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Item 6 (a) of the provisional agenda

Promotion of River Information Services and other Information and Communication Technologies in inland navigation: Guidelines and Recommendations for River Information Services (annex to resolution No. 57, revised)

Revision of the Guidelines and Recommendations for River Information Services (annex to resolution No. 57, revised)

Note by the secretariat*

Mandate

1. This document is submitted in line with the Proposed Programme Budget for 2021, part V, Regional cooperation for development, section 20, Economic Development in Europe. Programme 17, Economic Development in Europe (A/75/6 (Sect.20), para. 20.51).
2. At its sixty-fourth session, the Working Party on Inland Water Transport asked the secretariat to begin the revision of resolution No. 57 in 2021 in cooperation with the World Association for Waterborne Transport Infrastructure (PIANC) and to prepare a working document for the consideration by the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3) (ECE/TRANS/SC.3/213, para. 69).
3. The annex to the present document contains (a) a comparison of the structure of the annex to resolution No. 57 and the PIANC River Information Services (RIS) Guidelines 2019 and (b) a proposal for the revision of the existing chapters 3–5 of the annex to resolution No. 57, based on the PIANC RIS Guidelines.

* The present document was submitted after the deadline because of the need to take into account consultations with member States.

Annex

Guidelines and Recommendations for River Information Services

I. Structure of the annex to resolution No. 57 and the PIANC RIS Guidelines 2019

The comparison of the structure of the annex to resolution No. 57 and the PIANC RIS Guidelines 2019 is given in the table below.

<i>Annex to resolution No. 57</i>	<i>PIANC RIS Guidelines 2019</i>	<i>Comments on the PIANC RIS Guidelines 2019¹</i>
Summary	–	
Abbreviations	Annex 1: Abbreviations	
1. Introduction	1 Introduction	The foreword, summary and chapter 1 of the RIS Guidelines edition 3 (2011) are replaced by a new chapter 1
2. Definitions	–	Definitions are integrated in chapters 2, 3 and 4 or transferred to the PIANC RIS Related Definitions 2019
3. RIS objectives, services and stakeholders	2 River Information Services, objectives, stakeholders and information needs	The description of RIS stakeholders is reduced to summing up of the stakeholder groups
4. RIS Key technologies	5 Recommendations for the implementation of RIS technical services	An essential change is a basic alignment between RIS and e-Navigation. For this reason, the term “RIS key technologies” is replaced by “Technical Services” to be in line with the terms used in the domain of e-Navigation. The chapter has been updated to the state of the art 2018, and the technical services have been upgraded to worldwide use
5. RIS services and recommendations on the implementation of RIS services	3 RIS operational services and functions 4 Recommendations for the implementation of RIS operational services	The term “RIS Services” is replaced by “RIS Operational Services” to be in line with the terms used in the domain of e-Navigation. Chapter 3: <ul style="list-style-type: none"> • provides a decomposition of RIS, RIS functions and RIS information elements and information categories and connected to the RIS technical services • includes an extensive table on RIS functions and sub-functions based on the information needs.

¹ See the explanatory note to the PIANC concept RIS Guidelines edition 4 2018 (Informal document SC.3/WP.3 No. 15 (2018)).

<i>Annex to resolution No. 57</i>	<i>PIANC RIS Guidelines 2019</i>	<i>Comments on the PIANC RIS Guidelines 2019¹</i>
		Chapter 4 includes a sub-chapter on RIS enabled Corridor Management
–	6 Recommendations on integration of e-Navigation in the RIS domain	Chapter 6 builds on the main findings of the PIANC Working Group on e-Navigation for Inland Waterways (InCom WG 156)
–	7 Considerations on mid term RIS related developments	Chapter 7 reflects on the upcoming policy and project initiatives aimed to modernize inland water transport mode and make it more competitive, that will have an impact on RIS, and how RIS might be perceived and utilized by these initiatives
6. Structured approach of the implementation of RIS services	8 Considerations and recommendations on the structured approach of the implementation of RIS	Open standards are not mentioned anymore
Annex I. Open Standards – Service Oriented Architecture stack		Deleted
Annex II. RIS Information categories (2 levels)		The revised table is included in chapter 3
Annex III. Relation between Services and Systems		Deleted
–	Annex 2: Standards and information on technical services for the provision of static fairway and infrastructure information	
–	Annex 3: Standards on technical services for the provision of dynamic fairway and infrastructure information	
–	Annex 4: Standards and information on technical services for the provision of vessel information	
–	Annex 5: Standards and information on technical services for the provision of voyage and cargo information	

II. Revision of chapter 3 “RIS objectives, services and stakeholders”

SC.3/WP.3 may wish to rename the existing chapter 3 as “River Information Services, objectives, stakeholders and information needs” and revise it, based on the text of chapter 2 of the PIANC RIS Guidelines 2019, which is reproduced below.

[2]² River Information Services, objectives, stakeholders and information needs

[2.1] River Information Services and its objectives

River Information Services are formally defined as the concept for information services in inland navigation to support traffic and transport management, including the interfaces to other transport modes.³

River Information Services will support inland waterway transport to become a sustainable transport mode. RIS will improve the competitiveness of inland navigation and will contribute to the overall goal to make inland navigation a safe, secure, efficient and environmentally friendly link in the logistic chain.

