOngevallenSysteem) of Rijkswaterstaat.
[148] Recreational vessels were excluded.
[149] Note that this accident representation does not depend on changes in the activity level of, for example a decrease due to the economic crisis years, starting in 2009, or the impact of low-water periods as in 2011.

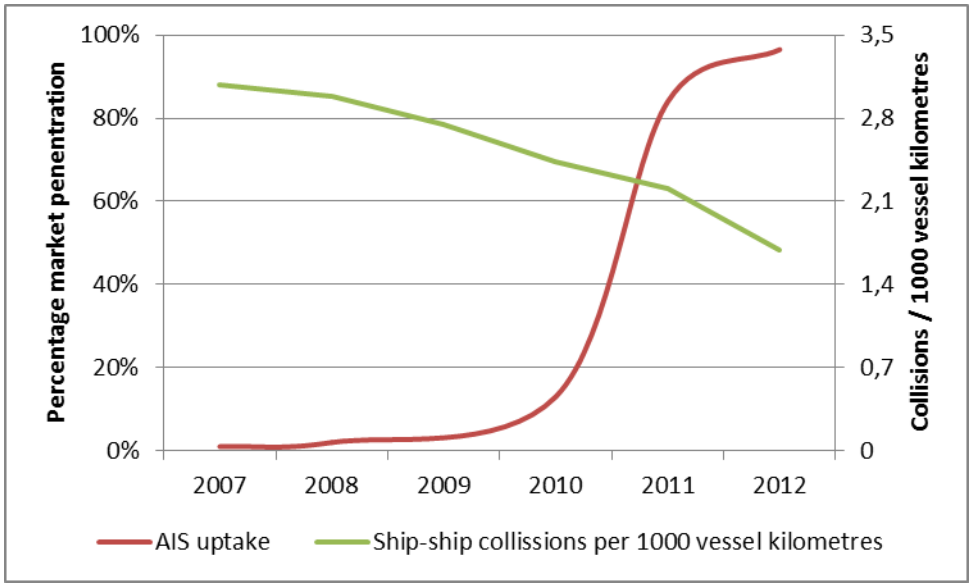
Figure 9.6 shows the number of accidents per year together with the AIS market penetration in the Netherlands. The figure suggests an impact of the introduction of AIS, in particular in the last years when the decrease of the collision series seems to become more pronounced after the steep increase of AIS. In 2009-2011 a steep increase of the market penetration occurred, reaching almost a 100% market share of AIS (see also chapter 3) was reached. This change was primarily due to large scale (subsidised) deployment programs in the Netherlands and Germany (These projects were also included in the TEN-T project descriptions in chapter 3 table 3.8: Deployment projects 2010-EU-70201-P and 2008-EU-7000-S).

Dividing the collision accidents by vesselkm, excludes the impact of a sudden reduction (or increase) of vesselkms caused by the economic downturn (decrease of vesselkms) or a prolonged period of low water (increase of vesselkms)

Other RIS related factors, e.g. inland ECDIS and NtS, could have contributed (integrated with AIS) to the improvement of safety as well.

Furthermore, the short time period in which the reduction of accidents occurred, excludes explanatory factors like changes in the fleet, vessel technology or the waterway network. The AIS uptake and RIS deployment in general is the only known factor.

Figure 9.6 Actual average number of collisions in Dutch waterways between IWT vessels per 1000 km sailing and estimated AIS market penetration



Source: SOS-database Rijkswaterstaat, Panteia (2013), Telematikumfragen WSV (2012 and 2010), Promotie Binnenvaart Vlaanderen (2008, 2010 and 2012).

Data from the Netherlands provide evidence for a reduction in the number of collisions due to the implementation of AIS. Implementation of AIS may bring down the number of collisions by 45% in the Netherlands. Despite this high reduction percentage, there is a limited impact in monetary terms. The accident data refer to all types of collisions and not ship-ship collisions alone. Accident costs are approximately 0.0003 euro per ton kilometre for IWT[150]. With 32.9% of the ton kilometres made in the

[150] http://www.ebu-uenf.org/fileupload/GREENING%20TRANSPORT.pdf.

Netherlands[151], 141 bln ton kilometre[152]s made in Europe and 327 accidents[153] occurring each year, the average costs per accident is 40,357 euro.

EU-wide, an estimation of the number of vessel collisions is 307 per year. Under the assumption of a generalisation of the Dutch accident reduction data and cost data from the Netherlands for the total inland navigation sector in the EU, the cost savings would amount up to 4.8 million euro per year in case of EU-wide implementation of RIS.

This estimation is based on full implementation of AIS in 2012. The benefits in case of a partial uptake in 2011, are 4 million euro. Assuming a gradual uptake between 2006 and 2011, the yearly benefits due to increased safety, are:

Table 9.9 Estimated annual safety benefits (2006-2011)

Year	2006	2007	2008	2009	2010	2011
Benefit (million euro)	0.00	0.80	1.60	2.40	3.20	4.00

Impact due to modal shift

If skippers and transport operators pass on benefits in the transport chain to the shippers, this could lead to a shift from other transport modes to IWT. However, this effect is expected to be very modest, even in cases where costs would lower by as much as 10%. The following studies provide support for this.

- Both PLATINA (2012) and Arcadis & TML (2009)[154] conclude that price-elasticities for IWT services are generally low, causing a relatively low modal shift effect in case of changes in transport prices. PLATINA concluded that transport services are relatively insensitive to changes in prices (direct elasticity between 0 and -1). Transport over longer distances is concluded to be (on average) even less price sensitive than transport over shorter distances.
- Arcadis et al (2009) used elasticities that were based on model results of the TREMOVE-model. The study applied a direct elasticity of -0.25 for inland waterway transport as an average for all commodities, whereas for bulk transport a value of -0.15 was applicable. This means that a cost increase of 10% would lead to a decrease of IWT transport volume by 1.5%.
- Sys and Vanelslander (2011)[155] identified a direct price elasticity for IWT on Flemish waterways of -0.34 (a cost increase IWT by 10% leads to 3.4% decline of IWT (tkm) and a cross-mode elasticity between road and IWT of 0.19 (Cost increase road by 10% leads to 1.9% growth of IWT).
- The study of CE et al. (2010)[156] on the corridor Amsterdam-Paris applied elasticities that ranged between -0.2 and -0.6. The range of elasticities to be used is -0.2 to -0.8 (direct price elasticity for IWT). This means that if total costs per tkm increased by 10%, demand for tkm would decrease by 2 to 8%.

Summarizing the above, benefits due to cost reduction will induce a very modest modal shift compared to the effects that benefit the existing fleet. Here the modal shift

[151] http://epp.eurostat.ec.europa.eu/.
[152] See Annex 8.
[153] Ship-ship collisions are a subset of the total number of accidents per year. Within the total number of accidents per year, also groundings, leakages and collisions with infrastructure and collisions with pleasure crafts are included.
[154] Reviewing Directive 97/68/EC Emissions from non-road mobile machinery, ARCADIS and Transport & Mobility Leuven (TML), 2009.
[155] Sys, C. and T. Vanelslander (eds.) (2011), Future Challenges for Inland Navigation: A Scientific Appraisal of the Consequences of Possible Strategic and Economic Developments up to 2030, University Press Antwerp.
[156] CE Delft, Alenium, Herry and Infras (2010), External cost based pricing on the corridor Paris-Amsterdam: Deliverable 2 – Scenarios and impact analysis Final report Delft, Delft.

effects are taken as 'pro memoria'-item (PM) in the analysis. It is true that in some market segments, other factors than the price level of transport are important for the choice of transport modes (e.g. in the container transport market "time" is an important factor as well) however in all the bulk markets, which still dominate IWT, price is the most important determinant.

Overview of costs and benefits

The following table 9.10 provides an overview of the costs and the benefits of the implementation of RIS. Please note that costs have been included in Table 9.10 as negative benefits.

Table 9.10 Overview of costs and benefits (million Euros), 2006-2011

Year	2006	2007	2008	2009	2010	2011
Government investments	-25.67	-25.67	-25.67	-25.67	-25.67	-25.67
Private investments	-0.00	-2.28	-4.56	-6.84	-9.12	-11.40
Fuel savings	0.00	1.00	2.00	3.00	4.00	5.00
Emissions & climate	0.00	1.38	2.76	4.14	5.52	6.90
Safety	0.00	0.80	1.60	2.40	3.20	4.00
Modal shift	PM	PM	PM	PM	PM	PM

The above mentioned figures have been estimated for the EU as a whole. For individual EU Member States, the proportion between the costs and the benefits that could be attained may be different, depending on:

- Length of the waterway network where RIS are implemented in a Member State;
- Number of self-propelled vessels, sailing under the flag of a Member State, and their characteristics;
- Transport performance of the fleet, sailing under the flag of a Member State.

Table 9.11 provides an overview of these data for the EU 12+1 Member States.

Table 9.11 Key indicators for EU 12+1 Member States

Country	Network >= class IV (*) (km)	Fleet of freight vessels		Transport performance	Vessel performance	No. of self-propelled pax vessels (**)
		No. of self-propelled transport vessels	Average ton.	(thousands of million ton km)	(tonkm per vessel)	
BE	975	1116	1,375	16.223	11,798,545	134
BG	236	68	1,147	1.897	1,653,880	46
CZ	271	44	929	0.589	634,015	222
DE	4,432	1,620	1,463	26.247	17,940,533	880
FR	1,820	997	648	6.714	10,361,111	8
LU	18	35	1,620	1.376	849,383	9
HU	385	106	1,387	1.334	961,788	1
NL	1,581	3,730	1,481	72.602	49,022,282	1,330
AT	336	21	1,550	1.487	959,355	7
PL	115	111	620	0.954	1,538,710	1

RO	750	262	1,234	8.437	6,837,115	38
SK	172	71	1,204	1.189	987,542	
HR	137.5	23	1,174	0.465	396,082	

**) Column 5 vessel performance (km) = freight transport performance (column 4)/average ton (column 3);*

***) PAX: passenger transport vessels*

Source: ETIS, Performance freight transport 2011, EICB, Eurostat, IVR 2013

For example, in the case of the Netherlands, the combination between network length, number and average size of vessels and transport performance offers a relatively high potential benefit resulting from the implementation of RIS, for the public as well as the private sector. In particular, the savings on fuel consumption due to a larger average vessel size and large transport performance and/or vessel performance (vessel kilometres) are much greater than average. For example, in case of 1-2% savings on yearly fuel costs of between 200,000 and 300,000 euro, the benefits will outweigh the yearly investment in equipment, even in case advanced RIS equipment is purchased (2,359 euro)[157].In countries with a smaller level of annual fuel cost expenditure (e.g. because of smaller average vessel size and/or a smaller vessel performance) the benefits may not outweigh the investments by private parties in RIS equipment. Table 9.11 contains indicators that should be considered, but as such the information is not sufficient to make country specific calculations.

Assessment of the evaluator[158]

- Between 2006 and 2011, the use of key RIS technologies was not realised to the full extent. Only at the end of the period AIS and ECDIS uptake of users reached high levels for the EU as a whole. On the shore side, important steps were taken in the facilitation of the use of key RIS technologies, but this did not yet result in the supply of a wide range of RIS services. For this reason, in the period 2006-2011 estimations indicate that the investments might outweigh the benefits that have been realised during this period (see table 9.10);
- The systematic use of RIS services by authorities for a number of key policy areas (lock management, traffic management, customs, port dues, statistics) is presently still in an early stage. It should be noted that this type of use also depends on the extent of the use of RIS technologies of private parties, which only in the past two years reached a very high level. So the delay is not really surprising given the long duration of the market penetration of key RIS technologies;
- Despite the fact that RIS implementation did not take place to the full extent, some benefits have been realised, albeit on a relatively modest scale. It has been shown that on average the benefits of skippers and barge operators using the key RIS technologies are currently not likely to outweigh the costs of purchasing the required equipment, software and data as well. Depending on specific situations, however, in which fuel consumption is high, the level of benefits can presently already be higher than the level of cost. In the long run the average benefits will have to be higher than the cost, otherwise the use of the on-board equipment is not sustainable;

[157] This can be roughly calculated as follows: take the sum of the fuel savings (percentage* fuel cost) with the safety savings form table 9.10 divided by the total number of vessels (2.7 million/ 10880) this should be higher than 871 euro resp. 2359 euro

[158] Evaluation question 1: What is the contribution of RIS to the overall EU transport policy objectives and to what extent are the objectives of RIS appropriate regarding the needs of the market/public administrations and the problems the intervention is meant to solve? In view of the objectives of the EU Transport policy White Paper, is there a need to realign the RIS policy objectives and if yes in which way?
Evaluation question 17: To which extent have *RIS policy objectives been achieved*? Have positive/negative *spill-overs* onto other economic, social or environmental policy areas been maximised/minimised?

- The analysis and estimates show that the RIS implementation in 2011 positively contributed to safety and the environment, although the size of these contributions is still far below expectations. Because of the long-winding roll-out of key RIS technologies and services the contribution to overall EU transport policy objectives could be much improved by speeding-up the implementation. Generally the IWT market parties expect that RIS technologies and services have the potential to realise future benefits to them. This is amongst others demonstrated by the investments of skippers and barge operators in on board equipment in the past years. Therefore, there is no need to realign the RIS policy objectives;
- The main benefits of skippers and barge operators are the reduction of fuel consumption and improvement of the safety level. The benefits that have been realised with regard to the reduction of fuel consumption were caused by the use of AIS. This function allows skippers to optimize their manoeuvring on a short time scale, in situations where the fairway is also shared with other vessels. The use of AIS has also led to an improved level of safety. Since the overall impacts in terms of total voyage cost reduction were small, a significant effect on pricing and (consequently) modal shift is estimated to be very modest and could not be found;
- It has been shown that on average the benefits of skippers and barge operators, using the key RIS technologies, currently are likely not to outweigh the costs of purchasing the required equipment, software and data. In order to outweigh the yearly private investments, the level of efficiency gains with regards to fuel consumption that was estimated for the year 2011 (the last year of the time period considered in this chapter) will in the future have to increase by a factor 2. In order to also fully cover for the government investments, the gains will also have to increase by a factor of at least 2. However, in the future one may expect that benefits from other sources that are at present not yet beneficial (e.g. reduction in waiting times for terminals) will contribute to the efficiency gains, as well;
- An increase of the fuel consumption efficiency gains is possible when RIS services are further developed that also allow for an optimized trip planning. Minimizing waiting time would enable skippers and barge operators to reduce vessel speed over a longer trajectory, thus enabling the realisation of far greater benefits.

9.2 Comparison of identified impacts with ex ante evaluation studies and their obstacles

Input to the assessment

Various attempts have been made to estimate the impacts of RIS. The most important and extensive one was an in-depth study of via donau, published in 2006 in the framework of the project SPIN-TN[159]. Another study in this respect was Compris (2006)[160]. Compris performed a cost-benefit analysis for private stakeholders, as well as authorities.

The SPIN study builds on the results of the following projects:

- INDRIS: a framework for cost/benefit analysis with example data;
- INCARNATION: among others determination of effects of RIS on safety;
- CBA/RIS in the Netherlands (AVV);
- DoRIS: costs and benefits for RIS operators;
- ALSO Danube: the socio-economic impacts of RIS.

The SPIN approach is fairly comprehensive and transparent regarding modelling and

[159] "Assessment of the Implementation of River Information Services in Europe (via donau 2006)". Document of SPIN-TN project (European Strategies to Promote Inland navigation).
[160] Report on socio-economic assessment of RIS, COMPRIS Deliverable 12.1, 2006. http://www.ris.eu/docs/File/386/compris_deliverable_12_1_socio_economic_assessment_final.pdf.

calculation methods. The study was applied to predict the impacts of the RIS implementation in 2005-2010 within a Cost-Benefit Analysis framework (CBA). The period 2005-2010 is a subset of the period which is also investigated in the present report.

