UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

TRANS/SC.3/WP.3/2003/11
17 March 2003

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE
Working Party on Inland Water Transport

Working Party on the Standardization of
Technical and Safety Requirements in Inland Navigation
(Twenty-sixth session, 3 - 5 June 2003,
agenda item 5)

ESTABLISHMENT OF COMMON PRINCIPLES AND TECHNICAL REQUIREMENTS FOR A PAN-EUROPEAN RIVER INFORMATION SERVICE (RIS)

As a follow-up to the Pan-European Conference on Inland Water Transport (Rotterdam, 5 and 6 September 2001), the Working Party on Inland Water Transport, at its twenty-fifth session, agreed to complete its Programme of Work with a new element 02.6.2(o) entitled: "Establishment of common principles and technical requirements for a Pan-European river information service (RIS)" (TRANS/SC.3/155, para. 47).

Reproduced below for consideration by the Working Party (SC.3/WP.3) are the Guidelines and Recommendations for River Information Services established by the International Navigation Association (PIANC). Two annexes to the RIS Guidelines 2002 (on Inland ECDIS and on Inland AIS, respectively) are not reproduced below due to UN restrictions as to the maximum admittable number of pages of working documents. A complete English version of the Guidelines, including the two annexes is available, however, at the UNECE website: http://www.unece.org/trans/main/sc3/wp3/wp3doc_2003.html.

Guidelines and Recommendations for River Information Services
(RIS Guidelines 2002)

SUMMARY

1. Traffic and transport services and systems for inland navigation should be harmonised by using the internationally approved approach for River Information Services (RIS).

2. Harmonised RIS should cover the rivers, canals, lakes and ports in a river basin over a wide area, often beyond national boundaries.

3. RIS are not dealing with internal commercial activities between one or more of the involved companies, but RIS are open for interfacing with commercial activities.

4. In the focal points of RIS coverage areas, Vessel Traffic Services (VTS) may be established locally with the emphasis on traffic organisation. Reference is made to the Inland VTS Guidelines of IALA. However, RIS have not necessarily to include a VTS.

5. These RIS Guidelines 2002 describe the principles and general requirements for planning, implementing and operational use of River Information Services and related systems. These guidelines may be complemented by detailed guidelines and standards for applications in specific parts of the world.

6. In order to promote mutual understanding between all stakeholders in RIS, the terms and definitions given in the RIS Guidelines 2002 should be used in further standardisation work and in application design (chapter 2).

7. Vessels should be equipped step by step with information systems appropriate to the information available (chapter 3).

8. The RIS Architecture given in these Guidelines should be applied in transforming policy objectives into the development of services, systems and applications (chapter 4).

9. The individual services should be supported in conjunction with currently available technical systems like VHF Radio, mobile data communication systems, GNSS, Internet, Inland ECDIS and Inland AIS (chapter 5).

10. In planning RIS, a systematic procedure as described in these Guidelines should be followed. User groups should be consulted (chapter 6).

11. Taking full account of all factors (e.g. changes in transport activity, meteorological conditions and infrastructure), a step-by-step development of RIS from simple systems to highly sophisticated systems is recommended (chapter 7).

12. Standards should be further developed in co-operation with the maritime world and the standardisation organisations (chapter 8).

13. The rapid development of information and communication technology will pave the way to new application possibilities for inland navigation worldwide, and thus also call for updating the RIS Guidelines 2002.

ABBREVIATIONS

ADNR	Regulations for the Carriage of Dangerous Goods on the Rhine
AIS	Automatic Identification System (transponder)
BICS	Binnenvaart Informatie en Communicatie Systeem (Electronic reporting system)
CAS	Calamity Abatement Service
CCNR	Central Commission for the Navigation of the Rhine
CCTC	Closed Circuit Television
CEVNI	European Code for Inland Waterways, edited by UNECE
DGPS	Differential Global Positioning system
DVK	Dienst VerkeersKunde (Dutch)
ECDIS	Electronic Chart and Display Information system
UNECE	United Nations Economic Commission for Europe
EDI	Electronic Data Interchange
ENC	Electronic Navigable Chart
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FI	Fairway Information
FIS	Fairway Information Service
GLONASS	Global Orbiting Navigation Satellite System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HF	High Frequency
IALA	International Organisation of Marine Aids to Navigation and Lighthouse Authorities
IEC	International Electrotechnical Commission
IHO	International Hydrographic Organisation
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organisation
INDRIS	Inland Navigation Demonstrator of River Information Services (R&D project of EU)
ITU	International Telecommunication Union
LAN	Local Area Network
LBM	Lock and Bridge Management
OFS	Official Shipping Number
PIANC	International Navigation Association
PTM	Port and Terminal Management
RIS	River Information Services
RTA	Required Time of Arrival
SAR	Search And Rescue
SIGNI	Signs and Signals on Inland Waterways, edited by UNECE
SMS	Short Message Service
SOLAS	International Convention on Safety of Life at Sea
SOTDMA AIS	Self Organising Time Division Multiple Access AIS
STI	Strategic Traffic Information (Image)
TI	Traffic Information
TTI	Tactical Traffic Information (Image)
UMTS	Universal Mobile Telecommunication System
UTC	Universal Time Co-ordinated
VHF	Very High Frequency
VTC	Vessel Traffic Centre
VTMIS	Vessel Traffic Management and Information Services (maritime navigation)
VTS	Vessel Traffic Services
WAP	Wireless Application Protocol

RIS Guidelines 2002

1 INTRODUCTION

(1) There is an increasing need for information exchange between parties in the inland navigation world. In particular, the exchange of traffic related information dealing with safety and of transport related information mainly focused on efficiency may benefit to actors involved in both types of activities.