The specific objectives of River Information Services are providing information to:

1. Make inland navigation a *reliable, plannable and transparent* transport mode in the multimodal transport chain.
2. Contribute to *safety* of traffic and transport by:
 - Reducing traffic and transport incidents and accidents
 - Reducing injuries
 - Reducing fatalities
 - Providing information for law compliance and statistics
3. Contribute to *efficiency of traffic and transport by*:
 - Optimizing the use of the capacity of waterways and prevention of traffic congestion
 - Optimizing the carrying capacity of vessels
 - Enabling “Just in Time” transport by a better predictability of travel times
 - Reduction of travel times and waiting times
 - Reducing the workload and increasing situational awareness of RIS users
 - Reducing transport costs
 - Reducing fuel consumption
 - Improving the efficiency of harbours and terminals
4. Contribute to *environmentally friendly* transport by:
 - Reducing environmental hazards
 - Facilitating smooth flow of traffic
 - Reducing/detecting polluting emissions (in particular, CO₂) and spills due to accidents, illegal actions or normal operations.

These objectives should be met under the constraints that RIS are supplied in a manner that is *reliable, cost efficient and legally sound*.

Internal commercial activities between one or more involved companies are outside the scope of RIS, but RIS are open for interfacing with commercial activities. RIS are provided by fairway authorities to

- Other fairway authorities
- Waterway users
- Related logistic partners.

² *Note by the secretariat:* Here and below, numbers within the square brackets correspond to the numbers in the PIANC RIS Guidelines 2019.

³ *Note by the secretariat:* The text of the PIANC RIS Guidelines 2019 is based on the definition in 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 and is in line with the definition of RIS in the annex to resolution No. 57 (para. 2.1).

According to the national allocation of responsibilities, RIS are in the jurisdiction of local, regional or national authorities.

RIS and the RIS systems and applications collect, process, assess and disseminate in a harmonized way fairway, traffic and transport information. It is essential that this fairway, traffic and transport information is harmonized worldwide; this is made possible through use of an internationally approved framework for RIS as depicted in these Guidelines, and to the extent possible international standards for technology and data exchange.

The RIS objectives are in service of RIS stakeholders; therefore, it is important to identify these stakeholders and their information needs as the basis for River Information Services.

[2.2] RIS stakeholders

The inland navigation sector includes many parties including national authorities, port authorities, vessel owners, skippers, providers of nautical services, customs authorities, etc. Achieving the objectives of RIS very much depends on the (information) needs of the stakeholders and interactions between these parties across national and organizational borders, hence, the RIS Guidelines will describe generic solutions.

The RIS guidelines will not consider how stakeholders are organized, as this may vary in different regions, countries and organisations.

The RIS Guidelines will focus on general recommendations for implementation of RIS, taking in account international and national agreements and regulations.

The following categories of stakeholders can be differentiated:

- Consumers of services: RIS users in inland navigation operations.
- Examples of this user group are: skippers, ship owners, lock operators, VTS⁴ operators, terminal operators and port operators, etc.
- Governmental and regulatory and standardization bodies.
- Examples of this stakeholder group are technical certification authorities, Competent Authorities for traffic management and port authorities; this category also includes international bodies such as IMO, IALA,⁵ IHO, CCNR,⁶ UNECE,⁷ CESNI⁸ and the European Commission.
- Managers in inland navigation.
- Examples of this stakeholder group are fleet managers, waterway managers and water managers.
- Information providers.
- Examples include: Waterway authorities, fairway authorities (fairway surveillance, VTS operators, lock operators, etc.).
- Service providers.
- Examples of this stakeholder group are RIS providers and rescue and emergency service providers.

The different stakeholder groups have their own *objectives* and requirements on the *services, systems and applications* to be provided or used based on their *information needs*.

[2.3] RIS Information Needs

Table [2.1] depicts information categories benefitting the potential stakeholders of River Information Services.

⁴ Vessel Traffic Services.

⁵ International Association of Marine Aids to Navigation and Lighthouse Authorities.

⁶ Central Commission for the Navigation of the Rhine.

⁷ United Nations Economic Commission for Europe.

⁸ European Committee for drawing up standards in the field of inland navigation.

Table [2.1] is organized in different information categories:

- Infrastructure-related information:
 - Waterway-related information
 - Land-related information
- Vessel-related information:
 - Dynamic vessel data
 - Hull related data
 - Vessel convoy information
- Voyage-related information
 - Location related information
 - Cargo related information
 - Persons on board related information
- Traffic-related information
 - Strategic traffic-related Information
 - Tactical traffic-related information.

An essential requirement from RIS users or service consumers is that the information is provided in a harmonized and standardized way throughout the entire inland waterway network or waterway corridors.

The personal data of RIS users, in particular skippers and crew, must be protected as a matter of ensuring users' trust and often a matter of law. The publication of personal data without consent of the data subject is not acceptable. Similar protections must be ensured for economically sensitive data.

RIS users or service consumers prefer that information they are required to submit should be able to be provided via a single entry of information during (international) voyages.