The SPIN-study distinguished various types of effects depending on the type of effects that could be taken into account in the analysis model, which was developed. Due to a lack of statistical input data or due to a lack of information on the possible positive impacts of the RIS services in question, inclusion of various effects in the model was not possible. This does not mean that those effects could not be quantified as such, but simply that the means and data for quantification were not available. The following categories of benefits were identified, which could be included in the analysis model:

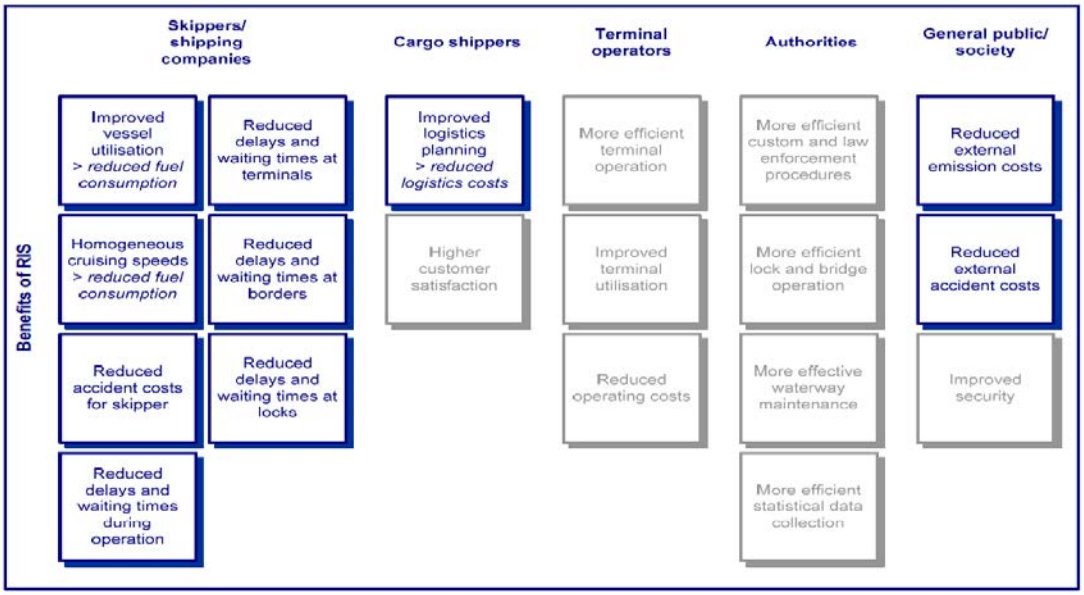
- Improved vessel utilisation;
- More homogeneous cruising speeds;
- Reduced delays and waiting times;
- Higher safety performance;
- Improved logistics planning for shippers.

The following categories of benefits were identified, which could ***not*** be included in the analysis model:

- More efficient custom and law enforcement procedures;
- More efficient lock and bridge operation;
- More effective waterway maintenance;
- More efficient statistical data collection;
- Improved efficiency at terminals;
- Improved security.

In figure 9.7 the various effects are presented and it is indicated which impacts could or could not be incorporated and it is also indicated to which (group of) user impacts are allocated.

Figure 9.7 Effects distinguished in the SPIN study (blue and gray squares indicate effects which could/could not be taken into account) in the SPIN CBA analysis



Source: report SPIN (2006)

Three scenarios were developed: a base scenario, a moderate scenario and an optimised

scenario, for planned initiatives in 2006-2010 quite high benefit/ cost ratios were found for the RIS investments, ranging from 3.0 (base scenario) until 7.4 (optimised scenario).

The base scenario was developed to establish a conservative reference scenario, in which the implementation of RIS is limited to some basic features in the first years until 2008 and consequently only brings small benefits to the daily operation of inland vessels in the first years. After 2008, RIS implementation brings down waiting times at terminals, locks and borders from 1% to 5%.

In the SPIN study, no gradual uptake by users was assumed. Benefits, which depend on the availability of AIS on a vessel are taken into account from the beginning of the evaluation period, in 2005.
In the SPIN study, the base scenario, starting from 2008, assumes a considerable contribution to the benefits as a result of a modal shift. Also in the COMPRIS study a modal shift is assumed of between 1% and 10%.
Although only a limited number of benefits could be taken into account in the analysis, the SPIN study results form a strong support that investments in RIS were very good value for money both for the society as well as for the industry. The same holds for the COMPRIS study. Compris concludes that the highest benefit/cost ratios exist for terminal operators and port managers. For skippers and barge operators, benefit/cost ratios are found that amount to 1.11, which is just feasible. External benefits, due to reduction of emission, accidents, are considerable.

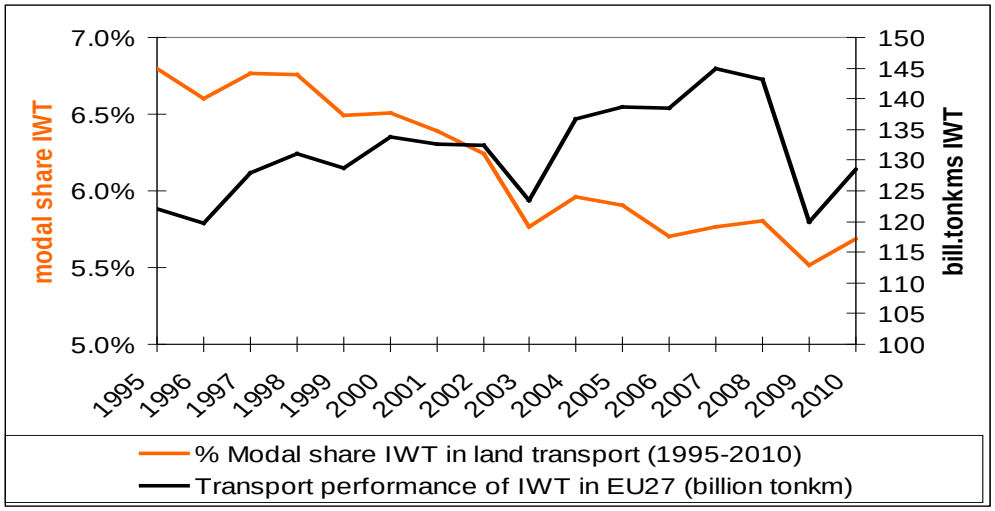
Assessment of the evaluator[161]

- The SPIN Benefit-Cost ratios that were reported for the three scenario variants in the SPIN report from 2006 are very high. In the "optimised variant" the estimated benefits are about 20-30% of the entire EU IWT annual industry turnover. Based on the size of investments planned, the RIS implementation could be considered as a structural change or a transition of the sector;
- In the COMPRIS study, the estimated benefits are considerable as well. The relatively small benefits for skippers and barge operators are more or less in line with the findings in 9.1 of this evaluation. However, Compris' starting point is an implementation level of RIS with more advanced functions with very high benefits for terminal operators and port managers. In fact, COMPRIS concludes that these actors enjoy the largest benefits. This is in contradiction with the current situation, where the services that are necessary for this, yet have to be implemented. It is the opinion of the evaluator that whenever such measures will be implemented also skippers and barge operators will share in the benefits, due to time savings and savings on fuel consumption. In that case, their benefit/cost ratio may be considerable greater than 1;
- There is no evidence, however, that large expected positive benefits for the society as a result of substantial investments in RIS in the period 2006-2012 have already been realised to a significant extent, as was expected by the SPIN and COMPRIS ex-ante studies held in 2006;
- Neither from experts and policymakers visited in Member States, nor from industry indicators (like modal split indicators, load rates of vessels, price level developments, vessel utilisation rates etc.[162]) was there much evidence for a structural change occurring around 2005/2006, setting IWT on a new growth path of industry development. On the contrary, an alarming observation is the decrease of the modal share of IWT compared

[161] Evaluation question 7: To which extent have the *benefits identified in ex-ante evaluation* work on RIS been realised? For areas (if any) identified where the benefits have not been realised, what have been the obstacles and how can they be overcome
[162] For modal shares see figure 9.8. In the periodic Market Observation Reports of CCNR time series of price levels in markets in Western Europe can be found, as well as figures on the utilisation rates of vessels. Latest report in September 2013: http://www.ccr-zkr.org.

to road and rail transport in the EU27 (see figure 9.8). It can be concluded that the overall performance in tonne kilometres increased in the decade before 2009 and in particular during the years with high economic growth (2004 – 2008). Besides transport price, a key aspect in the competition with road haulage is the quality of the service that is offered. The longer transit time of barge transport, compared to road haulage can be a barrier despite the cost savings that can be achieved. Another issue is reliability of price and quality. Events such as low water or blocked waterways are problematic for shippers;

Figure 9.8 Modal share and transport performance of IWT (btkm)



Source: Medium and long term perspectives in the European Union, CE Delft et al., 2011

- Some differences between the SPIN study estimates and the developments that were occurring in practice in the industry in 2005-2010 can be explained as follows. First, RIS implementation was spread over a longer period than originally anticipated in the SPIN study. Even in the Base Scenario, the SPIN study assumes benefits as a result of the development of applications that enable skippers and barge operators to reduce waiting time at terminals, locks and borders. However, to date, RIS implementation is still in the stage of offering basic information to skippers, such as AIS, ECDIS charts and Notices to Skippers. Therefore, the present RIS implementation status compares even unfavourable to the assumptions of the SPIN base scenario. This means that some of the benefits which were expected, and which depended on the full roll-out of the key RIS applications, will be realised in the next years when the RIS implementation will be complete. For another part, the expectations with regard to the effects of RIS implementation may have been overoptimistic. Time savings during voyages, which were expected as well, could not be measured;
- Current data concerning investments in RIS implementation show that the investments that were assumed to take place in the SPIN study were higher. Chapter 8 shows that only in 2013 the investment levels are reached that were expected in the SPIN calculations in 2010. The difference in investment level could concern (part of) the investments that are needed to develop RIS services that enable skippers and barge operators to reduce waiting time at terminals, locks and borders. If these RIS services would have been implemented during the period 2006-2011, far greater benefit would have been gained (see also the analysis of potential fuel consumption benefits in section

9.1). Further, it must be noted that the market environment has substantially changed since the financial and economic crisis in 2007/2008;

- The modal shift that was assumed in the SPIN study has not taken place during the period 2006-2011, as figure 9.8 points out. However, based on the evidence that has been presented in chapter 9.1, the evaluator is of the opinion that even when during 2006-2011 greater transport cost benefits would have been attained, the modal shift effects would have been relatively modest. For this reason, the evaluator considers the modal shift effects in the SPIN study, not realistic. Likewise, the assumed modal shift in COMPRIS seems not realistic.

- Also in the period before 2008, benefits are higher than estimated in section 9.1:
  - In the SPIN Base Scenario, external emission costs are seven times higher than the cost estimated in section 9.1;
  - Reduced accident costs (external costs and insurance costs) are in line with the findings in section 9.1;
  - Reduced costs for skippers and shippers outnumber the estimations made in section 9.1 by a factor 15.

Potential of RIS tools

The SPIN study was very influential and its sketch of RIS implementation as good value for money was quoted often in policy discussions. Based on the analyses of the impacts of RIS implementation in section 9.1 and the expected (ex-ante) impacts in section 9.2 the question is how much of the ex-ante benefits could still be realised in the future?

The following points should be considered:

- It was observed above that a number RIS services, in particular services aiming to improve the voyage planning of vessels are still to be developed. It was indicated that the current balance of costs and benefits could be reversed and become positive, if such services were rolled out;
- The present implementation of RIS technologies and services is still incomplete and could be improved upon. The positive impacts of RIS could, therefore, become much more substantial;
- Furthermore, even in the SPIN study a number of possible impacts were not processed/ taken into account in the ex-ante impact evaluation (see grey squares in figure 9.7).
- All these considerations point in the direction of a much better benefit/ cost ratio.
- However, it was also noted that SPIN ratios ranging from 3.0- 7.4 are not to be expected since the high modal shift effects in SPIN are not realistic. So, although benefit/ cost ratios in this range are far too high, the present negative benefit cost ratios could become quickly positive, but at a much lower level the SPIN ratios.

Summarising the above, it is clear that the ex-ante evaluation work on RIS was much too optimistic about a) the size of the impacts of RIS and b) about the duration of the implementation period. So far the identified benefits in this work have only been realised to some extent. Although it is expected that the benefits will increase, they will not attain the very high level that was anticipated in those studies.

PART 4: CONCLUSIONS AND RECOMMENDATIONS

10 Conclusions of the evaluator

10.1 General conclusions

1. RIS has been a major development in the inland waterway industry. In the past years many public and private parties collaborated to define and implement standards and roll out the key RIS technologies in all EU 12+1 countries[163] for which the RIS Directive applies. This laid the foundation for more efficient, safe and environmentally friendly transport operations and therefore contributes clearly to the overall objectives of the transport policy of the EU.

2. Moreover, in addition to these aforementioned 12+1 countries, countries such as Serbia, Switzerland, Ukraine, Italy and Sweden, participated in the process as well. "River Information Services" became a key concept in IWT policy making widely beyond the EU and is now also on the policy agenda in China, India, Brazil, and the United States.

3. Major progress was achieved in the past years with regard to the implementation of key RIS technologies and RIS services, such as fairway information and Traffic information services. However, it can be concluded that elements such as the applications focussing on optimising logistic processes and modal integration, are still missing or not yet functioning. The present implementation of RIS Directive is still work in progress. This involves both the implementation of legislation, the implementation of technologies and the actual use of RIS technologies and services in practice. The implementation of legislation has progressed far but is still not complete; the implementation of technologies has progressed considerably but differs per technology and per corridor; the implementation of RIS services is still far removed from completion.

4. In addition, considerable differences exist between Member States in the progress with regards to RIS implementation. In some Member States (e.g. Netherlands, Austria, Belgium-Flanders, Hungary) and corridors (Rhine and Danube) the implementation has reached a high level while in other Member States (e.g. Poland) and corridors (e.g. East-West) the process is still less advanced. These differences between Member States more in particular concern: the legislation, the level of implementation, the technologies implemented as such and the level of quality of services

5. Differences between the EU 12+1 regarding the pace of the implementation process arose because of
   - Different timing of the process, e.g. depending on EU accession date,
   - Differences in the size of the industry and the way infrastructure management was organised, e.g. the role of seaports, regions, inland ports
   - Differences in the availability of resources.

6. RIS implementation has taken much more time than foreseen in the Directive. In 2005/2006 it was expected that by 2010 the roll out would be close to completion. In reality, this time period has not been sufficient and the implementation faces some bottlenecks such as the (international) exchange of data and issues regarding protection of privacy.

[163] RO, BG, HU, SK, PL, CZ, AT, DE, NL, BE, LU, FR and HR

7. Because of differences in the pace of implementation between the Member States and differences in the pace of implementation in corridors, presently, one still has to operate in the IWT industry with key RIS technologies not fully deployed and with RIS services not implemented. Therefore, the benefits that were expected from the harmonisation of those services have not been realised. Part of these benefits may be realised when the deployment will increase.

10.2 Specific conclusions

10.2.1 Implementation of RIS legislation

Overview of the implementation

1. In all EU 12+1 countries the RIS Directive has been fully transposed into national legislation. However, only in the Netherlands, Hungary, Germany and Romania managed to do this within the time window that was stated in the Directive. Further, Croatia was is in 2007 not a Member State of the EU and therefore not subject to the same time window as other Member States. Croatia has been a Member State since 1st July 2013. But since Croatia had no objections to the legislation, it had already passed the Directive in its national legislation.