(2) During the last decades, a significant number of services and systems, dealing with vessel traffic and transport management, were developed and some are in operation. The inland waterborne transport sector is now faced with the challenge of integrating these building blocks into a common architecture that offers some degree of consistency and synergy across applications.

(3) Comprehensive and international Guidelines on River Information Services (RIS Guidelines 2002) are needed, in order that the already existing standards for particular river information systems and services can be harmonised by a common frame.

(4) These RIS Guidelines 2002 describe the principles and general requirements for planning, implementing and operational use of River Information Services and related systems.

(5) These RIS Guidelines 2002 are equally applicable to the traffic of cargo vessels, passenger vessels and pleasure craft.

(6) These Guidelines should be used in conjunction with international regulations, recommendations and guidelines, such as :

(a) Inland VTS Guidelines of the IALA (worldwide), 2001
(b) Regional Arrangement Concerning the Radiotelephone Service on Inland Waterways (Europe), 2000
(c) Inland ECDIS Standard by the Central Commission for the Navigation of the Rhine, 2001
(d) UN Location Code for electronic reporting (worldwide)
(e) EDIFACT Standard (worldwide)
(f) Standardised UNECE Vocabulary for Radio Connections in Inland Navigation (Europe), 1997

(7) A number of concepts and standardisation proposals for River Information Services have been developed in the research and development project INDRIS of the European Union. These are:

(a) Guidelines and Recommendations for RIS, 1999 (used as starting point to these RIS Guidelines 2002 by PIANC WG 24)
(b) Functional definition of the RIS concept, 1998
(c) Standardisation of data communication (AIS, GNSS, Internet), 1999
(d) Standards for tactical data exchange, communication and messages (Inland AIS), 1998
(e) Standardisation of data, 1998
- Standards of codes (country, location, terminal, type of vessel, cargo),
- RIS scenarios (functions)
- Data-interchange standards (Edifact, S-57 update mechanism)

(f) Reporting databases, 1999

(8) The concept for Inland ECDIS has been developed in the German ARGO project in co-operation with INDRIS.

(9) The concept for RIS architecture has been developed by the WATERMAN Thematic Network, a research action under the 5th Framework Programme of the EU in the fields of VTMIS (maritime navigation) and RIS.

(10) These RIS Guidelines 2002 have been developed in consultation with IALA.

2 DEFINITIONS

The following terms are used in connection with River Information Services in these Guidelines (see also some specific definitions in chapter 4).

2.1 River Information Services (RIS): River Information Services is a concept for harmonised information services to support traffic and transport management in inland navigation including interfaces to other transport modes. RIS aim at contributing to a safe and efficient transport process and they aim to utilise the inland waterways to their fullest extent.

Explanatory notes:

RIS include interfaces with other transport modes on sea, roads and railways. *Rivers* in the context of RIS include all types of inland waterways, e.g. also canals, lakes and ports. RIS is also the generic term for all individual information services to support inland navigation in a harmonised way. RIS collect, process, assess and disseminate fairway, traffic and transport information.

RIS are not dealing with internal commercial activities between one or more of the involved companies, but RIS are open for interfacing with commercial activities.

2.2 River Information System: For the purpose of RIS, modern River Information Systems consist of one or more harmonised IT systems. An IT system (information technology system) is the totality of human resources, hardware, software, communication means and regulations in order to fulfil the task of processing information.

2.3 RIS Area: The RIS Area is the formally described area where RIS are active. A RIS Area may comprise the waterways in a geographical river basin, including the territories of one or more countries (**Figure 1**).

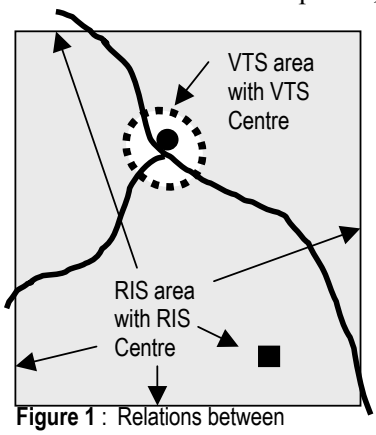

Figure 1 : Relations between RIS area / VTS area

2.4 RIS Centre: A RIS Centre is the place where the services are managed by operators. A RIS may exist without a RIS Centre (e.g. an Internet service, a buoys service). When ship/shore interaction in both ways (e.g. by VHF service) is intended one or more RIS Centres are needed. If a VTS Centre or a lock exists in a RIS area, they may also be used as RIS Centres. It is recommended to concentrate all services in a RIS area into one single RIS Centre.

2.5 Inland VTS: Inland Vessel Traffic Services are a service, implemented by a Competent Authority, designed to improve the safety and efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with the traffic and to respond to traffic situations developing in the VTS area (see Inland VTS Guidelines of IALA). Where present, Vessel Traffic Services (VTS) are part of

River Information Services (**Figure 1**). Within RIS, Inland VTS belong to the group of Traffic Management Services with the emphasis on traffic organisation (ch. 4.5 and 5.3.1).

2.6 Competent Authority: The Competent Authority is the authority made responsible, in whole or in part, by the government for safety, including environmental safety, and efficiency of vessel traffic and the protection of the environment (see for comparison IALA Inland VTS Guidelines). The Competent Authority usually has the task of planning, arranging funding and of commissioning of RIS.

2.7 RIS Authority: The RIS Authority is the authority with the responsibility for the management, operation and co-ordination of the RIS, the interaction with participating vessels and safe and effective provision of the service (see for comparison definition in the Inland VTS Guidelines of IALA).

2.8 RIS Users: The users of the services can be described in a number of different groups: shipmasters, RIS operators, lock/bridge operators, waterway authorities, terminal operators, operators at emergency services/calamity centres, fleet managers, cargo shippers.