Table [2.1]
Information needs and information categories

<i>Information category</i>		<i>Information Need</i>
<i>1st level</i>	<i>2nd level</i>	
Fairway and Infrastructure related	Fairway-related information	Navigation-based information on fairway and/or navigable water area
		Meteorological information
		Water level related information
		Information on obstructions and limitations
		Information on navigation rules and regulations
	Land-related information	Information on land region
		Information on harbours
		Information on terminals
		Information on locks and ship lifts
		Information on bridges
		Information on cables/pipes overhead and other special constructions
		Information on waste reception facilities

Information category		Information Need
1 st level	2 nd level	
Vessel related	Dynamic vessel data	Position information of vessels
		Information on vessel dynamics (i.e. RoT, ⁹ velocity, CoG, ¹⁰ SoG, ¹¹ ...)
		Event based triggers for vessel position
	Hull related information	Information on hull data
		Information on vessels certificates
	Vessel-convoy-related information	Overall convoy information
Voyage and cargo related	Location-related information	Information on origin of voyage
		Information on intermediate discharge locations
		Information on passage points
		Information on destination of voyage
		date/time of arrivals
		date/time of departures
	Cargo-related data	Predicted deviation of the original voyage plan (of skipper) at defined points on the route (locks, crossings, berths) and terminals/ports
		Information on origin of cargo
		Information on destination of cargo
		Information on cargo details
Persons on board related information	Loading unit related information	
	Information on number of persons (crew, passengers, ...) on board	
		Details on persons on board
Traffic related	Object-related information	Berth/terminal information
		Information on operational status of locks and bridges
		Information on actual passage time/duration at locks and bridges
		Information on predicted passage time/duration at locks and bridges
		Information on average passage time/duration for certain categories/certain vessel types
	Fairway section-related information	Information on traffic density on a certain stretch and/or corridor (for specific vessel classes)
		Information on sailing time over a certain stretch for certain vessel classes per sailing direction

III. Revision of chapter 5 “RIS services and recommendations on the implementation of RIS services”

SC.3/WP.3 may wish to rename the existing chapter 5 as “Recommendations for the implementation of RIS technical services” and begin its revision based on the text of chapter 3 of the PIANC RIS Guidelines 2019, which is reproduced below.

⁹ Rate of turn.

¹⁰ Course over ground.

¹¹ Speed over ground.

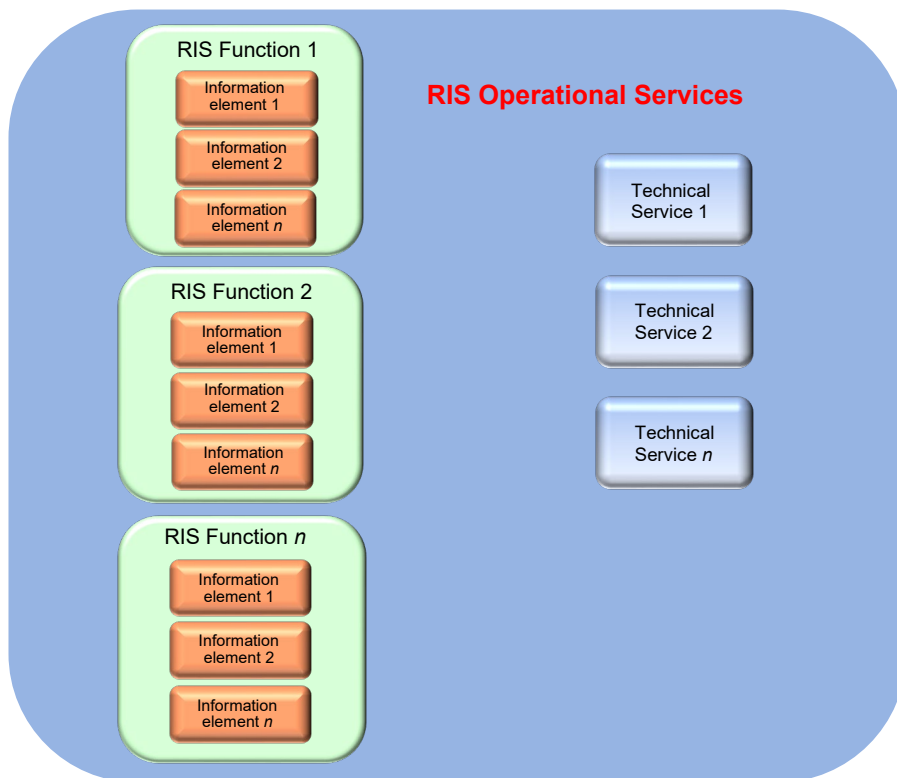
[3] RIS operational services and functions

[3.1] Functional Decomposition of the RIS Concept

RIS Operational Services have been identified to provide required information to RIS stakeholders. Figure [3.1] shows the relationship between RIS functions and RIS information elements¹², supported by RIS technical services used to produce, calculate, transport or compose the required capabilities for the operational services. The RIS-related information elements can be based on data from several sources and/or RIS technical services.