2. It was found that Czech Republic and Bulgaria have not fully implemented AIS yet. France, Belgium/Wallonia and Germany, do not always exchange data with shore based facilities. All the other countries meet the specifications of the AIS regulation, including the data exchange with shore based stations. Furthermore, in the implementation of AIS two types of additions to the regulation were observed:
   - *Purpose limitation of the use of AIS data*: the Dutch authorities concluded in an agreement with the Dutch inland shipping sector that the use of data by authorities was limited to specific purposes;
   - *Making the AIS/ transponder obligatory*: this happened in Austria, Hungary and the port of Antwerp and is planned by the CCNR for December 2014.

3. Since the regulation was published in September 2013, Member States are not yet required to fully implement the ECDIS regulation and to comply with its requirements, however, in the past all Member States already developed to some extent ECDIS charts, even for waterways and ports lower than the required CEMT class Va.

4. In case that ship reporting in inland navigation is required by national or international law, then also the Member State needs to support electronic reporting. In the present IWT market ship reporting is not common but limited to certain operating areas and types of cargo. It is at present is only obligatory for the Netherlands, Belgium, Germany, France (only Rhine river in container transport), Luxembourg (Mosel), Austria (only dangerous cargo) and Slovakia.

5. Bulgaria and Poland are the only Member States not fulfilling all the requirements of the regulation for Notices Skippers. The ICEM message is not published in Belgium (all regions), France (French ports) and Luxembourg. The WRM message (Water depths) which is also obligatory, is not published in Belgium (all regions), France (French Ports). Thus there is a considerable non-compliance in the NtS publication.

Problems with the implementation

1. An important problem with the transposition of the Directive into national legislation is that protection of personal data has been implemented in different ways in the Member States.
   For reasons of protection of personal data, in the Netherlands and Germany the use of personal data is limited to very specific purposes and the skipper always remains the owner of the data. There was a concern that legal problems result from both the data collection within countries as well as in the international exchange of data. This is also a concern of businesses. In arrangements with the IWT industry (for example the arrangement between the IWT industry and the authorities) in the Netherlands on the purpose limitation of the use of AIS data was included in an agreement.

2. Article 9 on personal data of the RIS Directive leaves a lot of room for the Member States to implement their own data protection policies. This has led to different approaches on how to deal with international data exchange: some countries are willing to accept an agreement between countries in which is stated that data exchange will be possible with mutual respect of the national privacy legislation, while other countries feel that the need for a more thorough European legal basis is needed in order to be able to exchange data.

3. In most countries in the Danube corridor AIS data exchange between the neighbouring countries or with EU Position Information System was successfully technically tested in the past years. Also here data privacy and data ownership questions are a sensitive issue. However, after a long period of discussions, a practical solution was worked out to facilitate the data exchange between Danube riparian countries. In all other corridors cross-border data exchange is a problem as well and the Danube but practical solutions have not been found yet.

4. It is not efficient that Member States, regions or even ports increasingly consider taking action to make AIS mandatory. Austria and Hungary were the first countries which went beyond the strict requirements of the RIS Directive and made AIS mandatory. Currently, also on the Slovakian part of the Danube and Croatia partial requirements exist. CCNR has recently proposed this as well and Serbia also intends to introduce an AIS obligation following the AIS obligation in some seaports, as in the Port of Antwerp. The conditions of the obligatory regimes differ however, e.g. regarding the use of ECDIS (navigation or information mode). So, even if AIS obligation is increasingly applied, it is still unlikely that uniform application of AIS will emerge without an EU requirement to make AIS mandatory.

5. The absence of a regulation on ECDIS[164] and, more generally, the lack of agreement on quality standards for digital maps were also frequently mentioned in interviews with stakeholders as a factor causing delays in private sector investment (investments of system suppliers) as well as investments from the side of authorities. This problem has now been solved by the new regulation.

[164] At the 10th of September 2013 the regulation on ECDIS was adopted.

6. A more fundamental issue with digital maps is that, except for inland ECDIS, all RIS requirements in accordance with the RIS Directive, apply to Class IV waterways and higher. However, inland ECDIS map coverage is only necessary for class Va waterways and higher classes. This causes problems in some parts of the network, where ports or accessing waterways have a lower class and maps are of lesser quality or not available.

10.2.2 Implementation of RIS key technologies and services

AIS

1. AIS requires both on-board equipment and land-side supporting infrastructure. At the end of 2012 the coverage rates were 92%, 79%, 89%, and 43 % for the shore station services along the Rhine, Danube, North-South and East-West corridor respectively.

2. In Germany, Netherlands, Belgium almost a 100% of the active self-propelled fleet has installed on-board equipment. In France, this is about 55% in 2013. On the Danube 100% has installed equipment in Austria and Hungary. Lower percentages apply to other Danube riparian countries. On the Danube corridor as a whole the average rate of installation of on-board equipment is 60%.

3. Dutch skippers use the systems in 90% of the cases, while in 10% of the cases systems are switched off. It is not known whether or not this behaviour is typical for Dutch skippers or is more common among skippers in the EU. Applications work well and are easy to use by IWT personnel. The technology is generally accepted.

4. The acceptance of AIS is not unconditional. Skippers and barge operators have concerns about their privacy. Examples are the perceived illegal publication of vessel locations on the internet or the use of data by authorities, freight forwarders or shippers. The use of data by the latter parties is seen by organisation of skippers as particularly undesirable because it could possibly affect commercial transactions. Al use of position/ tracing or other vessel data without permission of the individual skipper is considered to be illegal by the organisations (this includes the use of website vessel tracking programs).

5. Localisation- and mobile communication services are key technologies which are presently also available in smart phones and tablets. This new technology has considerable advantages in comparison to AIS. It costs less, is integrated in the Internet, is more flexible with regard to privacy and the technology is widely used on-board of many IWT-vessels. Irrespective of these benefits, there are also important reasons to keep using AIS in the near future:
   - It is embedded in the existing institutional framework (the industry has grown accustomed to AIS and adapted business processes. The exit costs of switching to other technologies may be high);
   - It is integrated with RADAR systems and Inland ECDIS;
   - It is integrated with AIS in maritime transport;
   - The coverage of AIS on the IWW is better than with Wi-Fi (in ports or resting; places) or 3G communication networks;
   - AIS is a self-organising system that can operate without shore connections.

   AIS may, however, be reduced to is core function as a nautical system only. But other scenarios are also possible. E.g. in the medium term mobile technology may

be integrated might also be integrated with AIS or with RADAR, Inland ECDIS and maritime AIS.

Inland ECDIS

1. Inland ECDIS coverage of the waterway network is currently 89% along the Rhine corridor, 88% along the Danube corridor, 82% along the North-South corridor and 60% along the East-West corridor. Coverage is not yet complete, and blank spots still exist. Often in practical applications these spots are filled with non-ENC maps of the suppliers.

2. Inland ECDIS provides as one of the key RIS technologies the information basis for other RIS applications. AIS data and standardised Notices to Skippers are often displayed on the maps and used for correction of planning and/ or loading.

3. Inland ECDIS is widely used in the industry in practice as well. Often Inland ECDIS is used in combination with AIS and Radar systems and/or is used as a background for the display of Nts. On the Rhine 76% of the vessels use Inland ECDIS, but only about 15% use the maps in navigation mode, which is considerably more expensive165.

4. An important problem with the current supply of maps is the significant difference in quality of the maps (reliability, maintenance, update frequencies) and the absence of quality standards. Different versions and different quality levels of maps were often used in the same corridors. This problem is expected to diminish significantly by the recently published regulation on ECDIS. But the regulation will not completely solve the problem, because natural circumstances (like floodings) also determine the value and quality of maps. They can quickly become outdated. Only maps which can be updated in real-time could theoretically sustain a high level of quality. Keeping maps “alive” in IWT is however much more difficult than in road transport because it requires a minimally sufficient number of fairway measurements each day, which is only feasible in certain stretches of the network, such as traffic between ARA-ports, lower-Rhine etcetera. But the earlier mentioned problems with changing riverbeds are most needed in the Danube and East-West corridors where traffic intensity is limited compared to waterways in Western Europe.

1. There are notable differences between the application of digital mapping in inland waterways networks/ IWT and road transport:

   - the costs of creating digital maps are high and the market in IWT for these maps is limited;
   - in road transport, digital mapping is a privatized market;
   - There is no full coverage of the IWT waterway network while in road transport each street is covered;
   - Locations and characteristics of riverbeds can be so variable that maps can become quickly outdated. Also after flooding, maps can become outdated.

[165] The 76% and 15% market share were mentioned in section 3.4. For the price differences between advanced and basic versions of systems (a.o bassed on the use navigation or information mode) see chapter 9 (on=board equipment cost)

ERI

1. ERI stands for Electronic Reporting International. A number of countries have implemented the ERINOT[166] message, often using BICS[167], an electronic web-based reporting system. The actual use of ERINOT is not widespread. This makes that ERI is the only one of four key RIS technologies that is not yet widely used by the IWT industry.

2. The use of ERINOT is compulsory since January 2010 on the Rhine for container ships with more than 20 containers on board or for ships transporting containers with dangerous substances. Monitoring on the Rhine shows that about 45% of vessels use ERI applications.

3. Of the three types of standardised messages (ERINOT/ERIRSP[168], PAXLST,[169] BERMAN[170]) which are defined in the RIS legislation, the last two are not mandatory in all EU 12+1 countries. The BERMAN message type is not used at all, and PAXLST is only used by a small group of operators in the Netherlands[171] and Hungary. Only the Netherlands technically support all three message types, although the BERMAN message type is not actually used in practice. The fact that the last two messages are not mandatory of course largely explains why they are not used.

4. ERI is considered not attractive enough to IWT operators in the current market. This is strange because ERI is one of the technologies which could provide high benefits to the industry. Although reporting requirements in IWT are relatively modest compared to other modes, avoiding duplication of reporting by means of "single windows" provides efficiency benefits. The uptake is however hampered by factors on the side of authorities: problems with international data-exchange between countries, the refusal to exempt operators from existing old reporting requirements in paper-format (or via VHf) or simply not being able to process messages in parts of corridor because they are still not implemented in countries, regions or ports.

5. The international exchange of messages is not yet possible due to technical, organisational and political bottlenecks.

6. The reporting requirements in IWT are not uniform across the EU and sometimes differ even across countries or regions in the same corridor/ operating area (e.g. North-South corridor or Danube)[172].A more uniform business environment would be attractive for companies that have to work in cross-border transport. A critical investigation of the reporting requirements aiming to create a uniform structure for the EU would be desirable. Possibly an extension of the maritime reporting framework to IWT could be is realised. Such an extension should be considered seriously. There are of course some structural differences between maritime transport and IWT. Maritime transport warrants a more stringent control and reporting than IWT. Therefore, IWT could be exempted from certain reporting requirements and/or subjected to a "lighter" reporting regime. Such exemptions are already included in the Reporting Formalities Directive. In such a market environment framework ERI would become an even much more powerful tool.

[166] ERI NOTification message.
[167] Barge Information and Communication System
[168] ERI ReSPonse message (this is the receipt confirmation message of the ERINOT message).
[169] Passenger List message.
[170] BERth MANagement message.
[171] These are large cruise operators which specialise in transport of disabled people.
[172] Differences between countries are sometimes related to differences between police regulations as was explained in chapter 5.

NtS

1. NtS stands for notices for Skippers. While special reports on sailing conditions and fairways in the form of publically broadcasted messages are used by many skippers, only 40-55% of skippers actually use software applications on-board that can process such messages. In RIS NtS refers only to the latter type of messages which are communicated in an XML format.

2. The NtS service can be integrated with Inland ECDIS, so that skippers can immediately update voyage plans. The NtS can be provided by pull (e.g. user downloads information from internet) or push service (user receives an e-mail with the information)

3. The messages are available free of charge and, usually, available in various languages. Furthermore the national supplier of NtS often includes links to the websites of other national suppliers. The direct international exchange of the Nts between authorities across countries is, however, currently limited. The authorities using this standard can integrate NtS of other authorities and countries in their own services and this is done in all countries.

4. Many countries offer message services, but not all messages types are covered. Some countries do not include the non-mandatory but recommended weather report messages (WERM) because very good and detailed messages are already available by other suppliers, e.g. meteorological institutes. Apart from messages about water levels, ice etc., which are included as separate messages, the added value of IWT weather reporting is small. The ICE- and water level messages are not a duplication of the WEather Report Message. The first two messages specifically aim at providing information on sailing conditions and fairways while the Weather message is just a coded standard weather report and not specifically.

RIS SERVICES

1. Fairway Information Services (FIS) are widely available. Many of these RIS services are provided via Inland ECDIS, but also via NtS and AIS. Only FISs related to infrastructure charges and pleasure navigation are usually not provided by key RIS technology. This RIS service is implemented and provided in all Member States where the key RIS technologies have been implemented. FIS are also used in commercial applications like voyage planning systems.

2. For Traffic Information Services a distinction is made between tactical and strategic traffic information. Tactical traffic information is provided by AIS both for skippers and traffic managers on shore (if there are shore stations). So, this basic information service is directly provided by AIS. But Inland ECDIS and Nts contribute to the realisation of functions as well. For Strategic traffic information tools and additional data are typically used by infrastructure managers and are less relevant to skippers. They are implemented and also widely used in the IWT industry and by infrastructure managers.

3. The RIS service Traffic Management (TM) is primarily relevant for authorities. It contains a number of functions (lock and bridge management) for which RIS key technologies (in particular AIS) are certainly relevant, but currently only used in pilot projects. This RIS service is only partly provided.

4. Unfortunately, for all the remaining RIS Service groups: calamity abatement Support, information for transport/ logistics management, law enforcement, statistics, waterway charges and harbour services are not provided at present or are currently only in an exploratory phase or pilot study. There is only one exception in the group information for transport/ logistics management: Inland ECDIS, AIS and NtS contribute already to the subgroup Voyage planning. Although the present level of this contribution can be called basic (much more is possible) it can be assumed that the uptake of this is large since voyage planning is very important for skippers and fleet managers, and better information on the use of vessels is always useful for them.

5. So few of the list of RIS services are currently provided. Only basic information services are provided. The main reason for the low uptake of the RIS services, is that most of the services require a high uptake of the key technologies. Since this has only very recently been achieved (for some technologies at least), the diffusion process has still to begin.

10.2.3 Implementation of the organisation of RIS

1. The organisation of RIS is influenced by many factors, such as the size of the market and the size of the waterway network, the level of involvement of regional/local authorities, the cultural and legislative situation, the level of involvement of the private sector, the existing technologies, the specific costs and benefits on national levels and the interests of national stakeholders.

2. RIS implementation in the period 2006-2012 has primarily been a bottom-up process. The RIS co-ordinators at Member State level determined the activities and decided about the planning. International co-ordination was present but less emphasis was put on steering this process of RIS implementation. The IRIS Master Plan[173] makes clear that a bottom-up organisation of the RIS implementation was not the recommended approach. Nevertheless, from the national point of view the bottom-up approach was effective in building the foundation for the national RIS organisation and roll-out of key technologies. But the lack of international coordination created in the international market a business environment that was far from optimal with a number of bottlenecks in services and the use of technologies across borders. A more integrated and top down approach would have avoided this.

3. The advantage of the bottom-up approach was proximity to users and ability to quickly adapt to national/regional circumstances. This was important because in the first phase of the RIS-implementation, roll-out of hardware and basic software in the Member States was the most important activity in order to create the basis for RIS services. This basis was a necessary but clearly not sufficient condition for the development of services; there should have been more attention for the interests of customers (especially potential customers active in cross-border transport).

4. The disadvantage of the bottom-up approach was less emphasis on the coordination between Member States, in particular where it concerned cross border transport operation. The picture of a diverging process of implementation across countries and corridors emerged.

[173] The IRIS Master Plan for Implementation of River Information Services in Europe (Master Plan IRIS (2006). This project provided important recommendations for the RIS implementation until 2010.