2.9 Levels of RIS Information: River Information Services work on the basis of different information levels. While Fairway Information contains the data of the waterway only, Traffic Information has also the information on the movement of vessels in the RIS area. Traffic Information (TI) is provided by traffic images.

There are three levels of information:

(1) *Fairway Information (FI)* contains geographical, hydrological, and administrative information regarding the waterway (fairway) 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 office.

(2) *Tactical Traffic Information (TTI)* is the information that affects the shipmaster's or the VTS operator´s immediate navigation decisions 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 presented on an Electronic Navigational Chart (Annex 1) and - if available - enhanced by external Traffic Information, such as the information delivered by an AIS (Annex 2). TTI may be provided as a *TTI on board* of the vessel or a *TTI on shore* in a VTS Centre.

(4) *Strategic Traffic Information (STI)* is the information that affects 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, reported by VHF voice reporting or electronic ship reporting, stored in a database and presented in a table or on an electronic map. Strategic Traffic Information may be provided as an STI on shore in a RIS/VTS Centre or in an office.

3 PARTICIPATING VESSELS

(1) Vessels navigating in a RIS area shall make use of mandatory services and are recommended to make use as far as possible of the information provided by RIS and relevant services.

(2) Decisions concerning the actual navigation and the manoeuvring of the vessel remain within the responsibility of the shipmaster. Any information provided by the RIS cannot replace any decision made by the shipmaster.

(3) Depending on the level of information available and on the requirements of the Competent Authority, the vessels (except pleasure craft) are recommended to be equipped step by step with (ch. 4.9):

(a) Radio equipment for the simultaneous reception of inland navigation radio on two VHF channels (ship/ship and ship/shore);
(b) A radar for the presentation of the traffic in the close surroundings of the vessel;
(c) A PC with modem and mobile communication facilities (GNSS) for the reception of e-mail and Internet, for electronic reporting, and for the presentation of Electronic Navigable Charts (ENCs);
(d) An automatic identification system (AIS) - transponder - with (D)GPS included for the transmission and receiving of identification data on vessels and cargoes;
(e) An Electronic Navigable Chart (ENC), Annex 1;
- in Information Mode
- in Navigation Mode with radar/AIS overlay

4 RIS ARCHTECTURE

4.1 General

The idea of WATERMAN (ch. 1(9)) behind the development of a systems architecture for RIS is to translate policy objectives into specifications for application design. The RIS Architecture should be defined in such a way that RIS Applications will be produced that are efficient, expandable, and that can interact with other RIS Applications or systems for other modes of transport. RIS Architecture development should to lead to an integrated environment of RIS Applications in a way that the performance, usefulness and efficiency of the applications will be enhanced. River Information Services may be developed and redesigned according to **Figure 4.1.**

In the following paragraphs of chapter 4, the components of the RIS Architecture will be further elaborated.

4.2 Stakeholders

4.2.1 Policy Makers: These want the RIS to solve (or diminish) traffic and transport problems. One party of policy makers are the authorities responsible for safety on the waterways. Other policy makers, e.g., organisations of ship owners, want to provide transport/logistical information services to cargo shippers and terminal operators. The different groups of policy makers have their own policy *objectives, tasks* and ideas about the required *services* to achieve its objectives. Once the services have been selected, the *functions* with their restrictions and interactions for providing these services should be determined.

4.2.2 Regional Managers: Regional Managers control the system, e.g. waterway managers of the Competent Authority, traffic control managers, managers of search and rescue services, ship owners, and cargo shippers. They define requirements for *applications* with more detailed and accurate descriptions of the services and the functions, regarding local aspects or aspects of man/machine interface.