Figure [3.1]

Functional decomposition of RIS operational services



[3.2] RIS Operational Services

An operational service provides and uses information. It supports the user in accomplishing the task at hand. RIS operational services are:

Fairway information Services (FIS): contains geographical, hydrological and administrative information regarding the waterway infrastructure and fairways in the RIS area that is required by the RIS users to plan, execute and monitor a voyage. Fairway information is one-way information: shore to ship or shore to stakeholder's office.

Traffic Information Services (TIS) are the provision of information to support the safety and efficiency of traffic and navigation on inland waterways.

- *Tactical traffic information (TTI)*

TTI is the operational service 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. Tactical traffic information contains position and specific vessel information of all targets detected by a radar and presented on an electronic navigational chart, and enhanced by external traffic information, such as the

¹² The combination of a few information elements can lead to an information function, which is a digital or physical product that offers information to a user. A set of information elements belong to an information category.

information provided by AIS.¹³ TTI may be provided on board of a vessel or on shore, e.g. in a VTS.

- *Strategic traffic information (STI)*

Strategic Traffic Information is the operational service affecting the medium- and long-term decisions of RIS stakeholders. Strategic traffic information contributes to the planning decision capabilities regarding a safe and efficient voyage or transport. A strategic traffic image contains all relevant vessels in the RIS area with their characteristics, types of cargo and ship positions, stored in a database and presented in a table or on an electronic map.

Traffic Management Information (TM) is the operational service that supports traffic management processes in inland navigation:

- *VTS – Vessel Traffic Services.*

Where VTS is a set of services implemented and provided in agreement with the IALA guidelines on Vessel Traffic Services for inland waterways. VTS is implemented by a Competent Authority, designed to improve the safety and efficiency of vessel traffic and to protect the environment.

- *Lock and Bridge management.*

Lock and bridge management is the process of planning and operating bridges and locks.

- *Traffic Planning Services.*

The information process for optimising the predictability and efficiency of the traffic flow on inland waterways.

Information to support Calamity Abatement (CAS) is the operational service that facilitates the actions necessary to limit the consequences of a calamity (or accidents and incidents).

Information to support Transport Logistics (ITL) is the operational service that supports transport logistic processes in inland navigation:

- *Voyage planning*

Voyage planning is the process of developing a complete detailed description of the journey of a vessel, from start to finish.

- *Transport management*

Transport management is the process of planning, organising and executing of the efficient movement of goods from one location to another.

- *Port and terminal management*

Port and terminal management is the process of planning, organising and executing the efficient ship and cargo handling in a port and terminal.

- *Cargo and fleet management*

Cargo and fleet management is the process of planning, organising and executing the efficient handling of cargo and vessels in a transport company.

Information to support Law Compliance (ILC) is the information that facilitates legal compliance for the waterway users and supports relevant agencies responsible for inland navigation law enforcement.

Statistics Information (ST) is the information on traffic and transport in inland navigation that is required to support statistical processes.

¹³ Automatic Identification System.

Information for Waterway Charges and Harbour Dues (WCD) is the information needed to facilitate the calculation and collection of waterway charges and harbour dues.

Table [3.2]

RIS Operational Services

RIS Operational Services

Mainly traffic related

1. Fairway information Services (FIS)
2. Traffic information Services (TIS)
 - (a) Tactical traffic information (TTI)
 - (b) Strategic traffic information (STI)
3. Information to support Traffic Management (TM)
 - (a) Local traffic management (vessel traffic services - VTS)
 - (b) Lock and bridge management (LBM)
 - (c) Traffic Planning (TP)
4. Information to support Calamity Abatement (CAS)

Mainly transport related

5. Information to support Transport Logistics (ITL)
 - (a) Voyage planning (VP)
 - (b) Transport management (TPM)
 - (c) Port and terminal management (PTM)
 - (d) Cargo and fleet management (CFM)
 6. Information to support Law Compliance (ILC)
 7. Information to support Statistics (ST)
 8. Information for Waterway Charges and Harbour Dues (CHD)
-

[3.3] RIS Functions

Figure [3.1] shows the connections between operational services and functions and information elements. A set of information elements is combined into information categories. The information categories are presented in table [2.1] and give an overview of the information needs of the stakeholders of RIS.

Based on the information needs the RIS functions are defined and presented in table [3.3]. The table is intended to be used as a guide for those who have a responsibility to implement RIS operational services.

Each function in the table provides a function number, the function number is related to the first level information category. As an example: 'F2 – provide meteorological information' has a primary relation to category of infrastructure-related information.