5. The European RIS Committee gave significant leeway to expert groups and other parties or arrangements. These were River Commissions, bi- or multilateral arrangements between countries and the UNECE. In particular, as a supporting organisation, RIS Expert Groups (participants of the expert groups are international representatives of governmental bodies, branch organisations, research institutes, consultants and the industry) played a key role in the international coordination of the RIS implementation. The various Expert Group Meetings and contacts have been very important to the cross-border coordination. Also the role of CCNR was important here for coordination on the Rhine.

10.2.4 Financial resources

1. The Commission Decision C(2007)3512 of 23 July 2007 established a multi-annual work programme for the period 2007 - 2013 for grants in the field of the trans-European transport network, which includes River Information Services (RIS). For the TEN-T programming period 2007-2013, projects have been focusing on the deployment of enabling infrastructure and on the provision of River Information Services.

2. Following the TEN-T Calls in 2008, 2010 and 2011, RIS projects with a volume of approximately 100.5 million euro (TEN-T co-financing: 33.6 million euro i.e. 33.4 %) have been completed or are currently still on-going.

3. Within selected EU co-financed programs (TEN-T, Structural and Cohesion Funds, Instrument for Pre-Accession) and the current financial framework, the total project volume in the period 2006-2012 amounts to approx. 154 million euro, of which a total of approximately 76.5 million euro have been co-financed from the European Union. This is almost 50% of the total investment costs.

4. The estimate of 154 million euro presents not the total investment costs that were spent on RIS-related projects for European waterways until 2013, but merely provides only a lower boundary of these total costs. This is caused by the fact that RIS related activities/ projects in national budgets are often entangled with other activities/ project which are not RIS related. An indication of the size of the costs can be given for Germany, which has some earmarked RIS budgets. Germany hardly participated in RIS project but chose to self-finance activities. In the period of 2006-2012 the RIS related investments were about 20 million euro[174]. This will be significantly lower for Member States which are smaller than Germany and participate more intensively in EU supported projects.

5. Non EU co-funded national investments cannot be precisely determined as in national accounts many RIS-related investments are a part of other types of projects. However, while the total national RIS-related investments are unknown, it is estimated that the total investments that were related to RIS may well amount to at least 200 million euro. This also concerns partially RIS-related projects and preparatory RIS projects.

6. Taking into account key EU co-financed RIS-related projects in the period prior to 2006 an additional 22 million euro can be identified as being “RIS-related”.

[174] See Annex 4 country report Germany.

10.2.5 Impacts of RIS

1. There is no evidence that large expected positive benefits for the society as a result of substantial investments in RIS in the period 2006-2012 have already been realised to a significant extent. In ex-ante studies (SPIN, COMPRIS) carried out before the RIS deployment such benefits were found.

2. Partly this is caused by the fact that the RIS implementation duration itself was considerably longer than expected. This means that some of the benefits which were expected, and which depended on the full roll-out of the key RIS services, will be realised in the next years when the RIS implementation will have progressed further. Partly, the expectations with regard to the effects of RIS implementation may have been overoptimistic.

3. In particular the systematic use of RIS applications by authorities for a number of key policy areas (lock management, traffic management, customs, port dues, statistics), is presently still in an early stage. This type of use amongst others depends on the extent of the use of key RIS technologies of private parties, which only in the past two years reached a very high level.

4. It has been shown that on average the benefits of skippers and barge operators, using the key RIS technologies, are lower than the costs of purchasing the required equipment, software and data. The main benefits of skippers and barge operators currently experience are a reduction of fuel consumption and improvement of the safety level. Time savings during voyages, which were expected as well, could not be measured. Finally, since the overall impacts in terms of total voyage cost reduction were small, and the price elasticities are small as well, a significant effect on pricing and on modal shift could not be found either. Please note, however, that in general the relation between freight rates and modal shift is weak.

11 Recommendations

11.1 RIS policy objectives and barriers to address

- **Completion of RIS Implementation:** The most urgent activity that should be taken up in 2014-2020 is the improving/speeding up of the current RIS-implementation. The present RIS implementation in the EU is still incomplete and need to be completed.[175] The RIS systems affecting the business environment of IWT operators will have to be harmonised, at least on the level of the corridors corresponding to the IWT operating areas distinguished in chapter 3. This will allow the IWT industry to benefit more from scale effects. Furthermore, increased supply chain visibility, security, safety and efficiency will make supply chains with IWT more attractive for shippers and forwarders and also increase the size of the market for suppliers of applications using RIS technologies. The first priority is the improvement of the implementation of key RIS technologies in order to enable cross border transport operations using RIS, since cross border transport is a major part of the overall transport performance by IWT. This activity will therefore help to increase the efficiency of the present RIS implementation.

  Attention of Quick Wins: The lack of harmonisation of the RIS for the IWT industry is in some cases caused by temporary factors, like shortages of financial resources in some regions, the late timing of activities, incidental delays or lack of manpower or expertise[176].

  Improve political and organisational consensus on EU level: The lack of harmonisation could also be caused by factors that are more difficult to remove. Such factors often are bottlenecks of a cultural, political and/or organisational nature. For example, the sensitivity of the population in a particular country for the protection of privacy can differ across countries. This can furthermore be the basis of a more or less stringent policy with in this field. Other examples are: market differences in the way the IWT infrastructure is managed (e.g. more or less central), more formal or less formal business culture in countries etc.

  When cross-border transport is affected the removal may require consensus between countries involved, River commissions, and the EC at the political level as well. Two subjects that were identified in this category are:

  - *The objectives and purposes of RIS* should be formulated more clearly and comprehensively. It should, for example, be more clearly stated for which purposes RIS can be used and for which not. The formulation in the RIS Directive leaves much room for different ways of interpretation by Member States and other stakeholders. Lack of consensus between Member States is at the core of some of the difficult implementation problems. A clear example is the barriers that were frequently encountered with data exchange between countries, concerns regarding privacy etc.);
  - The need for more agreement on the *role of authorities* and the private sector and the boundary between these. For example, should the private sector be involved in digital mapping, digital networks or the supply of fairway information? Should authorities be involved in tracking and tracing and in provision of services in supply chains and logistics? There are different opinions on this in different countries, and different opinions on this between RIS stakeholders (e.g. between skippers and infrastructure managers). Clarity is needed on the requested actions and contributions from the private

[175] See chapter 6.2 on the uptake, chapter 5 on the legal implementation and chapter 9 on impacts
[176] These and other factors are mentioned and discussed in action 7.1, which is based on Country Reports (see Annex 4)

industry (e.g. technology/service suppliers), in order to create a large market for the private industry and to enable investments on EU level from larger private companies that are interested in providing services.

- **Develop services with clear benefits for users and society:** The current RIS is predominantly oriented towards (various tasks of) infrastructure management and (nautical) safety. In comparison the economic performance of the inland waterways industry, the contribution of RIS to the quality of services and the integration of IWT in logistics is not significant yet. As was made clear from the evaluation of impacts (see chapter 9), there is however a clear potential to strengthen the position of IWT and to reduce external costs as well (e.g. fuel cost savings provide a win-win situation for private but also for public parties). In the period 2014-2020 RIS applications for business and logistics should be more central, as the basic components are now are available due to the implementation of RIS key technologies.

11.2 RIS legislation

1. **More uniform interpretation of RIS objectives:** Proposed changes of the legal framework as a consequence of actions that were taken to speed up the present RIS-implementation (see 11.1 previous points). The outcome of the political discussions, as suggested in 11.1, may indicate the need to adapt the legal framework (e.g. by adaptation of the RIS Directive).

2. **Address regular legal adaptations**: a framework should be made for regular adaption of RIS legislation (up-dating of standards and other necessary amendments etc.)

3. **A number of specific adaptations.** Based on findings from workshops and interviews with experts the following specific adaptations are proposed [177]:
   - Proposals stemming from the revision of the Directive on ship reporting Formalities (2002/06/EC). A possible extension of this Directive to IWT is studied and this may concern Electronic reporting;
   - Making the RIS index a standard and obligatory (adaptation of the Annex I of Directive 2005/44/EC);
   - Inclusion of the obligation of Member States to send data to the European Hull database in ERI regulation;
   - Adaptation of NtS regulation for international data exchange.

11.3 Technologies and services

1. **Focus on implementation of RIS key technologies:** Improving the present RIS implementation should have the highest priority. This implies that in 2014-2020, the implementation of key RIS technologies and supporting applications and databases and the maintenance and up-dating of standards will continue to be the most important activities in the period.

2. **Growing attention for quality and service definitions:** A promising, new field of activities is the defining and working out quality and service level definitions and standards. This could be standards for both RIS key technologies and RIS services, and build on the work done in the IRIS II project.

[177] See also expert paper 'RIS in Multi-Annual Financing Framework 2014-2020, page 8.

3. **Take into account ICT innovations:** The current RIS concept and RIS services were originally conceived in the period prior to the explosive use of smart phones and mobile internet applications in general. Mobile internet, social networks in particular, the expected innovations in internet itself (WEB 2.0) and GALILEO are some of the new basic technologies which will define the technological environment for RIS in the next decade and need to be taken into account. It is not expected that the key functions of RIS, and many of the standards, as included in the present RIS specifications need not be significantly re-examined. But it is quite likely that new types of applications might emerge on the market and properties of existing applications might change and be enhanced. It is also possible that new key RIS technologies will have to be added to the existing ones. It is therefore important to keep monitoring these developments and be prepared to revise and update standards to the changes in technology.

4. **Open standards allowing large numbers of users (market volume):** Activities in the field of defining and adapting of standards for technologies should always keep in mind the relatively small size of the market for applications in IWT. Investments in specific innovations in the IWT market will therefore always be limited and real innovations will often have to come from other industries. Therefore standards should preferably be chosen in such a way that the supply side of the market is as broad as possible. Niche markets for suppliers and monopoly situations should always be avoided to keep prices of products and services low and the market for these as competitive as possible.

5. **Open standards to support integration of IWT in multimodal supply chains:** The same argument also supports looking for a close integration with other modes of transport. There is of course already a close integration of applications, in particular AIS and ECDIS, with similar applications used in maritime transport, but one could also look for integration with applications used in road- and rail freight transport. It is clear that seeking this type of integration is not only positive for purchasing information technology applications, but is also interesting from the perspective of marketing IWT services to shippers or other supply chain organisers.

6. **Address possible market entry barriers:** It is remarked that the RIS environment as such (detailed specifications, supplier and hardware certification) can be a barrier for the rapid uptake of new technologies, since this raises the entry cost for possible new entrants (in the market of system suppliers). So, what is on the one hand an important advantage for the IWT market (a high level of interoperability through stringent specifications) could also be a disadvantage in another respect (barrier to the entry of new suppliers). The barrier for new players to enter the market shall be as low as possible in order to facilitate development and uptake of innovations, keep the market competitive and prices of products affordable for IWT operators across Europe.

7. **Explore and support promising applications:** Although, as it has been said, the main focus should be put on improving the current implementation of RIS and the current technologies which are in use, various types of new applications are promising[178]. At least in four fields, it is recommended to further investigate the prospects and test their feasibility:
   - *RIS for enforcement of sailing and resting times:* A field that has been identified already in the formation of the early RIS concept is the use if the RIS

[178] See also the RIS Strategy document by CCNR Annex 3 on possible measures for the future, http://www.ccr-zkr.org/files/documents/ris/ris_strategie_strat_nl.pdf.

environment and functions for enforcement of sailing and resting times. The electronic registration of voyage times and working hours, combined with the ability of the authorities to track and trace ship movements, would make checks more efficient and expand these. In practice many companies find it difficult to work with the present regulations on resting and sailing times. They doubt the possibility of a proper enforcement of the legislation and it is believed that non-compliance in practice is fairly widespread. Companies that strictly adhere to the rules feel that companies which do not, and which are prepared to take risks of being caught out, are unfair competitors. New technologies may offer new opportunities for more transparent and effective enforcement of legislation and may also reduce administrative cost. One may think for instance of registration of the times "on distance", and using smart cards to "check- in" and "check out" individual crew members on board of vessels. This possible use of RIS should of course respect the ownership of voyage and vessel related data of skippers and barge operators. Furthermore, it should be applied with caution and should not risk diminishing the acceptance of RIS technologies which would make it counterproductive.

- *RIS for payment of services:* Another field is the integration in RIS of electronic payment systems technologies. At present a new generation of those systems integrated with mobile telephones will spread through the market. The payment of port dues, services in ports (e.g. for bunkering or the use of electricity) will be much more convenient when using a payment card or a mobile phone app. But one could also use such systems for the purpose of payment of port dues and tolling.
- *RIS for optimising payload and reducing fuel consumption:* The on-voyage measurement of waterway depth data is another promising application. In many waterways, like the Rhine and Danube, more reliable information on the waterway depths is critical for improving the economic performance and utilisation rate of vessels. Currently there are on-going experiments on the Lower-Rhine to collect real-time high quality data by means of sensors installed in a large panel of vessels. These data are real-time collected and processed by means of detailed models on the shore that come-up with predictions of depths on voyages. This is a kind of crowd-sourcing application. First indications are that large vessels on the Rhine that such may indeed lead to a significant increase of load rates which increases efficiency of transport.
- *RIS for smart steaming and reliable ETA's:* As another example existing RIS applications and new applications might be used to introduce more pro-active support of the carrying out of voyages. A term used in this respect is "corridor management". In the most wide ranging variants one could, prior to starting a voyage, send a complete voyage plan to the corridor manager which reserves time slots with locks, resting-ports, terminals where cargo is loaded/ unloaded etc., and which subsequently (during the voyage) will monitor the adherence to the time-schedule of the voyage. The corridor manager acts as a kind of "buddy" of the skipper and the skipper can reduce waiting times and fuel costs during the journey. Of course this field of innovation will require a lot of organisational and cultural changes as well, since working in a scheduled business environment will considerably reduce the freedom of the skipper. E.g. it should be possible to make a reservation of time slots. One could also combine this with the payments systems innovation discussed above.

11.4 Governance

1. **High level political attention to common interpretation:** It is recommended to add to the current organisational structure around RIS Implementation more political steering at the European level under the umbrella of NAIADES II. The organisation of the RIS implementation in the past years was primarily a matter of Member States assisted by River commissions, PIANC, UNECE and Work group experts. It was mainly a process which was driven in a bottom-up way. The work groups received secretarial support from organisations like CCNR and EC projects (e.g. PLATINA). High level political attention is needed between EU and Member States to ensure the interoperability and common understanding of the desired role and function of RIS in the European transport system.

2. **Orientation towards interoperability and creating a common EU market for RIS applications:** The new organisation of the implementation will need to have another orientation. In 2014-2020 it is now important to consolidate the RIS and more particularly to look at their scope as well as their implementation at the critical sections of the inland navigation network. The existing structure may have been sufficient during the pioneering period in which RIS were initially being developed and implemented.

3. **Dedicated and longer term structure for technical support**: The maintenance of standards and organisation of the technical part of the work has been done on a project based funding which was effective and efficient in the set-up phase as it created flexibility. For longer term sustainability of the RIS resources, a more permanent solution is recommended. One of the options is to delegate technical support to a professional organisation. The role of this organisation would be to provide support (not maintain standards itself) to an international body (see next point: 11.4.4) in which all the Member States of the EU (who are affected by the RIS Directive) are involved with the same rights. Further, it could be considered to make the organisation responsible for:
   a) Organising the work and secretarial support to the various RIS Expert groups as well. The organisation of the content of the work remain a task of the expert groups;
   b) Organising/ supervising the maintenance and operation of the Hull database and the ERDMS (European RIS Reference Data Management System) which manages a number of reference data used within RIS (e.g. RIS index);
   c) Monitoring the progress of the RIS implementation.

   The organisation responsible for these tasks could be CCNR. However, options need to be compared and evaluated, for example with a possible role for EMSA (European Maritime Safety Agency) that also is involved in VTMIS[179].