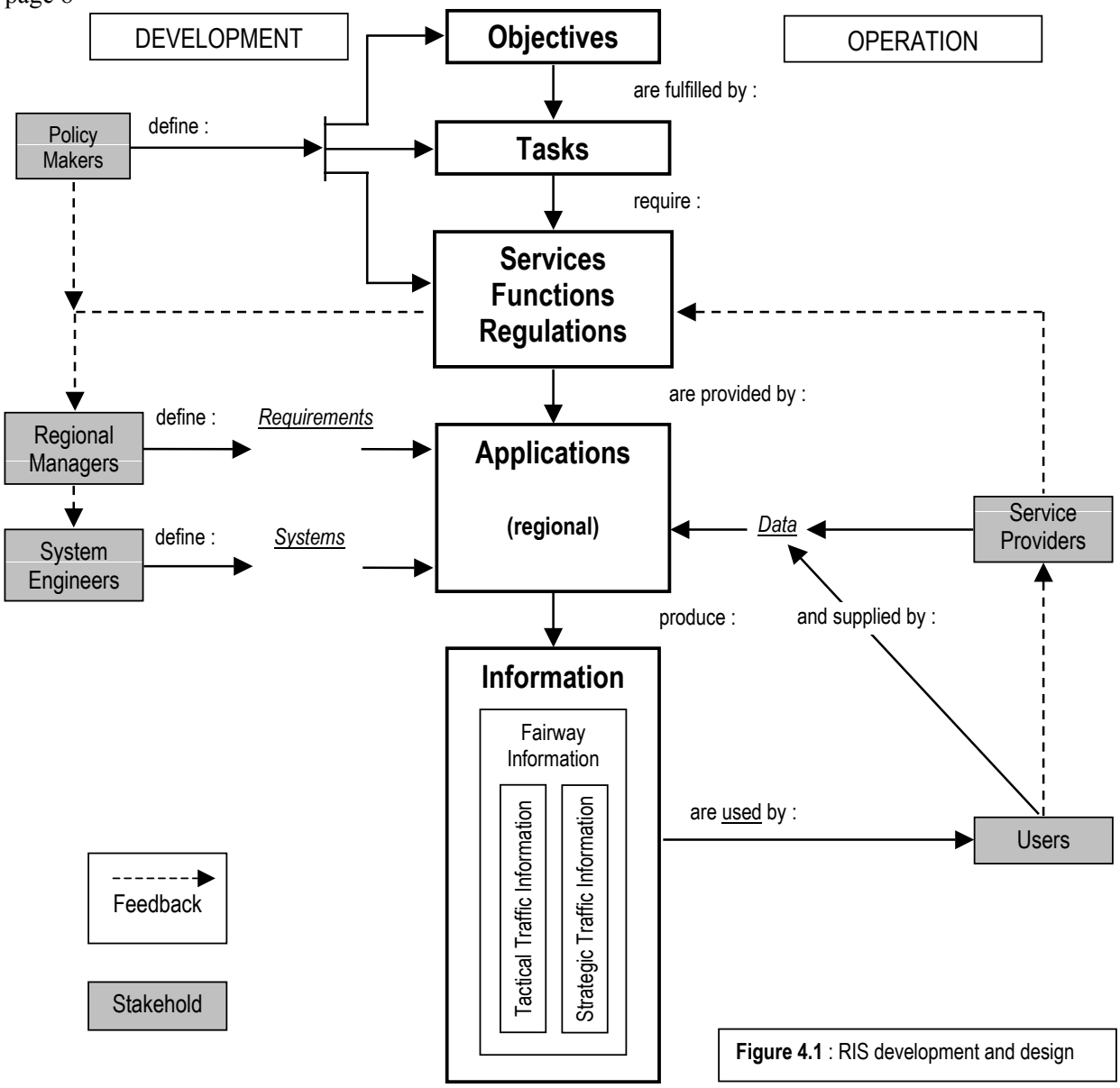

Figure 4.1 : RIS development and design

4.2.3 System Engineers: System Engineers prepare systems specifications and deliver hardware and software components to the *systems*. RIS and VTS suppliers, system integrators, and telecommunication operators will combine the components into complete systems.

4.2.4 Service Providers: Service Providers develop, maintain and operate the RIS application. They provide the main input into the applications either by themselves or by operators.

4.2.5 RIS Users: refer to 2.8

4.3 RIS Objectives

An objective is the description of intention. The objective may also be called the goal or aim. RIS have three main objectives:

(1) Transport should be **safe:**

- Minimise injuries

- Minimise fatalities
- Minimise voyage incidents

(2) Transport should be **efficient:**

- Maximise throughput or effective capacity of waterways
- Maximise the carrying capacity of vessels (length, width, draught and height)
- Reduce travel time
- Reduce workload
- Reduce transport costs
- Reduce fuel consumption
- Provide efficient and economical link between transport modes
- Provide efficient harbours and terminals

(3) Transport should be **environmentally friendly:**

- Reduce environmental hazard
- Reduce polluting emissions and spills due to accidents, illegal actions or normal operations.

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

4.4 RIS Tasks

Tasks are defined work units with one or more responsible parties (organisations, persons). Tasks are related to objectives in order to fulfil these and describe work on an abstract level. The tasks will define the approach for development of services. RIS support three main tasks:

(a) *Management tasks*

- Vessel (in particular management of navigation)
- Traffic
- Waterways (incl. fairway, locks, bridges and aids to navigation)
- Fleet
- Cargo flow
- Port and terminal
- Supporting services

(b) *Protection tasks*

- Vessels and shipmasters
- Environment
- Infrastructure
- Surrounding area

(c) *Enforcement tasks*

- Traffic rules
- Environmental rules
- Labour rules
- Statistical data rules

4.5 Subdivision of RIS (Services)

A service provides and uses information. It supports the user in achieving an improvement in performance. Services are developed by projects (stakeholder driven or by technology push). Services are the means for the user to achieve the objectives. A task can be carried out by using one or more services. RIS may be subdivided into different services that support the vessel/waterway system (**Table 4.5**).

Table 4.5 : RIVER INFORMATION SERVICES

Mainly traffic related:		*Mainly transport related:*
1) Fairway Information Service (FIS) a) Visual Aids to Navigation b) Radiotelephone Service on Inland Waterways c) Internet Service d) Electronic Navigational Chart Service **2) Traffic Information Service (TI)** a) Tactical Traffic Information (TTI) Service b) Strategic Traffic Information (STI) Service **3) Traffic Management (TM)** a) Local Traffic Management (Vessel Traffic Services - VTS) b) Lock and Bridge Management (LBM) **4) Calamity Abatement Service (CA)**	**5) Voyage Planning (VP)** **6) Port and Terminal Management (PTM)** **7) Cargo and Fleet Management (CFM)** **8) Statistics (ST)** **9) Waterway Infrastructure Charges (IN)**	

4.6 RIS Functions

A RIS function is understood to be a contribution to a service. The functional decomposition of River Information Services (RIS) allows the allocation of information supply to user demand. **Table 4.6** shows the connections between services (4.5), functions (4.6), users (2.8) and information levels (2.9). It shows also that in many cases the same function serves to many participants in the transport process. Table 2 gives an example as a guide to anybody else and may remind the reader in making his/her own list.