Table [3.3]
Functional decomposition of River Information Services

Information Category		Functions		Function Number
1 st level	2 nd level	1 st level	2 nd level	
Fairway and Infrastructure related	Fairway Related Information	Provide navigation-based information on fairway and/or navigable water area		F1
			Provide information on bank of waterway, boundaries of the fairway, etc.	
			Provide information on depth profile of the fairway	
			Provide information on non-navigable or un-surveyed water area	
			Provide information on anchorage areas, mooring facilities and berths	
			Provide information on permanently moored vessel or facility in waterway	
		Provide meteorological information		F2
			Provide continuous weather information	
			Provide weather warnings	
			Provide actual ice situation	
			Provide predicted ice situation	
		Provide water level related information		F3
			Provide actual water levels	
			Provide predicted water levels	
			Provide actual discharge information	
			Provide predicted discharge information	
			Provide least sounded actual depths information (shallow sections)	
			Provide least sounded predicted depths information (shallow sections)	
		Provide barrage status		
		Provide regime status		
	Provide information on obstructions and limitations		F4	
		Provide information on long-time obstructions in the fairway		
		Provide information on temporary obstructions in the fairway		
		Provide information on ferries		
	Provide information on navigation rules and regulations		F5	
		Provide information on official Aids to Navigation		
		Provide information on traffic signs		
		Provide information on traffic rules and regulations		
	Provide information on anchorage areas, mooring facilities and berths			
	Provide information on waterway charges, harbour dues and infrastructure charges			
	Provide actual status of light signals			
Land Related Information	Provide information on land region		F6	
	Provide information on harbours		F7	
		Provide information on harbour area and basin		
		Provide information on category of harbour facility		
		Provide information on port schedule		
	Provide information on terminals		F8	
		Provide information on category of terminal		
		Provide information on cranes and boat ramps		
		Provide information on terminal schedule		
	Provide information on locks and ship lifts		F9	
	Provide information on construction and facility			
	Provide information on lock schedule			
	Provide operational status of locks			
Provide information on bridges		F10		
	Provide information on construction			
	Provide information on openable bridge schedule			
	Provide operational status of openable bridges			
	Provide information on vertical clearance			

Information Category		Functions		Function Number	
1 st level	2 nd level	1 st level	2 nd level		
		Provide information on cables/pipes overhead and other special constructions		F11	
		Provide information on construction			
		Provide information on vertical clearance			
		Provide information on waste reception facilities		F12	
Vessel related	Dynamic vessel data	Provide position information of vessels		V1	
		Provide actual position information of vessels			
		Provide historic position information of vessels			
		Provide vessel dynamics (i.e. RoT, velocity, CoG, SoG, ...)		V2	
		Provide actual vessel dynamics (i.e. RoT, velocity, CoG, SoG, ...)			
		Provide historic vessel dynamics (i.e. RoT, velocity, CoG, SoG, ...)			
	Event based triggers for vessel position	Provide notifications of arrivals at defined (passage) points of the waterway			
		Provide notifications of arrivals or departures at defined locations on the waterway			
	Hull related information	Provide information on hull data			V4
		Provide specific information on hull data			
		Provide data for the identification of vessels (minimum hull data set)			
		Provide full hull data			
		Provide information on craft certificates			V5
		Provide community certificate ¹⁴			
		Provide ADN tank certificate			
	Vessel-convoy related information	Provide overall convoy data			V6
		Provide information on convoy type			
		Provide information on the hulls of a convoy			
		Provide information on the characteristics of a convoy			
Voyage and cargo related	Location related information	Provide information on origin of voyage		VC1	
		Provide information on intermediate discharge locations		VC2	
		Provide information on passage points		VC3	
		Provide information on destination of voyage		VC4	
		Provide information on date/time of arrivals		VC5	
		Provide estimated date/time of arrivals			
		Provide requested date/time of arrivals			
		Provide date/time of actual arrivals			
		Provide information on estimated date/time of departures		VC6	
		Provide estimated date/time of departures			
	Provide date/time of actual departures				
	Provide date/time of requested departures				
	Provide information on the predicted deviation of the original voyage plan (of skipper) at defined points on the route (locks, crossings, berths) and terminals/ports		VC7		
	Cargo related data	Provide information on origin of cargo		VC8	
Provide information on destination of cargo			VC9		
Provide information on cargo details			VC10		
Provide details of cargo sender					
Provide details of cargo receiver					
Provide details of non-dangerous cargo					
Provide details of dangerous cargo					
Provide port of loading					

¹⁴ Note by the secretariat: SC.3/WP.3 may wish to consider replacing “community certificate” with “Ship’s certificate (Inland navigation vessel certificate)”.

Information Category		Functions		Function Number	
1 st level	2 nd level	1 st level	2 nd level		
Persons on board related information		Provide estimated date/time of departure at loading place			
		Provide port of discharge			
		Provide estimated date/time of arrival at discharge place			
		Provide loading unit related information		VC11	
		Provide number of containers on board			
		Provide information on type of containers on board			
	Persons on board related information	Provide information on number of persons /crew, passengers, ... on board		VC12	
		Provide details on persons on board		VC13	
	Traffic related	Object related information	Provide berth/terminal information		T1
			Number of vessels at berth		
Percentage of occupied berth space					
Exact location of vessel at berth					
Predicted number of vessels at berth at a certain time/in a time period					
Predicted percentage of occupied berth space at a certain time/in a time period					
Reserved berth space (in percent or list of vessels) at a certain time/in a certain period					
Provide information on operational status of locks				T2	
Door status (open, closing, closed, opening, malfunction, unknown)					
Chamber availability for navigation (Yes or No, if No then vessels entering, vessels leaving, locking in process, not in operation, unknown)					
Water level at lock chamber (low, leveling up, high, leveling down, unknown)					
Position of vessels in a lock chamber including number of blue cones or passenger vessel or certificate					
Number of announced vessels approaching the lock per sailing direction (arriving on short term)					
Number of vessels waiting for locking per sailing direction					
The still available length and/or width					
Provide information on actual passage time/duration at locks and bridges				T3	
Actual passage duration					
Actual waiting time					
Actual locking duration					
Sequence of entering the lock/passing bridge					
Provide information on predicted passage time/duration at locks and bridges			T4		
Predicted passage duration					
Predicted waiting time					
Predicted locking duration					
Planned locking time					
Provide information on average passage time/duration for certain categories/certain vessel types			T5		
Average passage duration					
Average waiting time					
Average locking duration					
Waterway section related information	Provide information on traffic density on a certain stretch and/or corridor (for specific vessel classes)		T6		
	Actual density				
	Predicted density				
	Average density				
	Provide information on sailing time over a certain stretch for certain vessel classes per sailing direction		T7		