4. **Establish a single body for coordination of work and RIS policy support:** At present, a number of players work on the same issues (in particular RIS standards) at an international level: UNECE, Danube Commission, CCNR, European Commission. Of these bodies, only the Danube Commission, CCNR and the European Commission have regulatory powers. In order to reduce bureaucracy and ensure proper resource utilisation, in particular of experts, who are too often called upon to participate in different working groups on similar or even identical subjects, it would seem desirable to establish a single body that will allow all institutional players to coordinate their work and develop common standards. In case the CCNR would be selected to provide

[179] Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system.

the technical support, CESTE (the new committee which will be installed for the maintenance of the technical directive and the Rhine Inspection Rules) could be used as this body. The terms of reference of CESTE must ensure that all affected countries are participating with the same rights.

11.5 RIS Financing 2014-2020

More attention for public private partnerships and enabling funding from private organisations and the IWT industry: The limited involvement of the industry in RIS projects, comes as no surprise, because the biggest part of funds which have been invested in RIS implementation in the past years consisted of funds that were either allocated to or owned by the infrastructure management authorities of countries. This is in particular true of the TEN-T allocated funds, which have a size and funding structure which is not attractive for IWT industry operators, shippers or IWT industry suppliers. The large size of the TEN-T projects and the substantial requirements regarding co-funding are not interesting for businesses which operate in a small scale market. In many projects of (national) authorities private companies are included (as a subcontractor or partner). However, generally the overall project design, the project objectives and agenda are closely linked to the core objectives of authorities. This is of course reasonable, because the authorities have to operate within their publically circumscribed tasks.

So, in order to let the private sector obtain a bigger amount of the funding of RIS related activities and to let them pursue their own ideas, and set their own agenda one has to change the parameters of the funding arrangements for RIS (or RIS-related) projects in their favour.

Annex 1 History of RIS

With its more than 30,000 km. of canals and rivers and a core network of 10,000 km. inland waterways transport in Europe offers huge possibilities for cargo transport. The European waterways connect the Netherlands, Belgium, France, Luxembourg, Germany, Austria, Slovakia, Poland, Czech Republic, Romania, Bulgaria, Hungary and Croatia within the EU and with Switzerland, Serbia, Moldova and Ukraine outside the EU.

However, freight transport on inland waterways only accounts for 6 % of the total land transport. Freight transport performance in the European Union is expected to grow 32 % by 2020 and 50 % by 2030. In order to continue to ensure sustainable mobility within Europe, optimisation of all transport modes in terms of environmental friendliness, safety and energy efficiency has to go hand-in-hand with a shift towards more environmentally-friendly modes and an intelligent combination of the different transport modes.

The European Commission recognised the great potential of inland navigation for freight transport in the new White Paper[180] of European Transport Policy. In order to optimise the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes, the White Paper of European Transport Policy set the following goal: 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors. To meet this goal will also require appropriate infrastructure to be developed.

European research has already played a very important role in the development of RIS in the past decades. Especially the EU research programmes (Framework programmes) financially supported together with EU Member States the early development of RIS. Already in 1994 the experts of the research project COST 326 started to analyse maritime ECDIS at international and European level. By investigating European ECDIS user requirements and the feasibility of linking national databases to European (or international) databases, the constraints on data supply, production and updating of ENCs were identified.

In the late 1990s several countries started working on information systems for inland shipping. However, their work was not coordinated and further continuation of these activities could have led to the implementation of different technologies in each country. European research has played an important role in harmonising these different RIS developments as the policy development went hand in hand with these European research projects. Demonstration and implementation activities within projects like INCARNATION, RINAC, INDRIS, COMPRIS and ALSO Danube have contributed to technology, organisation and policy and have helped to clear the obstacles to an effective realisation of RIS.

The concept of RIS was first introduced in the EU project INCARNATION in 1997/1998. Developed to promote IWT by improving traffic management and enhancing safety by providing skippers with a strategic information message. During the project it became clear that a better access to information was needed.

[180] WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport (EC, Brussels, 2011).

The project partners of RINAC recognised the importance of standardization of different types of information which led to the formation of European expert groups like the ECDIS expert group and the Tracking & Tracing expert group. The RIS concept was demonstrated successfully in the INDRIS project. One of the tasks INDRIS undertook was the drafting of the RIS guidelines. Within ALSO Danube: inland navigation was promoted and not only focused on the development of appropriate IT solutions, but also on ideas to create a friendly business environment for waterborne transport in managed intermodal logistics chains. COMPRIS dealt with the Pan-European standardisation of River Information Services, which is a pre-requisite for full installation of RIS on all navigable waterways.

In 1998 the European Union defines the concept of RIS to improve the reliability and availability of inland navigation. In 2001 the development of RIS is included in the EC White Paper “Transport Policy for 2010: time to decide”. The White Paper proposed shifting of cargo from the heavily loaded road network on to the waterways. By balancing the modal shares of transport systems, the existing infrastructure capacity can be fully used to accommodate future economic growth in the EU.

The basis of the PIANC RIS guidelines was the output of the earlier mentioned INDRIS project and these PIANC guidelines finally resulted in the RIS directive 2005. Increased competitiveness, optimised use of infrastructures, improved safety and security and an increased environmental protection and energy efficiency are seen as the major benefits of the implementation of RIS, Besides the RIS directive, also RIS standards have been published and are in force like the Notice to Skippers and Electronic Reporting.

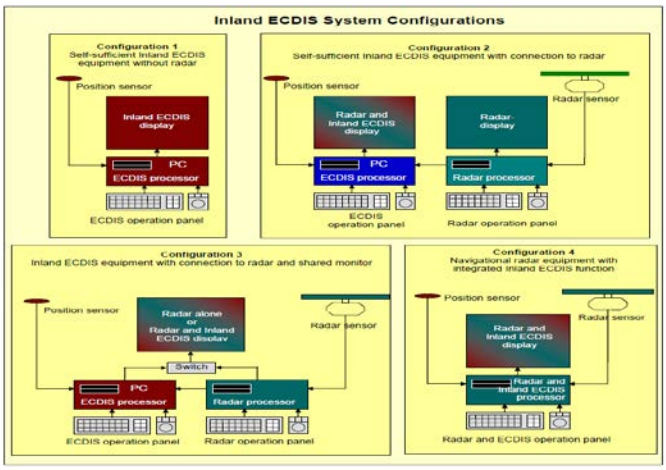
After publication of the RIS Directive, RIS project started in all European countries with connected inland waterways. The integration of RIS into the Multi-annual programme of the Trans-European Networks for Transport (TEN-T MAP) was another important step to facilitate the European RIS development. In this respect also the IRIS Masterplan, in which an outline was given of the process of RIS implantation was proposed, was very important.

Annex 2 Detailed technical background

Inland ECDIS

Inland ECDIS is the standard for ECDIS on inland shipping routes as established by the Central Commission for Navigation on the Rhine (CCNR), the Danube Commission (DC), the European Community (EC) and the United Nations Economic Commission for Europe (UN/ECE). The standard provides a uniform basis for the use of electronic inland navigation charts and for the use of applications like Inland AIS transponders or other methods of identifying, tracing and tracking of vessels on inland waterways. It contains the technical and operational requirements, testing methods and required test results for Inland ECDIS applications. Inland ECDIS uses the specifications of the maritime ECDIS and supplements them, but does not amend them.

Figure A2.1 various inland ECDIS system configurations



Source CCNR "Leaflet Inland ECDIS"

The standard includes four system configurations (see figure A2.1). In configuration 1, only operation in the information mode is possible. In configurations 2 and 3, the Inland ECDIS equipment extends the functions of radar equipment. These configurations can be operated in the information mode as well as in the navigation mode. In configuration 4, the functions of the Inland ECDIS are integrated into the radar equipment.

Electronic Ship Reporting

Electronic Ship Reporting consists of standardised electronic data exchange between skippers and waterway authorities (Ship to authority and authority to authority) concerning relevant cargo, traffic and transport information. At present four types of messages are incorporated within RIS:

- The ERI notification message (ERINOT);
- The ERI response message (ERIRSP);
- The Berth Management message (BERMAN);
- The Passenger / Crew List message (PAXLST).

The ERI notification message (ERINOT) must be used for the reporting of dangerous and non-dangerous cargo carried by inland waterway vessels. It is the message from the party responsible to report "dangerous" goods to the authority performing the control and checks on conformance with the legal requirements. The message is conveying information on the

"dangerous" goods being loaded, discharged and/ or in transit relating to a means of transport such as ships used for inland waterway transport. Where reporting is mandatory and if technically feasible, an ERI notification message is to be composed and sent to the competent authority for each inland waterway transport area.

Data to be included in the electronic report[181] are:

Compulsory data	*Optional*
Type of ship	Position and direction of voyage
Name of ship	Route, waypoints
European Number (ENI, OFS, IMO)	Displacement (at the request of the authorities)
Capacity	
Unloading port	
Information on goods and dangerous substances (UN number, name, class, classification, packaging group and quantity)	
Dangerous goods level	
Number of containers	
Number of person on board	
Type, length and with of torque link	
Length and width of vessel	
Load port	

The ERIRSP messages is a response message on the respective functions (new, modification or cancellation) of the ERI notification message ERINOT. The message can be used as an indication that the reporting message has been received by the competent authorities and as such also serves as a proof of receipt of the reporting message by the competent authority. The response on a modification or a cancellation contains information whether or not the modification or cancellation has been processed by the receiving system.

The Berth Management message (BERMAN) combines the pre-arrival notification respectively general declaration combined into one single notification. The message is sent by the vessel before arriving at or departing from a berth or a port giving particulars about the time of arrival, the services required and any particulars necessary to ensure prompt handling of procedures and facilitating controls.

The Passenger / Crew List message (PAXLST) permits the transfer of passenger/crew data. Where national privacy legislation permits, and with the agreement of all parties involved, the message may be exchanged between Captain/Skipper or Carrier (such as inland waterway operators) and Customs, Immigration, Police, ISPS Terminals or any designated authorities. The message can also be used to transfer passenger / crew data from a Customs, Immigration or other designated authority in the country of departure to the appropriate authorities in the country of arrival of the means of transport.

Vessel Tracking and Tracing (Inland AIS)

Inland AIS are vessel tracking and tracing services similar to maritime navigation. An automatic identification system (AIS) on board of inland vessels allows for vessel tracking and tracing on inland waterways. Through AIS transponders data concerning

[181] Electronic reporting: Frequently asked questions, Promotie Binnenvaart Vlaanderen

tactical traffic information can be broadcasted and received. It supports on-board navigation, shore-based traffic monitoring as part of Vessel Traffic Services (VTS) and other tasks such as calamity abatement. Inland AIS and maritime AIS are compatible. All data transmitted can be received by both maritime and Inland AIS devices to be visually displayed and analysed. However, specifically Inland AIS information is only transmitted and assessed by Inland AIS devices.

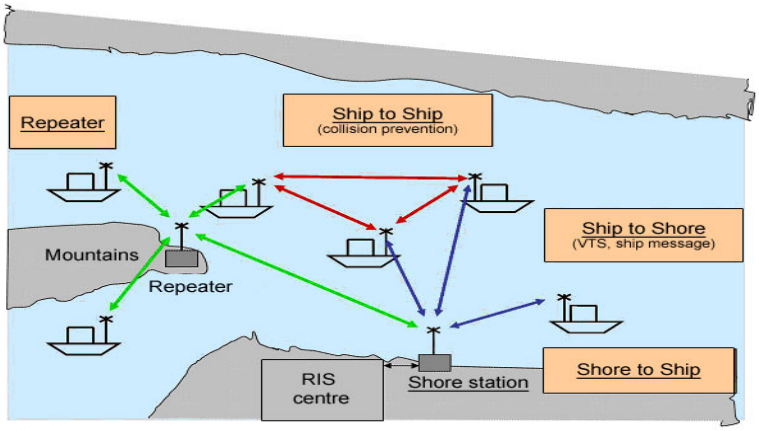
Vessels, equipped with AIS, transmit and receive information automatically on a periodical basis from other ships equipped with AIS. This information regards the vessel and its current nautical data:

- Identity of the ship;
- Its exact position;
- Its course and speed;
- Other ship-specific data.

AIS shore stations within VHF radio range can also receive these data and in turn broadcast navigation-related information to vessels.

AIS is an additional source for navigation-related information. AIS does not replace navigation-related services such as tracking by radar and VTS, but in fact supports them. The strength of AIS lies in the detection and tracking of those craft fitted with it. AIS and radar complement one another due to their different characteristics.

Figure A2.2 Information flows and communication AIS



Source CCNR "Leaflet AIS"

Notices to Skippers

Notices to Skippers are standardised messages for skippers containing fairway information and other weather/ environment related information allowing traffic management as well as voyage planning. They provide the facility to issue the following messages in a standardized format:

- Fairway and traffic related message means a notice, which provides information about a fairway section or an object.
- Water level related message means a notice, which provides information on the water level, the least sounded depth, the vertical clearance, the barrage status, the discharge, the regime, the predicted water level, the least sounded predicted depth or the predicted discharge.
- Ice message means a notice, which provides information on the ice situation.

- Weather related message means a notice, which provides information on the weather situation. (The states are not required to provide weather data.)

The international Standard for Notices to Skippers provides a standardized data format, which can be used for publishing notices to skippers on the internet (pull-services) or for distribution by e-mail (push services). The content of the messages is encoded in an XML-file. This file can be used by software applications like voyage planning or Inland ECDIS applications on board of a vessel or by internet sites.

International RIS developments: inspiration from China

Probably the most interesting country outside the EU to look at for RIS implementation is the People's Republic of China. The volumes transported on the Chinese waterways (1.3 billion tonnes annually on the Yangtze River), the fact that large volumes of dangerous cargoes in solid (e.g. fireworks and chemicals) and liquids (chemicals, POL) are transported on the waterways, combined with the capacity problems experienced in ship-locks (e.g. in the Three Gorges area and the Grand Canal), have led to urgent needs for River Information services.

As a good Chinese practice, lessons are learned from other areas in the first stage of development, notably from the European Union, where the Netherlands Rijkswaterstaat and the Austrian via donau have supported the Chinese authorities. A second good Chinese practice is to adopt the best practices, but adapt them to the local situation and change them where needed. As a result a 'RIS Chinese style' is under development.

For the major waterways such as the Yangtze River, there is a central River Administration of Navigational Affairs in charge of the management of the waterways. Next there is the Maritime Safety Administration, and both bodies are under the Ministry of Transport. This makes information exchange and harmonisation in principle relatively easy. However, many individual systems have been developed in the past that are scattered over China. The Chinese government and the shipping companies have recognized this problem and have started an integration process. This development of harmonised River Information Services is relatively new to China, and many present RIS services cover only parts of the fairway system, focusing at demonstration areas at Yichang, Three Georges, Chongqing and the lower reaches of the Yangtze River close to the major seaports. In the Three Gorges Area for example the following elements have been implemented: Office Automation system, Three Gorges VTS system, CCTV monitoring system, GPS & Tracking system, Lock integrated management, Remote ship reporting system, website to public, lock planning optimization system, technical drawing management system, lock pilot navigation river bed information system. The lower reaches of the Yangtze River are considered as a sub-maritime waterway, and the construction standard of infrastructures and information development are strategically on the same level as the Shanghai maritime ports. This region has the most advanced systems and equipment on the Yangtze such as ENC, AIS, VTS, EDI, GPS systems. For the coming years a start will be made with Electronic Reporting for dangerous cargoes, inland AIS transponders, and voyage planning especially with the aim to simulate different lock planning systems based on accurate voyage plan data (source: information provided by the Waterborne Transportation Institute of MoT). One can state that developments on the major waterways follow the examples and practices of Europe.

Next to the organisations at national level, it is interesting to look at RIS applications on some smaller provincial waterways, as different solutions are implemented there.