Table 4.6: Functional decomposition of River Information Services

No.	RIS Service RIS Function	Information Level	User							
			Ship Master	VTS Operator	Lock/ bridge Operator	Waterways Authority	Terminal Operator	Calamity Centre	Fleet Manager	Cargo Shipper
FIS	**Fairway Information Service**									
FIS.1.	Geographic of the navigation area and their updates	FIS	X	X	X	X		X	X	X
FIS.2	Navigation aids and traffic signs	FIS	X	X	X	X		X		
FIS.3	Water depths contours in the navigation channel	FIS	X	X	X	X	X	X		X
FIS.4	Long time obstructions in the fairway	FIS	X	X		X		X		
FIS.5	Actual meteorological information	FIS	X	X		X		X		
FIS.6	Temporary obstructions in the fairway	FIS	X	X		X		X		
FIS.7	Present and future water levels at gauges	FIS	X	X		X		X		
FIS.8	State of the rivers, canals, locks and bridges in the RIS area	FIS	X	X		X		X		
FIS.9	Restrictions caused by flood and ice	FIS	X	X		X		X		
FIS.10	Malfunctions of aids to navigation	FIS	X	X		X				
FIS 11	Short term changes of lock and bridge operating times	FIS	X	X		X				
FIS 12	Short term changes of aids to navigation	FIS	X	X		X				
FIS.13	Regular lock and bridge operating times	FIS	X	X		X		X	X	
FIS.14	Physical limitations on waterways, bridges and locks	FIS	X	X	X	X		X	X	X
FIS.15	Navigational rules and regulations	FIS	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				
TI	**Traffic Information**									
TTI	*Tactical Traffic Information (short term related)*									
TTI.1	Presentation of own vessels´s position	TTI	X							
TTI.2	Presentation of other vessel´s positions	TTI	X							
STI	*Strategic Traffic Information (medium and long term related)*									
STI.1	Presentation of Fairway Information (=FIS)	FIS	X			X				
STI. 2	Presentation of vessel´s positions in large surroundings	STI	X			X				
STI.3	Medium and long term assessment of traffic situation	STI	X			X				
STI.4	Presentation of vessel's characteristics	STI	X		X	X	X	X		X
STI.5	Presentation of cargo´s characteristics	STI	X		X	X	X	X		X
STI.6	Intended destination	STI	X	X		X	X	X		X
STI.7	Information on incidents/accidents in coverage area	STI	X	X		X		X		
STI 8	Organisation and regulation of traffic flow	STI	X	X		X				
	Traffic Management									
VTS	*Vessel Traffic Services (local)*									
VTS.1	Presentation of vessel´s positions in large scale	TTI		X						
VTS.2	Monitoring of passing and manoeuvring arrangements	TTI		X						
VTS.3	Short term assessment of traffic situation	TTI		X						
VTS.4	Organisation and regulation of traffic flow in RIS coverage area	TTI		X						

Table 4.6: Functional decomposition of River Information Services

No.	RIS Service RIS Function	Information Level	User							
			Ship Master	VTS Operator	Lock/ bridge Operator	Waterways Authority	Terminal Operator	Calamity Centre	Fleet Manager	Cargo Shipper
LBM	*Lock and bridge management*									
LBM.1	*Lock/bridge operation*									
LBM.1.1	Presentation of actual status of lock/bridge process	TTI	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					
LBM.2	*Lock/bridge planning*									
LBM.2.1	ETAs of approaching vessels	STI			X					
LBM.2.2	Medium and long term schedule lock/bridge process	STI			X	X				
LBM.2.3	Medium and long term RTA´s of vessels	STI	X		X					
CA	**Calamity abatement**									
CA.1	Information on incidents focused on traffic situation	TTI	X			X		X		
CA.2	Assessment of the traffic situation in the situation of an incident	TTI				X		X		
CA.3	Co-ordination of the assistance of patrol vessels	TTI		X		X		X		
CA.4	Assessment of the possible effects of the accident on environment, people and traffic	TTI				X		X		
CA.5	Presentation of information to patrol vessels, police boats, fire squad boats	TTI				X		X		
CA.6	Initiation and co-ordination of search and rescue activities	TTI	X			X		X		
CA.7	Measures on traffic, environmental and people protection	TTI				X		X		
VP	**Voyage planning**									
VP.1	Port of destination, RTA at final destination, type of cargo	STI	X						X	
VP.2	Information on the fairway network at different scales	STI	X						X	
VP.3	Presentation of lock and bridge opening times and general waiting times	STI	X						X	
VP.4	Presentation of long term weather information	STI	X						X	
VP.5	Presentation of mid and long term prediction of water levels,	STI	x						X	
VP.6	Information on route characteristics with RTAs, ETAs, ETDs at waypoints	STI	X						X	
VP.7	Presentation of information affecting travel information	STI	X							
CF	**Cargo and fleet management**									
CF.1	Information on fleet of vessels and their transport characteristics	STI							X	
CF.2	Information on the cargo to be transported	STI							X	X
PTM	**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			
PTM.1.2	Presentation of actual status of terminal process	TTI					X			
PTM.1.3	RTAs of vessels, waiting places, positions	TTI	X				X			
PTM.2	*Port or terminal planning*									
PTM.2.1	ETAs of approaching vessels	STI					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			
ST	**Statistics**					X				
ST.1	Transit of vessels and cargo at certain points (locks) of the waterway					X				
IN	**Waterway Infrastructure Charges**		X		X	X				

4.7 Regulations

As an important aspect of the policy level, national and local authorities have the responsibility and the possibility for issuing regulations on how to implement and use the systems as part of ensuring that the objectives of the society as a whole, for which the systems were created, are met. Special issues in this field are the rules and regulations with respect to the protection of the confidentiality of personal and commercial information. For cross-border inter-operability, the international authorities may also issue regulations, as well as standards and recommendations.

4.8 RIS Applications

RIS Applications are regional or dedicated uses of systems under specific requirements: local, functional, process-oriented. A single application can use one or more systems to provide a service.