IV. Revision of chapter 4 “RIS Key technologies”

SC.3/WP.3 may wish to rename the existing chapter 4 as “Recommendations for the implementation of RIS technical services” and modify it based on the text of chapter 5 of the PIANC RIS Guidelines 2019, which is reproduced below.

[5] Recommendations for the implementation of RIS technical services

[5.1] General

RIS should be based on technical services that facilitate the provision of information related to:

1. Fairway and infrastructure information ([5.2 and 5.3])
2. Vessel related information ([5.4])
3. Voyage and cargo related information ([5.5]).

The efficient and effective use of RIS technical services is based upon harmonized use of reference data. RIS reference data ensures the interoperability of RIS operational and technical services. [Chapter 5.6] provides recommendations on the implementation of reference data.

Several RIS technical services have their origin in the maritime domain; the following technical services are used on a global level:

1. ECDIS (Electronic Chart Display and Information System) as standardized by IMO; ENC (Electronic Nautical Charts) are standardized by IHO;
2. Notices to Mariners following IHO/IMO guidelines for navigational warnings.
3. The Automatic Identification System (AIS) as standardised by ITU (International Telecommunication Union) and IEC (International Electrotechnical Commission). The performance standard for AIS was defined by IMO (International Maritime Organization) and developed by IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities);
4. The EDIFACT standard as published by UN/CEFACT incorporating IFTDGN message and partially complying IMO FAL¹⁵ forms.

To ensure interoperability throughout the entire transport and logistics chain the components of the RIS technical services shall be aligned with applicable international standards and recommendations such as those issued by CCNR, IEC, IHO, IMO and IALA, ISO, ITU, PIANC, UNECE and other relevant bodies.

Apart from the defined RIS technical services, many technologies such as radar and VHF¹⁶ radiotelephone services, mobile data connections (e.g., mobile (telephone) networks, satellite, Wi-Fi, WiMax, LoRa, etc.) are important supporting technologies for RIS. Description of these technologies is beyond the scope of these guidelines.

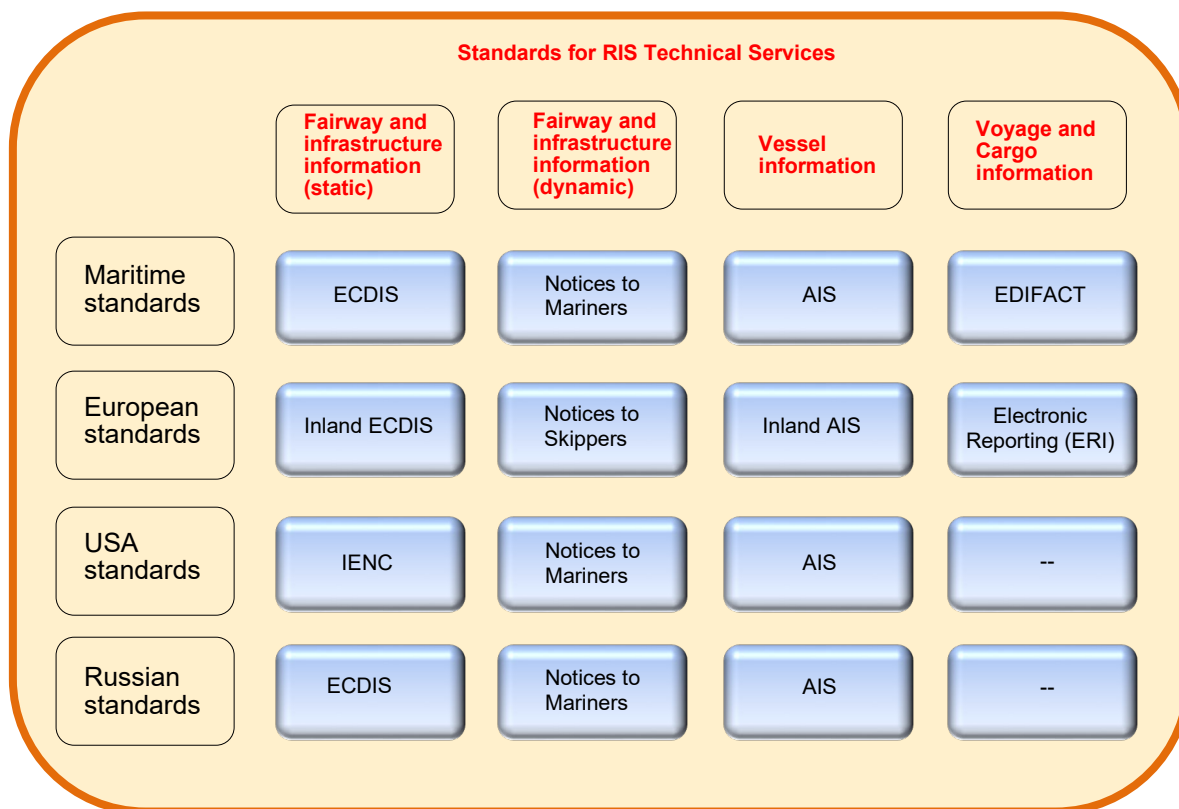
The PIANC RIS Guidelines 2019 are based on the basic RIS technical services as defined and developed in previous decades. Due to their operational service driven approach (as depicted in the functional decomposition in [chapter 3]), RIS operational services are open for the use of new technologies and technical services that might arise in coming years, for example, through development of the e-Navigation concept.