Based on information supplied by the Chinese Academy of Transport Sciences, some interesting examples are given below:

- Use of the mobile phone apps, SMS and websites for real time information on waterborne public information service
- Rfid technology: some provinces have adopted the system of providing Rfid electronic tags to vessel operators, as a cheap alternative for AIS. This has to do with low cost and the reluctance of vessel owners to invest in transponders, combined with the fact that AIS data is always not accessible to the provincial authorities.
- Use of smart cards: in combination with Rfid, the smart cards provide information on cargo, vessel and crew. In every port the operator is obliged to report to the maritime safety administration office. The local MSA use the Ship Registration Management System, the Crew Management system and the Ship Dynamic Management Information System.
- Intelligent video analysis software: this is used for automatic detection, recognition and tracking of vessels and automatic detection of abnormal events about vessels and waterways:

Ship Detection

Abnormal Detection

Annex 3 List of stakeholders

The following stakeholders have been interviewed within the framework of the evaluation study:

The Netherlands

- RIS Authority/Rijkswaterstaat: Ivo ten Broeke, Jos van Splunder and Peter Oudenes
- Port of Rotterdam: Raymond Seignette
- Bureau Telematica: Henk van Laar

Belgium

Flemish government

- Department Mobility and Public Works – Mr. Pim Bonne

Walloon government

- Direction de la Promotion des Voies Navigables et de l'Intermodalité – Mr. Jean Louis Boutry
- Direction de la Promotion des Voies Navigables et de l'Intermodalité – Mr. Pascal Moens

Federal government FOD Mobiliteit

- Federal Public Service for Mobility and Transport – Mr. Benoit Adam –
- Federal Public Service for Mobility and Transport – Mr. Peter Claeyssens

Promotie Binnenvaart Vlaanderen

- Promotie Binnenvaart Vlaanderen – Mrs. Annick Javor

Infrastructure managers:

- NV De Scheepvaart – Mr. Jan Gillissen – RIS coördinator
- NV De Scheepvaart – Mr. Barthold Van Acker – RIS project leader
- NV Waterwegen & Zeekanaal – Mr. Piet Creemers – RIS project leader
- Port of Antwerp – Ms. Karen Van der Auwera – Consultant Ship management
- Port of Brussels – Mr. Luc Delprat – Harbour master
- Port of Ghent – Mr. Alexander Jacxsens – Junior Harbour master
- Port of Ghent – Mr. Hans Van Ootegem – ICT advisor
- Scheldt Radar network – Mr. Johan Raes – Chief administrator
- Scheldt Radar network – Mr. Rob Scipio – Chief administrator

Industry and company representatives:

- Tresco Engineering – Mr. Jo Jacobs

France

Government

- Voies Navigables de France – Mr. Alaric Blakeway
- Compagnie Nationale du Rhône (CNR) – Mr. Pierre-Emmanuel Pareau

Ports

- HAROPA ports – Mrs. Florence Perouas
- Port of Dunkirk – Mr. Frank Roth

Industry and company representatives

- CEMEX – Mr. Philippe Bellanger
- Compagnie Fluviale de Transport (CFT) – Mr. Steve Laybelie

Industry and company representatives

- CEMEX – Mr. Philippe Bellanger
- Compagnie Fluviale de Transport (CFT) – Mr. Steve Laybelie

Luxembourg

Ministère des Transports – Direction des transports aériens et fluviaux

- La service de la navigation – Mr. François Merten

Industry and company representatives

- Naviglobe – Mr. Daniel Bollaert – Manager
- Tanklux – Mr. David Bollaert – Manager

Austria

- Ministry of Transport, Supreme Shipping Agency - Mr. Vorderwinkler / Mr. Birklhuber
- via donau - Mr. Simon / Mr. Sattler
- Pro Danube/Austrian Public Ports - Mr. Steindl

Germany

- Federal Ministry of Transport, Building and Urban Development, Department Waterway Infrastructure Engineering - Mr. Korinth / Ms. Schaefer / Mr. Braunroth
- Federal Ministry of Transport, Building and Urban Development, Department International Inland navigation policy - Mr. Kaune
- Waterway and shipping Administration, Federal Traffic Technologies Centre - Ms. Boettcher
- Federal German Association of Inland Navigation - Mr. Rusche
- Federal German Association of Inland Ports - Mr. Kluge / Mr. Weiß

Czech Republic

- Ministry of Transport, Navigation Department - Mr. Dabrowski
- Waterways Directorate, Development Department - Mr. Bukovsky
- National Navigation Administration, Methodology of Navigation Surveillance Department - Mr. Fanta
- Czech Barge Union - Mr. Fojtu

Poland

- Ministry of Transport, Construction and Maritime Economy, Maritime Transport & Shipping Department - Mr. Chmielewski
- Inland navigation office Szczecin - Mr. Wos / Mr. Durajczyk

Slovakia:

- Ministry of Transport, Construction and Regional Development, Matej Vanicek:
- SPS, Slovakia, RIS provider: Stefan Chalupka - SPS

Hungary:

- National Ministry for Development, Shipping Department, Matics Imre
- National Shipping Authority, Kojnok Róbert
- RSOE-Rafael Róbert

Serbia

- Plovput, Ivan Mitrovic, Zoran Lukic

Croatia

- CRUP mr. Ivan Suker
- RGO mr. Damir Obad

Romania

- ITS Romania mr. Mihai Nicolescu
- Romanian Naval Authority Iulian Ichim –
- Romanian Naval Authority Ghiba Mihai Gheorghe
- Ministry of Transport: Monica Patrichi
- KDU – Marius Gamen

Bulgaria

- Bulgarian Ports Infrastructure Company mr. Stefan Dimitrov
- Bulgarian Ports Infrastructure Company Mr. Victor Atanassov

CCNR

- Raphaël Wisselmann, Pauli Gernot

PIANC

- Cas Willems

UN ECE

- mr. Vorderwinkler

Annex 4 Country reports

Published in a separate document: Country reports used for data collection Member States.

Annex 5 Logframe table

	Intervention logic	Objectively Verifiable Indicators / Indicators of Achievement	Sources of Verification	Assumptions and Risks	Text in report
Global Objective	Contribution of RIS to the White Paper and overall EU transport policy objectives: Optimizing the performance of multimodal transport chains Increasing the efficiency of transport and infrastructure use with information systems and market-based incentives	**Impact indicators**: Investments and operational costs of RIS equipment and services Fuel consumption due to fleet operations Service level of IWT Shift between transport modes Safety on IWW Emission of air pollutants due to fleet operations Climate change due to fleet operations	Ex ante evaluation studies compared to this current evaluation results	Assumption: RIS implementation should be fully realised (legally and technically) to fully profit of the benefits	Chapter 9 and 10
Intermediate Objectives	RIS directive objectives: enhancing: - Safety in IWT - Efficiency in IWT - Environmental friendliness in IWT - Facilitating interfaces with other transport modes	**Impact indicators:** Public and private investments in RIS and maintenance of on shore equipment Fuel savings due to implementation of RIS Reduction of waiting times for terminals, and bridges	EU and national (public and private) RIS budgets Results of the Dutch programme "Voortvarend	Risk: the difficulty is to disentangle changes in variables: which results can be directly explained by implementation of RIS? Availability of data which gives a clear insight in this issue is a risk.	Chapter 9

	Intervention logic	Objectively Verifiable Indicators / Indicators of Achievement	Sources of Verification	Assumptions and Risks	Text in report
		(Financial) benefits due to cost reduction Reduced accident rate on EU waterways Increased emergency response time Annual reduction of emissions	Besparen" Indicators of Ministries of Transport Studies on impact due to modal shift National (Accident) statistics IWT Information on fuel savings Interviews		
Specific Objectives	The benefits for infrastructure operators and IWT businesses (parties directly involved in RIS implementation) Effectiveness and efficiency of support measures for infrastructure, IWT, skippers and operators	**Result indicators** Public and private investments in RIS applications Reduced waiting times (hours) and costs (Euro) for locks, bridges and in ports for voyages for skippers Better vessel utilisation (tonnes cargo versus tonnes) and according to theoretical loading capacity	Interviews (fieldwork) Reports from the research literature Existing statistical IWT databases Cost- and vessel	Assumption: improved information should lead to improvements in voyage plans, vessel utilisation and also manifest itself in cost reduction.	Chapter 9

	Intervention logic	Objectively Verifiable Indicators/Indicators of Achievement	Sources of Verification	Assumptions and Risks	Text in report
		Reduction fuel consumption and costs (liters, Euro) More efficient lock and bridge operations for infrastructure managers Reduced water way maintenance costs (Euro) Expansion/ improvement of IWT statistics and cost reduction (euro) of existing data collection	exploitation models		
Operational Objectives	Timely legal and technical implementation of RIS Directive, guidelines and regulations including the setting-up of the organisation	**Output indicators:** Timely and correct implementation of RIS Directive in MSs (legal obligation fulfilled y/n) Implementation of technologies in Mss en per corridor (km network) and proper functioning of technologies: AIS: Number of ships using AIS (in relation to total fleet of MS) and availability of shorebased installations/km. of class IV and higher MSs; international information exchange possible NtS: FRM, ICEM, WRM and WERM available according to standards and webbased ECDIS: availability of charts per km. of	Interviews (fieldwork) with RIS experts per MS and a number of international experts Reports of EGs and PLATINA reports MS legislation transposing and implementing provisions of Directive	Indicators are only partly quantifiable and if so by 1-0 variables (e.g. if a technology is present or not in a country, corridor or waterway trajectory) Evaluation of the organisation is qualitative	Chapter 3,6 and 9

	Intervention logic	Objectively Verifiable Indicators / Indicators of Achievement	Sources of Verification	Assumptions and Risks	Text in report
		class V waterways MSs ERI: ERINOT (and ERIRSP) available including international data exchange (if electronic reporting is obliged in MS). RIS Index available (to what extent): are all objects, most important objects available in the national RIS Index including international data exchange with ERDMS? Hull Database: availability of national Hull Database and data exchange possible with European Hull Database Availability of all relevant data concerning navigation on IW by MSs			
Inputs	Financial, administrative and human resources used in the Implementation process	**Input indicators**: Project Cost EC funded projects (TEN-T and other RIS related projects) broken down in EC contribution Co-financing share Administrative costs (in Euro) for MS and the EC MS funded projects Administrative costs for operators and other stakeholders	Data from TEN-T agency and from countries involved in the projects. Data of EGs		Chapter 8

Annex 6 RIS services and functions

No.	RIS service *RIS sub-service* RIS function (Information Element)	Information level	Ship master	VTS operator	Lock/ bridge operator	Waterways authority	Terminal operator	Calamity Centre	Fleet manager	Cargo shipper	*NtS*	*ERI*	*VTT*	*ENC (IECDIS)*
FIS	**Fairway information service**													
FIS.1	Geography of the navigation area and their updates	FIS	X	X	X	X		X	X	X				X
FIS.2	Navigation aids and traffic signs	FIS	X	X	X	X		X					X	X
FIS.3	Water depths contours in the navigation channel	FIS	X	X	X	X	X	X		X				X
FIS.4	Long time obstructions in the fairway	FIS	X	X	X	X		X	X	X	X			X
FIS.5	Actual meteorological information	FIS	X	X		X		X			X		X	
FIS.6	Temporary obstructions in the fairway	FIS	X	X		X		X		X	X			
FIS.7	Present and future water levels at gauges	FIS	X	X		X		X	X	X	X		X	X
FIS.8	State of the rivers, canals, locks and bridges in the RIS area	FIS	X	X	X	X		X		X	X			(X)
FIS.9	Restrictions caused by flood and ice	FIS	X	X	X	X		X	X	X	X			
FIS.10	Malfunctions of aids to navigation	FIS	X	X		X					X			
FIS 11	Short term changes of lock and bridge operating times	FIS	X	X	X	X				X	X			
FIS 12	Short term changes of aids to navigation	FIS	X	X		X					X			
FIS.13	Regular lock and bridge operating times	FIS	X	X	X	X		X	X	X				X
FIS.14	Physical limitations on waterways, bridges and locks	FIS	X	X	X	X		X	X	X	X			X
FIS.15	Navigational rules and regulations	FIS	X	X	X	X		X	X		X			
FIS.16	Rates of waterway infrastructure charges	FIS	X			X			X	X				
FIS.17	Regulations and recommendations for pleasure navigation	FIS	(X)			X		X						

No.	RIS service *RIS sub-service* RIS function (Information Element)	Information level	Ship master	VTS operator	Lock/ bridge operator	Waterways authority	Terminal operator	Calamity Centre	Fleet manager	Cargo shipper	NtS	ERI	VTT	ENC (IECDIS)
TI	**Traffic information**													
TTI	***Tactical traffic information (short term related)***													
TTI.1	Presentation of own vessel's position	TTI	X		X								X	X
TTI.2	Presentation of other vessels´ positions	TTI	X	X									X	X
STI	***Strategic traffic information (medium and long term related)***													
STI.1	Presentation of fairway information (=FIS)	FIS	X			X		X	X					X
STI. 2	Presentation of vessel's positions in large surroundings	STI	X		X	X		X					X	X
STI.3	Medium and long term assessment of traffic situation	STI	X			X							X	X
STI.4	Presentation of vessel's characteristics	STI	X		X	X	X	X		X		X	X	(X)
STI.5	Presentation of cargo's characteristics	STI	X		X	X	X	X		X		X	(X)	
STI.6	Presentation of intended destination	STI	X	X	X	X	X	X	X	X		X	X	
STI.7	Presentation of information on incidents/accidents in the coverage area	STI	X	X		X		X			X	X	X	X

No.	RIS service *RIS sub-service* RIS function (Information Element)	Information level	Ship master	VTS operator	Lock/ bridge operator	Waterways authority	Terminal operator	Calamity Centre	Fleet manager	Cargo shipper	NtS	ERI	VTT	ENC (IECDIS)
TM	**Traffic management**													
VTS	***Vessel traffic services (local)***													
VTS.1	Presentation of vessel's positions in large scale	TTI		X									X	X
VTS.2	Monitoring of passing and manoeuvring arrangements	TTI		X									X	X
VTS.3	Short term assessment of traffic situation	TTI		X									X	X
VTS.4	Organisation and regulation of traffic flow in RIS coverage area	TTI		X									X	X
NS	***Navigational support***													
NS.1	Information to pilots (navigational support)	TTI	X	X									X	X
NS.2	Information to tug boats (nautical support)	STI	X										X	X
NS.3	Information to bunker boats, waste oil removal boats, vessel equipment firms (vessel support service)	STI	X						X				X	X
LBM	***Lock and bridge management***													
LBM.1	Lock/bridge operation													
LBM.1.1	Presentation of actual status of lock/bridge process	TTI	X		X								X	X
LBM.1.2	Presentation of short term planning of lock/bridge (ETAs / RTAs of vessels, waiting places, lock/bridge positions)	TTI	X	X	X							X	X	X
LBM.2	Lock/bridge planning													
LBM.2.1	Provision of ETAs of approaching vessels	STI			X							X		(X)
LBM.2.2	Provision of information on medium and long term schedule of lock/bridge process	STI			X	X								
LBM.2.3	Provision of medium and long term RTAs of vessels	STI	X		X							X		

No.	RIS service *RIS sub-service* RIS function (Information Element)	Information level	Ship master	VTS operator	Lock/ bridge operator	Waterways authority	Terminal operator	Calamity Centre	Fleet manager	Cargo shipper	*NtS*	*ERI*	*VTT*	*ENC (IECDIS)*
CAS	**Calamity abatement support**													
CAS.1	Information on incidents focused on traffic situation	TTI	X			X		X			X	X	X	X
CAS.2	Assessment of the traffic situation in the situation of an incident	TTI				X		X				X	X	X
CAS.3	Co-ordination of the assistance of patrol vessels	TTI		X		X		X					X	X
CAS.4	Assessment of the possible effects of the accident on environment, people and traffic	TTI				X		X				X	X	X
CAS.5	Presentation of information to patrol vessels, police boats, fire squad boats	TTI				X		X				X	X	X
CAS.6	Initiation and co-ordination of search and rescue activities	TTI	X			X		X				X	X	X
CAS.7	Taking measures on traffic, environmental and people protection	TTI				X		X				X	X	X