4.9 RIS Systems

A wide range of technical systems has been developed for RIS, most of them used for more than one service, function or application (**Table 4.9**):

Table 4.9: Relation between Services and Systems

SYSTEM	SERVICE										
		Traffic Information		Traffic Management							
	Fairway Information	Tactical	Strategic	Vessel Traffic Services	Lock and Bridge Management	Calamity Abatement	Voyage Planning	Port and terminal management	Fleet and cargo management	Statistics	Waterway Infrastructure Charges
Visual aids to navigation	X										
Radar reflecting aids to navigation	X										
Light signals				X	X						
Cellular phone (voice and data)	X				X	X	X	X	X		X
GNSS for vessel positioning		X	X			X	X	X			
VHF radio	X	X	X	X	X	X	X	X			
Internet	X						X	X	X		X
Vessel based radar	X	X									
Shore based radar		X		X	X						
Shore based CCTV cameras		X		X	X						
Inland ECDIS	X	X		X	X	X	X				
Automatic Identification System		X	X	X	X	X	X	X	X		
Ship Reporting System			X		X	X	X	X	X	X	X

5 INDIVIDUAL SERVICES

Since technology changes fast, the emphasis is laid on services and less on technology dependent systems in this chapter.

5.1 Fairway Information Services (FIS)

5.1.1 General

(1) Traditional means to supply FIS are e.g. visual aids to navigation, notices to shipmasters on paper, broadcast and fixed telephone on locks. Cellular phone by GNSS has added new possibilities of communication, but it is not available in all places and at all times. Tailor-made FIS for the waterways can be supplied by :

(a) Radiotelephone Service on Inland Waterways.
(b) Internet service.
(c) Electronic Navigable Chart (Inland ECDIS with ENC) service.

These three FIS categories are dealt with in this chapter 5.1. They are mainly based on the current situation, but for example notices to shipmasters may be supplied also via ENC service in the future.

(2) Types of Fairway Information are listed in **Table 4.6**

(3) Fairway Information contains *static, dynamic* as well as *urgent* information regarding the fairway. The urgent information needs to be updated very frequently and/or should to be communicated on a real time basis (by VHF or electronic data interchange). Dynamic and static information should be communicated on a scheduled basis.

(4) Safety related Fairway Information should be provided by or on behalf of the Competent Authority.

(5) Fairway Information for an international river area should be given by one single dissemination point that is provided with data from the Competent Authorities concerned.

(6) Safety related data provided should be certified by the Competent Authority as much as possible.

(7) Values should only be given with an indication of the accuracy that can be attached to it.

(8) Fairway Information Services should be provided through the approved communication tools (e.g. “notices to shipmasters” via the Internet or by VHF) and be given tailor-made as much as practicable.

(9) In order to enable navigation in poor visibility by means of radar, the fairway should be equipped with radar reflecting top marks on buoys and beacons and with radar marks in front of bridge piles. The equipment of the fairway for radar navigation is the infrastructure task of “radar reflecting aids to navigation”. This task is related to, but not part of RIS. Therefore, it is not dealt with in these RIS Guidelines 2002.

5.1.2 Radiotelephone Service on Inland Waterways

(1) The Radiotelephone Service on Inland Waterways enables the establishment of radio communication for specific purposes by using agreed channels and an agreed operational procedure (service categories). The Radiotelephone Service on Inland Waterway comprises five service categories:

- Ship to ship.
- Nautical information.
- Ship-to-port authorities.
- On board communications.
- Public correspondence (service on a non-mandatory basis).

Of these five categories only the first three are important for RIS. The Radiotelephone Service enables direct and fast communication between shipmasters, waterway authorities and port authorities. It is best suited for urgently needed information on a real time basis.

(2) The Radiotelephone Service on Inland Waterways is based on the following rules and regulations:

(a) Radio Regulations of the International Telecommunication Union ITU (worldwide).

(b) Regional Arrangement concerning the Radiotelephone Service on Inland Waterways (Europe, 06.04.2000).

(c) Standardised UNECE vocabulary for radio connections in inland navigation (UN Economic Commission for Europe No. 35, 1997).

(e) National inland waterway rules of navigation.

(3) In the service categories ship-to-ship, nautical information and ship-to-port authorities, the transmission of messages should deal exclusively with the safety of human life, movement and the safety of ships.

(4) Fairway Information by voice in the nautical information (shore/ship) service category is recommended to be implemented:

(a) For urgent information that needs to be updated frequently and has to be communicated on a real time basis.

(b) For dynamic information that has to be communicated on a daily basis.

(5) The urgent and dynamic information to be communicated by voice radio concerns for example:

(a) Temporary obstructions in the fairway, malfunctions of aids to navigation.
(b) Short term changes of lock and bridge operation times.
(c) Restrictions in navigation caused by flood and ice.
(d) Present and future water levels at gauges.

(6) The RIS area should be fully covered by the range of the VHF base stations for nautical information.

(7) In the nautical information service category, “notices to shipmasters” may be transmitted “to all shipmasters” as:

(a) Scheduled reports on the state of the waterways incl. water level reports at the gauges at fixed times of the day.

(b) Urgent reports at special events (e.g. traffic regulations after accidents).

(8) It should be possible for the operator in the RIS Centre to answer specific questions of shipmasters on demand and to receive reports from shipmasters.

5.1.3 Internet Service

(1) An Internet homepage is recommended to be established for the following types of Fairway Information:

(a) Dynamic nautical information on the state of the waterways that needs to be communicated not faster than on a daily basis. This information may have the form of “notices to shipmasters”.

(b) Dynamic hydrographical information, as actual water levels, water level predictions, navigation channel depths (if available), ice and flood predictions and reports. This information may be presented in the form of dynamic tables and diagrams.

(c) Static information (e.g. physical limitations of the waterway, regular operating times of locks and bridges, navigational rules and regulations). This information may be presented in the form of static Internet pages.

(2) A standard vocabulary should be used for the "notices to shipmasters" in order to enable easy or automatic translation into other languages.

(3) For a dense and/or extended waterway network, the dynamic information may be organised in interactive databases (content management system) in order to enable easy access to the data.

(4) In addition to the Internet presentation, the "notices to shipmasters" may be mailed by
(a) E-mail subscription to computers on board of vessels and in offices.
(b) SMS subscription to mobile phones.
(c) WAP pages to mobile phones.