In different regions of the world, different versions or types of RIS technical services are implemented, these different technical services are depicted in the figure [5.1].

¹⁵ Convention on Facilitation of International Maritime Traffic.

¹⁶ Very high frequency.

Figure 5.1
Worldwide application of standards for RIS technical services



Worldwide provision of static fairway and infrastructure information is primarily accomplished using the Electronic Navigation Chart (ENC) in conjunction with Electronic Chart Display and Information System (ECDIS). In Europe the inland version (inland ECDIS) is used; in US inland waterways the inland ENC (IENC) is used with electronic charting systems (ECS). More information on this technical service is given in chapter [5.2] with more specific information and the related standards in [Annex 2].

Provision of dynamic fairway and infrastructure information is accomplished worldwide using the “Notices to Mariners.” In the European inland waterways this information is provided through “Notices to Skippers.” More information on this technical service is given in chapter [5.3] with more specific information and the related standards in [annex 3].

The Automatic Identification System (AIS) is used worldwide for vessel situational awareness and vessel tracking. In European inland waterways a version of AIS named “Inland AIS” is in use. More information on this technical service is given in chapter [5.4] with more specific information and the related standards in [annex 4].

For voyage- and cargo- related information, in European inland waterways the technical service on Electronic reporting (ERI) is in operation, based on the worldwide EDIFACT standard. More information on this technical service is given in chapter [5.5] with more specific information and the related standards in [Annex 5].

General information on “reference data” is given in chapter [5.6]. [Annex 6] provides details on standards for reference data.

[5.2] Technical Services to Support the Provision of Static Fairway and Infrastructure Information

The principal technical service in the RIS domain for the provision of static fairway and infrastructure information is an electronic navigational chart or ENC.

An ENC is an official database created by a national hydrographic office for use with an Electronic Chart Display and Information System (ECDIS), Electronic Charting System

(ECS), or other display system. An ENC should at least comply with the standards S-57 and S-58 stated by IHO.

ECDIS is a system for the display of electronic navigation charts (ENCs) and additional geographic related information. ECDIS is displaying selected information from a System Electronic Navigational Chart (SENC) with positional information from navigation sensors and (if required) additional navigation-related information. Its purpose is to contribute to safety and efficiency of navigation and thus also to protection of the environment and reducing the workload of the skipper.

Inland ENC are based on the standards for maritime ENC, supplemented with special information for the use on inland waterways. That means that currently:

(a) Inland vessels sailing in maritime waters with Inland ENC displays are able to portray all maritime ENC information.

(b) Sea-going vessels sailing in inland waters with maritime ENC displays are able to portray all information that is provided equivalent to marine information (e.g. river banks), but they will not portray the additional inland information (e.g. inland notice marks).

1. Sea-river vessels are recommended to use the additional Inland ENC software libraries in order to obtain full Inland ENC information. These are:

- S-57, S-63 or S-401
- S-58.

2. The presentation of ENCs should comply with the IHO S-52 Standard (edition 3.0) and with the amendments published by the IEHG.¹⁷

3. It is recommended to include the water depths in the ENCs (depth contours) for shallow river stretches that limit the draught of vessels using these waterways. The water depths may be related to a reference water level or to the actual water level. It is recommended to use the S-104 and S-112 product specifications if applicable.

[5.3] Technical Services to Support the Provision of Dynamic Fairway and Infrastructure Information

In the maritime domain the Notices to Mariners (NtM) standard is used for publication and provision of the status of navigation infrastructure. This is however not the only standard for providing waterway or navigation information, e.g. there is also Navtex, weather warnings etc.

The general idea is to provide dynamic fairway and infrastructure information in electronic format which allows for intelligent filtering and display of the available information.

1. Typically, the following types of information are provided through NtM:

- Dynamic fairway information
- Dynamic traffic related-information
- AtoN information
- Water level related messages
- Ice messages
- Weather related messages.

2. It is recommended that the provision of traffic related messages are:

- machine-readable
- language independent
- using official standardized location codes for referring to geographic objects

¹⁷ Inland ENC Harmonization Group.

- should be provided according an agreed encoding principle to ensure harmonized codification in different areas.

[5.4] Technical Services to Support the Provision of Vessel Information

The principal technical service in the RIS domain for the provision of vessel information is AIS.