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No.	RIS service *RIS sub-service* RIS function (Information Element)	Information level	Ship master	VTS operator	Lock/ bridge operator	Waterways authority	Terminal operator	Calamity Centre	Fleet manager	Cargo shipper	*NtS*	*ERI*	*VTT*	*ENC (IECDIS)*
ITL	**Information for transport logistics**													
VP	***Voyage planning***													
VP.1	Provision of information on port of destination, RTA at final destination, type of cargo	STI	X						X	X		X		
VP.2	Provision of information on and presentation of the fairway network at different scales	STI	X						X	X				X
VP.3	Presentation of lock and bridge opening times and general waiting times	STI	X						X	X				
VP.4	Presentation of long term weather information	STI	X						X	X				
VP.5	Presentation of mid and long term prediction of water levels	STI	x						X	X	X			
VP.6	Presentation of information on route characteristics with RTAs, ETAs, ETDs at waypoints	STI	X						X	X		X		
VP.7	Presentation of information affecting travel information	STI	X											
TPM	***Transport management***													
TPM.1	Provision and presentation of ETA´s of vessels	STI	X	Ship supplier organisation						X		X		
TPM.2	Provision and presentation of voyage plans of vessels	STI	X	Bunker organisation						X		X		
TPM.3	Provision of information on free loading space	STI	X	Repair organisation						X		(X)		
TPM.4	Monitoring of the performance of contracted transports and terminals		Freight brokers											
TPM.5	Monitoring unusual threats (like strikes, fall in water level) for the reliability of transport		Transport service quality managers											
TPM.6	Match the transport and terminal performance with service levels agreed on													
TPM.7	Define adjustments to methods for voyage planning													
PTM	***Inter-modal port and terminal management***													
PTM.1	Presentation of actual terminal or port status													
PTM.1.1	Presentation of vessels waiting, being loaded/unloaded	TTI					X			X				(X)
PTM.1.2	Presentation of actual status of terminal process	TTI					X			X				
PTM.1.3	RTAs of vessels, waiting places, positions	TTI	X				X			X				(X)
PTM.2	Port or terminal planning													
PTM.2.1	ETAs of approaching vessels	STI					X					X		(X)
PTM.2.2	Medium and long term schedule terminal process	STI					X							
PTM.2.3	Medium and long terms RTAs of vessels	STI	X				X							
CFM	***Cargo and fleet management***													
CFM.1	Information on fleet of vessels and their transport characteristics	STI							X	X				
CFM.2	Information on the cargo to be transported	STI							X	X		X		

No.	RIS service *RIS sub-service* RIS function (Information Element)	Information level	Ship master	VTS operator	Lock/ bridge operator	Waterways authority	Terminal operator	Calamity Centre	Fleet manager	Cargo shipper	*NtS*	*ERI*	*VTT*	*ENC (IECDIS)*
ILE	**Information for law enforcement**													
ILE.1	Cross-border management (immigration service, customs)					X						X	X	X
ILE.2	Compliance with requirements for traffic safety					X								
ILE.3	Compliance with environmental requirements					X								
ST	**Statistics**					X								
ST.1	Transit of vessels and cargo at certain points (locks) of the waterway					X						X	X	X
CHD	**Waterway charges and harbour dues**		X		X	X				X				

Annex 7 Transposition table articles RIS directive

Directive 2005/44/EG	*Transposed in (legal documents)*	*Transposed since*
Article 1 (Subject matter)		
Article 2 (Scope)		
Paragraph 1 (RIS obliged for waterway of class IV and above)		
Paragraph 2 (RIS could be applied also to other waterways)		
Article 3 (Definitions)		
(a) definition of RIS		
(b) definition of fairway information		
(c) definition tactical traffic information		
(d) definition strategic traffic information		
(e) definition RIS application		
(f) definition RIS centre		
(g) definition RIS users		
(h) definition RIS interoperability		
Article 4 (Setting-up of RIS)		
Paragraph 1 (MS takes necessary measures)		
Paragraph 2 (MS implement efficient, expandable and interoperable)		
Paragraph 3 (in order to set up RIS, MS shall:)		
(a) supply all relevant data concerning navigation and voyage planning		
(b) ensure ENCs for all waterways of class IV and above		
(c) enable competent authorities to receive electronic ship reports and transmitted to the competent authorities abroad		
(d) ensure provision of Notices to Skippers (standardised, encoded and downloadable)		
Paragraph 4 (competent authorities shall establish RIS centres according to regional needs)		
Paragraph 5 (for use AIS regional arrangement concerning radiotelephone service shall apply)		
Paragraph 6 (MS shall encourage users to fully profit from the services)		
Paragraph 7 (EC takes appropriate measures to verify interoperability, reliability and safety of RIS)		
Article 5 Technical guidelines and specifications		
Paragraph 1 EC shall define technical guidelines for		
(a) inland ECDIS		
(b) electronic ship reporting		
(c) notices to skippers		
(d) vessel tracking and tracing systems		
(e) compatibility of the equipment		
Paragraph 2 timeline establishment technical guidelines and specifications		
Paragraph 3 Publication of RIS technical guidelines and specifications in the Official Journal of the European Union		

Directive 2005/44/EG	*Transposed in (legal documents)*	*Transposed since*
Article 6 Satellite positioning		
The use of satellite positioning technologies is recommended		
Article 7 Type approval of RIS equipment		
Paragraph 1 Where necessary and required, RIS terminal and network equipment shall be type-approved		
Paragraph 2 MS notify EC the national bodies responsible for type approval		
Paragraph 3 MS shall recognise type-approvals of other national MS bodies		
Article 8 Competent authorities		
MS shall designate competent authorities for the RIS application and international exchange of data and notify this the Commission		
Article 9 Rules on privacy, security and the re-use of information		
Paragraph 1 MS shall ensure processing personal data carried out in accordance Directives 95/46/EC and 2002/58/EC		
Paragraph 2 MS shall implement and maintain security measures to protect RIS messages and records		
Paragraph 3 Directive 2003/98/EC shall apply on the re-use of public sector information		
Article 10 Amendment procedure		
Annexes I (minimum data requirements) and II (principles for RIS guidelines and technical specifications) may be amended		
Article 11 Committee Procedure		
Paragraph 1 EC shall be assisted by the Committee instituted by art. 7 91/672/EEC		
Paragraph 2 where reference is made to this paragraph, art. 3 and 7 of 1999/468/EC shall apply		
Paragraph 3 where reference is made to this paragraph, art. 5 and 7 of 1999/468/EC shall apply		
Article 12 Transposition		
Paragraph 1 MS which have inland waterways falling within scope of article 2 shall bring into force the laws, regulations and administrative provisions		
Paragraph 2 MS shall take necessary measures to comply with article 4 not later than 30 months after the entry into force of relevant technical guidelines and specifications (art. 5)		
Paragraph 3 Commission may extend the period provided laid down in article 11		
Paragraph 4 MS shall communicate to Commission the text of the main provisions of national law		
Paragraph 5 MS shall assist one another where necessary		
Paragraph 6 Commission shall monitor the setting up of RIS		
Article 13 Entry into force		
Directive shall enter into force 20 days following publication (30 September 2005)		

Directive 2005/44/EG	*Transposed in (legal documents)*	*Transposed since*
Article 14 Addressees		
Directive is addressed to MS which have inland waterways falling within the scope of article 2		

Annex 8 Transition of tonne kilometres to vessel kilometres

Within 2006-2012, an average of 142,961 million tonne kilometres per year were transported on the European Inland Waterways[1]. See Table X for the amount of ton kilometres per flag.

Average load capacities are obtained from the IVR database.

In order to make the amount of vessel kilometres comparable to the numbers in 'iww_tf_vetf', a load factor of 80%[3] and an empty shipping factor of 27.5% have been taken into account[4].

Flag	Transport performance average 2006-2012 (mln tonnekm)	Share of total	Load capacity avg.	Vessel km (mln) per flag	Share of total vessel km
FRANCE	6.561	4,59%	850	13,311	5,84%
BELGIUM	16.413	11,48%	943	30,001	13,16%
GERMANY	26.875	18,80%	1170	39,619	17,38%
NETHERLANDS	68.773	48,11%	1377	86,111	37,77%
LUXEMBOURG	893	0,62%	847	1,818	0,80%
POLAND	960	0,67%	519	3,193	1,40%
CZECH REPUBLIC	591	0,41%	587	1,736	0,76%
SWITZERLAND	2.083	1,46%	1698	2,116	0,93%
OTHER COUNTRIES	19.810	13,86%	725	50,105	21,97%
TOTAL	**142.961**	**100%**	**1081**	**228,011**	**100.00%**

Vessel kilometres :	(tonne kilometres / (avg. load capacity * load factor)) / (1 – empty shipping factor)
Load factor:	80%
Empty shipping factor:	27,5%
Example:	(68,773 / (1,377 * 80%)) / (1-27.5%) (68,773 / 1,102) / (1-0.275) = 86.11 million vessel kilometres

In million vessel kilometres, taking into consideration the above assumptions, the ratios change slightly: ships from Belgium, France, Germany and The Netherlands contribute for 160.9199999 million vessel kilometres. For ships from other countries, this number is 37.53 million vessel kilometres.

[1] Eurostat, iww_go_anave, average for 2006-2012.
[3] Panteia (2014), based on freight rate analysis between sept-2009 and march-2014, consisting of 21,693 trips.
[4] This (more or less) equals the ratio between loaded and unloaded vessel kilometres in the Eurostat table 'iww_tf_vetf'.

Bibliography

- Prospects of inland navigation within the enlarged Europe PINE), Buck Consultants International/Progtrans/VBD/viadonau, 2004
- Single Transport Document', Action Plan of 2007 (COM(2007)607), EC, 2007
- 'White Paper on Transport Roadmap to a single European Transport Area-Towards a competitive and resource efficient transport system', EC, 2011
- Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community
- Electronic reporting: Frequently asked questions, Promotie Binnenvaart Vlaanderen
- Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community (to be implemented by the Member States on 20 October 2007)
- Commission Regulation (EC) No 414/2007 of 13 March 2007 concerning the technical guidelines for the planning, implementation and operational use of river information services (RIS) referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community
- Commission Regulation (EC) No 415/2007 of 13 March 2007 concerning the technical specifications for vessel tracking and tracing referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community
- Commission Regulation (EC) No 416/2007 of 22 March 2007 concerning the technical specifications for Notices to Skippers as referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community
- Commission Regulation (EC) No 164/2010 of 25 January 2010 on the technical specifications for electronic ship reporting in inland navigation referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community
- Commission Regulation (EC) No 689/2012 of 27 July 2012 on Vessel Tracking and Tracing amending Regulation (EC) No 415/2007 concerning the technical specifications for vessel tracking and tracing systems referred to in Article 6 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community
- RIS Guidelines and Recommendations for River Information Services, Edition 2.0, Annex or enclosure to protocol 2003-I-22, Formalized: 05-02-2004 Standard Electronic Char
- t display and Information system for inland Navigation, Inland ECDIS, Edition 2.0, Annex or enclosure to protocol 2006-II-22, Formalized: 23-11-2006
- Clarifications, Corrections and Extension Document to the Inland ECDIS Standard; Transition from Edition 2.0 to Edition 2.1 of the Standard, Formalized 22-10-2008

- Vessel Tracking and Tracing Standard for Inland Navigation, International Standard Edition 1.01 Annex or enclosure to protocol 2006-I-21, Formalized 10-10-2007
- Test Standard for Inland AIS, Edition 1.01, Annex or enclosure to protocol 2007-I-15, Formalized 22-1--2008
- Technical Clarifications on Vessel Tracking and Tracing and the Test Standard for Inland AIS, Formalized 22-10-2008
- Notice to Skippers for Inland Navigation; International Standard, Edition 2.0, Annex or enclosure to protocol 2004-I-17, Formalized 22-10-2008
- Standard for Electronic Reporting in Inland Navigation, Edition 1.2, Annex or enclosure to protocol 2006-II-23, Finalized 19-10-2006
- Guidelines and Criteria for Vessel Traffic Services on Inland Waterways, Annex or enclosure to protocol 2006-I-20, Finalized 31-05-2006
- International Standard for Tracking and Tracing on Inland Waterways (VTT) - Resolution No. 63 (ECE/TRANS/SC.3/176: International Standards for Notices to Skippers and for Electronic
- Ship Reporting in Inland Navigation - Resolution No. 60 (ECE/TRANS/SC.3/175: Eng/Fre/Rus, and Annexes and Appendices: Eng/Fre, ECE/TRANS/SC.3/175/Amend.1:)
  Guidelines and Criteria for Vessel Traffic Services on Inland Waterways - Resolution No. 58 (TRANS/SC.3/166: (TRANS/SC.3/166/Corr.1)
  Guidelines and Recommendations for River Information Services - Resolution No. 73 (Revised Resolution No. 57) (ECE/TRANS/SC.3/165/Rev.1)
  Recommendation on electronic chart display and information system for inland navigation (Inland ECDIS) - Resolution No. 48 (ECE/TRANS/SC.3/156/Rev.2: *and Annexes and Appendices:*
- Directive 2010/65/EU on reporting formalities applicable to maritime transport
- RIS support structure workflows Advise on EC support for the RIS Expert Groups (PLATINA 2011; D. 5.6)
- Assessment of the Implementation of River Informations Services in Europe (via donau 2006)". SPIN-TN project (European Strategies to Promote Inland navigation)
- RIS Implementation Support and Assistance. PLATINA (31/10/2012; D5.7)
- The Future of Transport, EC, 2009
- TEN-CONNECT 2, Tetraplan and partners, European Commission, 2011
- NAIADES Good Practice database' PLATINA Deliverable WP1, 2011
- European Union Strategy for the Danube Region, SEC 1489, Brussels, 2010
- Economical and Ecological Comparison of Transport Modes: Road, Railways, Inland Waterways', PLANCO/BFG, 2007
- 'Inland navigation in Europe, Market Observation', CCNR, 2009/1
- Monitoring of working conditions in freight transport and logistics, BAG, 2010
- Transport Yearbook Czech Republic, Czech Republic Ministry of Transport
- Deliverable 3.1, Inventory of existing IWT education and training institutes and curricul, PLATINA, EC-DG MOVE, 2009
- Deliverable 3.6, Inventory of IWT related logistics education institutions and training content, PLATINA, EC-DG MOVE, 2010
- 'Commission of the European Communities, Communication from the commission of the promotion of Inland waterway transport', "NAIADES", EC-DG MOVE, 2006
- 'Rivers of the World, Atlas', NEA/EICB/Marin, 2010
- 'Information supplied by VNF', Bearingpoint France SAS, 2010
- 'European Inventory of available knowledge on strategic inland waterway projects', PLATINA, EC-DG MOVE, 2010