(5) In order to facilitate route planning by the shipmaster, all Fairway Information needed for a route from port of departure to port of destination may be presented on one page on demand by the user.

5.1.4 Electronic Navigable Chart Service (Inland ECDIS)

(1) Electronic Navigational Charts (ENC) as a means of presenting Fairway Information should fulfil the regulations for the Information Mode of the Inland ECDIS standard. (see Annex 1).

(2) The chart information to be used in Inland ECDIS should be the latest edition of information.

5.2 Traffic Information Service

5.2.1 General

Information concerning the traffic situation may be provided in two ways (ch. 2.8):

(a) As Tactical Traffic Information (TTI) using radar and - if available - AIS with underlain Electronic Navigational Charts.
(b) As Strategic Traffic Information on (STI) using a Ship Reporting System (e.g. database with ship and cargo data, reports by VHF, cellular phone -voice and data - or Inland AIS).

5.2.2 Tactical Traffic Information (TTI) Service

(1) Vessels should be equipped with radar in order to monitor all other ships in the close navigational surroundings to the shipmaster in poor visibility.

(2) A Tactical Traffic Image on board (ch. 2.8) should be enhanced by displaying the radar signals and - if available - AIS signals on an Electronic Navigable Chart (ENC). The radar and AIS information should be clearly distinguishable from the chart information

(3) The integrated display (radar, AIS and ENC) should be in accordance with the requirements for the *Navigation Mode* of the Inland ECDIS standard (see Annex 1). In Navigation Mode, an Inland ECDIS (operating system software, application software and hardware, radar) should have a high level of

reliability and availability at least of the same level as other means of navigation. An Inland ECDIS equipment for Navigation Mode should be certified by the Competent Authority.

(4) In Navigation Mode of Inland ECDIS, the vessel's position should be derived from a continuous positioning system of which the accuracy is consistent with the requirements of safe navigation.

(5) In Navigation Mode of Inland ECDIS, at least the safety relevant geo-objects should be included into the ENC. The Competent Authority should verify the safety relevant information in the ENC.

(6) It is recommended to include all geo-objects of the object catalogue for Inland ECDIS into the ENC.

(7) It is recommended to include into the ENC the water depths (depths contours) for shallow river stretches that determine the draught of the vessels. The water depths may be related to a reference water level or to the actual water level.

(8) Using AIS as additional position sensor for detection of surrounding vessels, AIS should fulfil the requirements of the Inland AIS standard (see Annex 2). No shore based AIS stations are needed. The AIS vessels should be identified on the tactical traffic image, and other additional information on these vessels should be available.

(9) VTS Centres may send information about vessels which are not carrying AIS (pseudo-AIS targets) and which are tracked only by radar, via AIS to vessels equipped with AIS (**Figure. 5.2.2).**

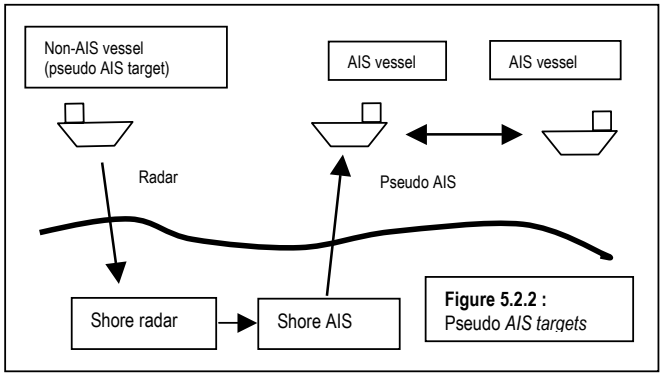

Figure 5.2.2 :
Pseudo *AIS targets*

(10) Tactical Traffic Information on shore is used in VTS traffic management (ch. 5.3.1).

(11) RIS Centres may also send short messages to all vessels within a certain range via AIS, e.g. local navigational warnings.

5.2.3 Strategic Traffic Information (STI) Service (Ship Reporting)

(1) Strategic Traffic Information should be established when a permanent survey of the shipping situation in the RIS area is needed for medium term and long-term decisions (e.g. for the emergency management at flood and ice).

(2) Strategic Traffic Information can be auxiliary to the following services:

(a) Lock and Bridge Management (calculation of Estimated Times of Arrival-ETAs-and Required Times of Arrival -RTAs-).
(b) Voyage Planning.
(c) Calamity Abatement (vessel and cargo data).
(d) Terminal Management (calculation of ETAs and RTAs).

(3) A Ship Reporting System with a RIS Centre should be established for Strategic Traffic Information. The RIS Centre of the Competent Authority should have the task of collecting, verifying and disseminating the reported data.

(4) The STI should be is delivered to RIS Users (ch. 2.7) on demand (ch.5.6).

(5) Vessel and cargo data should be collected in a database. The database will be filled up by:

(a) Voice reporting via cellular phone.
(b) Voice reporting via VHF (ch. 5.1.2 (7)).
(c) Electronic reporting via on-board computer (e.g. BICS application), modem and mobile communication facilities (e.g. cellular phone data) for initial reports on vessel and cargo.
(d) Electronic reporting via Inland AIS (see Annex 2) for progress reports (position and ETA).

(6) Reports from inland vessels should have an agreed format, e.g.:

(a) UN Location code.
(b) UN Harmonised System Code for cargoes.
(c) Common ship identity code.
(d) Common ship type code.