The Automatic Identification System (AIS) is a shipborne radio data system, providing (static and dynamic) vessel related information between equipped vessels and between equipped vessels and shore stations. Shipborne AIS stations broadcast the vessel's identity, position and other data at regular intervals. By receiving this information, ship borne or shore based AIS stations within radio range can automatically locate, identify and track AIS equipped vessels and present this information an appropriate display integrated with radar and ECS information or Inland ENC display.

AIS is a source for navigation-related information but is not a navigation system. AIS does not replace navigation-related services such as tracking by radar, but augments and enhances them. The strength of AIS lies in the provision of ships identity and other navigation related data for those vessels fitted with it. AIS and radar complement one another due to their different characteristics.

For vessels on international voyages, AIS carriage requirements according to the SOLAS convention applies.

To ensure interoperability it is recommended to use AIS for the provision of vessel information in accordance with the standards as given in [annex 4] taking in account possible regional requirements.

Inland AIS is based on the standards for maritime AIS, supplemented with special information for the use on inland waterways.

[5.5] Technical Services to Support the Provision of Voyage and Cargo Information

Electronic Ship Reporting is a RIS technical service that facilitates the following RIS operational services:

- Strategic Traffic Information (STI)
- Traffic Management Information (TM)
- Information to Support Calamity Abatement (CAS)
- Statistics Information (ST)
- Information to support Law Compliance (ILC)
- Information on Waterway Charges and Harbour Dues (CHD)
- Information for Transport Logistics (ITL).

Electronic ship reporting will reduce the administrative burden and improve the quality of information being exchanged. Electronic ship reporting in Inland Navigation facilitates electronic data interchange 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.

Electronic transport notifications are intended to inform the Competent Authorities of the intention to make a defined voyage with a designated ship, either carrying a specified cargo or being empty. The transport notification can either originate from the skipper of the ship or from the shipper of the cargo on behalf of the skipper.

1. Exchange of ship, voyage and cargo data by electronic reporting reduces the need for voice communication via VHF and reduces errors in (verbally) reported information
2. Electronic reporting should replace the need for carrying physical documents.

3. Electronic reporting supports safety and calamity abatement and as such electronic reporting should be made mandatory as needed in support of these services.
4. It is the responsibility of the skipper or the agent or shipper of the transported cargo to report the required information.
5. It is required that the Competent Authorities are able, as far as ship reporting is required by national or international regulations, to receive and process electronic ship reports.
6. The Competent Authorities should take the necessary measures to ensure the confidentiality, integrity and security of information sent to them pursuant this standard. They should use such information only for the purposes of the intended operational services, for example support for calamity abatement (CAS) and border control and inspections as Law Compliance Information service (ILC).
7. It is required that a request to forward information contained in a 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.
8. An agreement on the protection of privacy between all involved public and private parties should be concluded, based on UNECE Recommendation 26 that contains a “Model Interchange Agreement” if applicable or regional agreements depending on regional or local legislation.
9. It is recommended that transport notifications shall be sent before the start of a voyage initially before entering the jurisdictional area of a Competent Authority and subsequently after every significant change of the voyage data, e.g. number of crew on board or number of barges in the convoy.
10. When a ship requires a permit for the voyage or part thereof, it is recommended that the competent waterway authority shall acknowledge the message after processing the contents of the notification. The acknowledgement will include the permission together with a reference or where applicable a refusal for such a permit together with further details upon the action to be taken.
11. Arrival notification and position reports are to inform the local waterway operators – such as lock masters, bridge operators, traffic centre operators, ports and docking crew – of the impending arrival of a ship. It is recommended that position reports will be sent at certain reporting points at the waterway. Arrival notifications and position reports can be obtained by AIS (preferably) or VHF radio.
12. In cross-border transport, it is recommended that electronic reports will be transmitted to the Competent Authorities of the neighbouring jurisdictional area and any such transmission is completed before arrival of the vessels at the border.

[5.6] Reference Data Supporting RIS Operational and Technical Services

Reference data is used to uniquely identify critical information needed in the provision of services.

RIS references and code tables are key elements in the RIS-standards and are an important link between the various RIS operational and technical services. The exchange of digital data without direct human involvement between RIS users and the providers of RIS operational services is facilitated by the use of codes and references. RIS reference data contributes to the automated and efficient interpretation of RIS information.

1. In order to guarantee a solid basis for the use of reference data and code tables, it is recommended to pay special attention to quality and maintenance aspects of the reference data. Maintenance procedures and procedures for distribution of the reference data and code tables are needed. These procedures should be understood and agreed upon by all parties making use of reference data.
2. It is recommended – as further specified in [annex 6] - to use:
 - the UN/LOCODE as part of the reference data for locations and

- the RIS index for the unambiguous coding of locations of geographic objects;
 - the IMO ship identification number as a unique reference for ships and for registered ship owners and management companies or management companies;
 - ENI number (European Number of Identification or European Vessel Identification Number) is a registration for ships capable of navigating on European inland waters;
 - the HS¹⁸-code to reference transported goods;
 - The UNECE ADN-code – the European code for the carriage of Dangerous Goods by Inland Waterways.
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¹⁸ Harmonized System.