- ‘Strengthening inland waterway transport: Pan-European co-operation for progress’, European conference of ministers of transport, ECMT, 2006.
- ‘Annual Activity Report 2009-2010 for Priority Project 18 (Rhine/Meuse-Main-Danube Inland Waterway Axis) and Priority Project 30 (Inland Waterway Seine-Scheldt)’, Brussels, TEN-T Trans-European Transport Networks, 2010
- ‘Effects of Climate Change on the inland waterway NETwork’ (ECCONET), Newsletter 1, 2011
- ‘Implementation of River Information Services in Europe’, Final Technical Report, IRIS Europe, 2009
- ‘Good Practices report II’, Final Report, PLATINA, Ecorys, 2010
- ‘Setting the Course, a new transport policy for 2020’, INE, EBU & ESO, 2011-12-05
- ‘Action Plan to keep freight moving: for Freight Transport Logistics’, EC-DG TREN, 2011
- ‘Performance Indicators for Inland Waterways Transport – user guideline,Report no. 111, PIANC, 2010
- ‘The role of Maritime Clusters to enhance the strength and development of European maritime sectors’- Report on results’, presentation, Policy Research Corporation, 2008
- ‘STREAM International Freight 2011, Comparison of various transport modes on a EU scale with the STREAM database’, CE Delft, 2011
- ‘IMPACT ASSESSMENT STUDY – Reviewing Directive 97/68/EC Emissions from non-road mobile machinery’, Specific Contract n° SI2.ACPROCE018014400 ENTR/04/093 Lot 5 FINAL REPORT, Arcadis & TML, 2009
- ‘Technical option to reduce GHG for non-Road Transport Modes’. Paper 3 produced as part of contract ENV.C.3/SER/2008/0053 between European Commission Directorate-General Environment and AEA Technology plc; see website www.eutransportghg2050.eu, Hazeldine, Pridmore, Nelissen and Hulskotte, 2009
- ‘Lokale Maatregelen voor emissiereductie van binnenvaartemissies’: Finaal rapport 11-005444 LNE, Arcadis, TML and DLR, 2011
- ‘Beperking NOx-uitstoot bij een bestaande scheepsdieselmotor, effectiviteit SwirlFlahs en SCR-techniek’, ECN-C—04-083, available in digital format at www.ecn.nl, De Wilde, H.P.J. and Kos, G.P.A, 2004
- ‘2007 Technical Review of the NRMM Directive 1997/68/EC as amended by Directives 2002/88/EC and 2004/26/EC Part II’, JRC and IES, 2008
- ‘Etude sur les pratiques de navigation et les technologies dans le domaine de la performance énergétique due transport fluvial des merchandises. Fiches Innovations’, TL&Associés Consulting en Cabinet Lebéfaude, 2010 \\
- ‘Effecten van prijsbeleid in verkeer en vervoer’. Kennisoverzicht, Bilthoven/Delft, PBL, CE Delft, 2010
- ‘Revenue Use from Transport Pricing. Deliverable 6: Synthesis and policy conclusions’, Version 1.2, Rome, REVENU, 2006

General RIS Definitions (Pianc)

Interoperability (system) means that services, organisation, data contents and data exchange formats are harmonised in such a way that users have access to the services and information on a pan-European level to enable the use of the same equipment onboard of vessels, all over Europe.

Interoperability (Transport) is the ability of multiple entities in different networks or systems to operate together without the need for additional conversion or mapping of states and protocols.

RIS application is the regional or dedicated use of RIS systems under specific requirements: local, functional and process-oriented. A single application can use one or more systems to provide a service.

RIS centre is the place, where the services are managed by operators. RIS centre is the place where the services are managed by operators; if necessary it is established by the Competent Authority. A RIS may exist without a RIS centre (e.g. an Internet service, a buoy"s service).

River Information Services (RIS) means harmonised information services to support traffic and transport management in inland navigation, including, wherever technically feasible interfaces to other transport modes. RIS aim at contributing to a safe and efficient transport process and at utilising the inland waterways to their fullest extent. RIS are already in operation in manifold ways.
(Source: RIS-Guidelines 2007/414/EC)

RIS users are the users of the services described in a number of different groups: boat masters, RIS operators, lock/bridge operators, waterway authorities, terminal operators, operators in calamity centres of emergency services, fleet managers, cargo shippers and freight brokers.

RIS Functions

Fairway Information Services

Fairway Information (FI) means geographical, hydrological and administrative information regarding the waterway (fairway).

Fairway Information Services (FIS) a FIS is a system that provides information regarding the fairway and the meteorological and hydrological characteristics.

Strategic Traffic Information
Strategic Traffic Information (STI) is the information affecting the medium- and long-term decisions of RIS users.

A strategic traffic image contributes to the planning decision capabilities regarding a safe and efficient voyage. A strategic traffic image is produced in a RIS centre and delivered to the users on demand. A strategic traffic image contains all relevant vessels in the RIS area with their characteristics, cargoes and positions, stored in a database and presented in a table or on an electronic map. Strategic traffic

information may be provided by a RIS/VTS centre or by an office.

Tactical Traffic Information

Tactical Traffic Information (TTI) is the information affecting the skipper's or the VTS Operator's immediate decisions with respect to navigation in the actual traffic situation and the close geographic surroundings.

A tactical traffic image contains position information and specific vessel, information of all targets detected by a radar and presented on an electronic navigational chart and, if available, enhanced by external traffic information, such as the information delivered by an Inland AIS. TTI may be provided on board a vessel or on shore, e.g. in a VTS centre.

Calamity Abatement Support

Rescue and Emergency Services Providers are the persons responsible for the search and rescue and emergency services (deals with a calamity and takes care of the people, animals, cargo and vessels involved).

Calamity is a natural disaster that brings terrible loss, lasting distress or severe affliction. A calamity could cause complete loss of the passengers, the crew, the cargo or even the ship.

Calamity abatement support is the RIS centres ability of transmitting necessary information to the rescue teams.

Logistics

Agent is a person or organisation authorised to act for or on behalf of another person or organisation, such as the forwarding agent, the custom agent and the carrier agent

Consignor (synonym: Cargo shipper, Shipperand Sender) is the merchant by whom, in whose name or n whose behalf a contract of carriage of goods has been concluded with a carrier or any party by whom, in whose name or on whose behalf the goods are actually delivered to the consignee in relation
to the contract of carriage.

Customs is the department of the Civil Service that deals with the levying of duties and taxes on imported goods from foreign countries and the control over the export and import of goods, e.g. allowed quota, prohibited goods.

Freight broker (synonym: Forwarder and Freight forwarder) is responsible on behalf of the transport supplier for the physical transport of the goods to be executed. The freight broker offers transport capacity to shippers on behalf of the transport supplier and in this way mediates between supply forwarder and master in charge.

Terminal is a location at either end of a transportation line including servicing and handling facilities. Also container, respectively oil terminal

Terminal operator (synonym: Stevedore) controls a set of one or more terminals and puts these terminals at the disposal of terminal operators to transhipcargo from one conveyance to another.

Inland VTS

VTS-area is the delineated, formally declared, area for which the VTS has sensor coverage in order to construct a traffic image. A coverage area may be subdivided into subareas or sectors.

VTS Authority is the Authority responsible for the management, operations and co-operation of the VTS, the interaction with participating vessels and the safe and effective provision of the service

VTS Operator is the person who monitors and controls the fluent and safe progress of traffic within the area around the VTS centre.

Inland VTS Services

Navigational assistance service is a service of a VTS to assist to the onboard navigational decisionmaking and to monitor the effects, especially during difficult circumstances, with messages updated in appropriate intervals.

Traffic organisation service (VTS) is a service to prevent the development of dangerous vessel traffic situations by managing of traffic movements and to provide for the safe and efficient movement of vessels traffic within the VTS area.

VTS Services are services provided by a VTS centre, partly facilities (placed at the disposal of the mariner, optional), partly measures (adherence is mandatory): information service, navigational assistance service, traffic organisation service, co-operation with allied services and with emergency services

Tracking and Tracing

Automatic Identification System (AIS) is a maritime radio data exchange system between equipped ships and between ships and shore stations.

Inland AIS is AIS for inland navigation.

Inland ECDIS

Inland Electronic Navigational Chart (Inland ENC) means the data base, standardised as to content, structure and format, issued for use with Inland ECDIS.

Electronic Data Interchange (EDI) is the automated exchange of any predefined and structured data for business among information systems of two or more organisations.

Single Window is a system that allows parties involved in trade and transport to lodge information with a single body to fulfil all regulatory requirements.

Vessel Traffic Management

Vessel Traffic Management (VTM) is providing information orally as well as electronically as well as giving directions in interaction with and response to vessels in a traffic flow to optimise the smooth (efficient) and safe transport.

Abbreviations

A

ADN: Accord européen relatif au transport international des marchandises Dangereuses par voies de Navigation intérieures

ADNR: Accord européen relatif au transport international des marchandises Dangereuses parvoie de Navigation intérieure du Rhin

AI: Application Identifier

AIS: Automatic Identification System

AI-IP: Automatic identification via Internet Protocol

ASCII: American Standard Code for Information Interchange

ATA: Actual Time of Arrival

ATD: Actual Time of Departure

ATIS: Automatic Transmitter Identification System

A to N: Aids to Navigation

B

BERMAN: BERth MANagement message

BICS: Barge Information and Communication System

C

CAS: Calamity Abatement Support

CCS: Cargo Community System

CCNR: Central Commission for the Navigation on the Rhine

CCTV: Closed Circuit TV

CEVNI: Code européen de voies de la navigation intérieure (European code for inland waterways)

CN: Combined Nomenclature

CPA: Closest Point of Approach

COG: Course Over Ground

CSTDMA: Carrier Sense Time Division Multiple Access

CUSCAR: CUStom CArgo Report

CUSDEC: CUStoms DEClaration

D

DAB: Digital Audio Broadcasting

DAC: Designated Area Code

DC: Danube Commission

DG: Dangerous Goods

DG TREN: Directorate General for Energy and Transport

DGNSS: Differential Global Navigation Satellite System

DGPS: Differential Global Positioning System

DSC: Digital Selective Calling

E

EANA: European Article Numbering Association

EBL: Electronic Bearing Line

ECDIS: Electronic Chart Display and Information System

ECE: Economic Commission for Europe of the United Nations

EDI: Electronic Data Interchange

EDIFACT: Electronic Data Interchange for Administration, Commerce and Transport

EMMA: European Multiservice Meteorological Awareness system

EMSA: European Maritime Safety Agency

ENC: Electronic Navigation Chart

ENI: European Navigation Identifier (Unique European vessel identification number)

EPC: Electronic Port Clearance
ERI: Electronic Reporting International
ERINOT: ERI NOTification message
ERIRSP: ERI ReSPonse message
ERN: Electronic Reporting Number
ETA: Estimated Time of Arrival
ETD: Estimated time of Departure
ETSI: European Telecommunications Standard Institute
EU: European Union

F

FAL: IMO facilitation committee
FATDMA: Fixed Access Time Division Multiple Access
FI: Fairway Information
FI: Function Identifier
FIS: Fairway Information Services
FM: Frequency Modulation

G

GALILEO: European Satellite Navigation System
GEO: Geo-synchronous Earth Orbit
GIS: Geographic Information System
GLONASS GLObal Navigation Satellite System
GMDSS: Global Maritime Distress and Safety System
GMS: Global Mobile communication System
GNSS: Global Navigation Satellite System.
GPRS: General Packet Radio Service
GNSS: Global Navigation Satellite System
GPRS: General Packet radio service
GPS: Global Positioning System
GSM: Global System for Mobile Communication
GUI Graphical User Interface

H

HAZMAT: Hazardous Material Directive
HCC: Harmonised Customs Code
HF: Human Factors
HF: High Frequency
HGE: Harmonised Group on ECDIS
HMI: Human Machine Interface
HO: Hydrographic Office
HSC: High Speed Craft
HS Code: Harmonised commodity description and coding system

I

IAI: International Application Identifier
IALA: International Association of Marine Aids to Navigation and Lighthouse Authorities
IANA: Internet Assigned Numbers Authority
ID: Identifier
IEC: International Electro technical Commission
IEEE: Institute of Electrical and Electronics Engineers
IENC: Inland ENC
IETF: Internet Engineering Task Force
IFTDGN: International Forwarding and Transport Dangerous Goods Notification (message)

IFTMIN: Instruction message, from barge operator to skipper (container transport, tank transport)
IHO: International Hydrographic Organisation
IMDG Code: International Maritime Dangerous Goods Code
IMO: International Maritime Organisation
IMO FAL: IMO's Facilitation of Maritime Traffic Convention 1965, with amendments
Inland ECDIS: Inland Electronic Chart Display and Information System
Inland SENC: Inland System Electronic Navigational Chart
INT 1: International Chart 1
IP: Internet Protocol
ISO: International Standardisation Organisation
ISM: International Safety Management Code
ISPS: International Ship and Port facility Security (Code)
IT: Information Technology
ITS: Intelligent Transportation Systems
ITU: International Telecommunications Union

L

LAN: Local Area Network
LBM: Lock and Bridge Management
LEO: Low Earth Orbit (Satellite)
LOCODE: LOcation CODE for ports and freight stations (UNECE code)
LRIT: Long Range Identification and Tracking

M

MEO: Medium Earth Orbit
MIB: Meldungs und Informations System für die Binnenschifffahrt
MHz: Mega Hertz
MID: Maritime Information Digits
MKD: Minimum Keyboard and Display
MMSI: Maritime Mobile Service Identity
MTBF: Mean Time Between Failures
MTR: Mean Time to Repair

N

NAVSTAR: Navigational Satellite Timing and Ranging
NSTR: Nomenclature uniforme de marchandises pour les Statistiques de Transport (Revised)
NTS: Notices to Skippers

O

OEF: Open ECDIS forum
OFS: Official Ship Number
OFS: Official Shipping Number
OSI: Open System Interconnection Standards

P

PAXLST: Passenger List Message
PCS: Port Community System
PI: Presentation Interface
PIANC: Permanent International Commission for Navigation Congresses
PSW: Port Single Window
PTM: Port and Terminal Management

R

RADAR: RAdio Detection And Ranging
RAI: Regional Application Identifier
RAIM: Receiver Autonomous Integrity Monitoring

RATDMA: Random Access Time Division Multiple Access
RIS: River Information Services
ROT: Rate Of Turn
RTA: Required Time of Arrival
RTD: Required Time of Departure
RTK: Real Time Kinematic
RU: Rescue Unit

S

SAR: Search And Rescue
SCAC: Standard Carrier Alpha Code
SENC: System Electronic Navigational Chart
SIGNI: Signs and Signals on Inland Waterways
SMS: Short Message Service
SOG: Speed over Ground
SOLAS: International convention for Safety of Live at Sea
SOTDMA: Self Organising Time Division Multiple Access, used for AIS
SQRT: Square Root
STI: Strategic Traffic Information

T

TCP/IP: Transmission Control Protocol/Internet Protocol
TCPA: Time Closest Point of Approach
TDED: Trade Data Elements Dictionary
TDMA: Time Division Multiple Access
TEU: Twenty Feet Equivalent Unit
TI: Traffic Information
TTI: Tactical Traffic Information

U

UDP: User Datagram Protocol
UML: Unified Modelling Language
UMTS: Universal Mobile Telecommunications System
UN: United Nations
UN/CEFACT: United Nations Centre for Trade Facilitation and Electronic Business
UN/EDIFACT: United Nations Electronic Data Interchange for Administration, Commerce and
Transport
UNECE: United Nations Economic Commission for Europe
UNDG: United Nations Dangerous Goods
UN/LOCODE: UN Location Code
UNTDID: United Nations Trade Data Interchange Dictionary
URL: Uniform Resource Locator
UTC: Universal Time Co-ordinated

V

VDL: VHF Data Link
VDR: Voyage Data Recorder
VHF: Very High Frequency
VTMIS: Vessel Traffic Management and Information Services
VTM: Vessel Traffic Management
VTMIS Vessel Traffic Management Information Services
VTMS: Vessel Traffic Management System
VTS: Vessel Traffic Services
VRM: Variable Range Marker

W

WAP: Wireless Application Protocol
WCO: World Customs Organisation
WGS: World Geodetic System
Wi-Fi: Wireless Fidelity
WLAN: Wireless Local Area Network
WMS: Web Mapping Service
WWRNS: World Wide Radio Navigation System

X

XML: eXtended Mark-up Language