(7) A possible composition of data sets for different services like Lock and Bridge Management, Calamity Abatement or Terminal Management is given as an example in **Table 5.2.3.**

Table 5.2.3: Data set for Ship Reporting (example)

Static data of vessels in composition	
Type	MV
Name	Arcona
Official shipping No. (for sea vessels IMO-no.)	4620004
Length	110m
Width	11.40m
Variable data	
No. of crew on board	3
Position (by waterway and km or by longitude and latitude)	Emmerich, km 57,0
Sailing direction	Upstream bound
Number of vessels in composition	2
Length/width of composition	187 m
Width of composition	11.40 m
Draught	3.20 m
Next reporting point (lock/bridge, terminal)	Mediate lock
ETA at reporting point with accuracy	17.30 ± 0.30
For each partial cargo	
Category of cargo	Chemical product
Loading port (UN-Locode)	Rotterdam
Destination port (UN-Locode)	Mannheim
Amount of cargo (tons)	2800 tons
Only if dangerous cargo:	
Name of cargo	Na-Nitrit
Code of Cargo	ADN, ADNR
Class	5.1
No.	6
UN-No. (if available)	1500
Quantity of blue cones/lights	1

(8) A Strategic Traffic Image on shore may be restricted to special types of vessels (e.g. extraordinarily big vessels, vessels with dangerous cargo, special transports, special tug combinations).

(9) Data interchange should be established between the RIS Centres of neighbouring authorities. Depending on the number of vessels involved this should be done by telephone, fax, e-mail and electronic data interchange.

5.3 Traffic Management

5.3.1 Local Traffic Management (Vessel Traffic Services - VTS)

(1) Reference is made to the Inland VTS Guidelines of IALA (ch. 1, no. 5.a) and to the Standards for Training and Certification of VTS Personnel, IALA recommendation V-103, 1998.

(2) A VTS Centre for local traffic management by means of a Tactical Traffic Image on shore (ch. 2.9) should be established for the safety of navigation in difficult local situations and for the protection of the surrounding human population and infrastructure, from potential dangers of shipping. It emphasises on traffic organisation. The difficult local situations may be:

(a) Narrow fairway and/or shoals.
(b) Narrow bends.
(c) Narrow and/or many bridges.
(d) Fast water currents and/or cross currents.
(e) Fairway with traffic regulations, as one-way-traffic.
(f) Conjunction of waterways.
(g) High traffic density.

(3) The Tactical Traffic Image is produced by collecting shore based radar and ship based AIS signals and displaying the signals on an Inland ECDIS (see Annex 1). The standards for Inland ECDIS and Inland AIS (see Annex 2) should be used. For a long river stretch and heavy traffic, the TTI may be enhanced by target tracking.

5.3.2 Lock and Bridge Management

(1) RIS should optimise the traffic flow by:

(a) Support of the lock/bridge master in short term decisions for planning of the lock and bridge cycle by presentation of an electronic lock diary by a database and registration of waiting times.
(b) Support of the lock/bridge master in medium term decisions by data exchange with the neighbouring locks.
(c) Support of the shipmaster by transmission of waiting times.
(d) Optimising of lock circles by calculation of ETAs / RTAs for a chain of locks, transmission of RTAs to shipmasters.

(2) A Ship Reporting System with a database and appropriate means of communication (VHF, cellular phone - voice and data -, AIS) is recommended to be established (ch. 5.2.3) in order to enhance lock and bridge planning.

5.4 Calamity Abatement Service

(1) Calamity Abatement Services register the vessel and transport data at the beginning of a voyage in a RIS Centre and update the data during the voyage. In case of an accident, the RIS Centre delivers the data without delay to the emergency services.

(2) Depending on the risk assessment (ch. 6.3. no.9.a), a Calamity Abatement Service may register only certain types of vessels and compositions (Ch 5.2.3.(8)) or all vessels.

(3) It should be the responsibility of the shipmaster to report the required data (**Table 5.2.3**).

(4) A Ship Reporting System with a database and appropriate means of communication should be established (see Ch. 6.2.3).

(5) Position and sailing direction of the vessel should be reported:

(a) When entering or leaving the area of a RIS Centre.
(b) At specified reporting points within the area of the RIS Centre
(c) When the data has been changed during the voyage.
(d) Before and after stops of longer than a specific period.

5.5 Voyage Planning

(1) Voyage planning is the task of the shipmaster and the vessel owner. Voyage planning comprises the planning of the draught of the vessel as well as the planning of the ETA.

(2) RIS should support voyage planning by:

(a) Fairway Information Services (Ch. 5.1.1).
(b) Strategic Traffic Information (Ch. 5.1.2).
(c) Lock and Bridge Management (Ch. 5.1.3).

5.6 Transport Logistics

(1) Logistic applications of RIS comprise:

(a) Port and Terminal management,
(b) Cargo and Fleet management.

(2) The Competent Authorities should design their information systems in a way that data flow between public and private partners is possible. The standards according to ch. 1(6.d and e) should be used.

(3) Communication and information exchange between private and public partners in RIS for logistic applications should be carried out according to the procedures and standards that are being agreed for RIS.

(4) The Competent Authorities should provide ample room for logistics applications like:

(a) The exchange of cargo and stores information between fleet operators, vessels, terminals, customs etc.
(b) Fleet planning support.
(c) ETA/RTA negotiations between vessels and terminals.
(d) Tracking and tracing.
(e) Electronic marketplaces.
(f) The movement of people (for immigration service).

The Competent Authorities should indicate the data structure in use to application builders.

(5) Confidentiality of data exchange in a RIS needs to be ensured. In cases where logistic information is provided by systems operated by a Competent Authority, that authority should take necessary steps to ensure the protection of confidentiality of commercial information. Confidential data shall only be provided to third parties when special conditions apply.

6 PLANNING OF RIS

6.1 General

The need for RIS should be carefully assessed based on a benefit/cost analysis and a consultation of the user groups. In those cases where RIS are deemed to be necessary or when the information provided is

thought to be essential for the safety of traffic flow, to reduce environmental pollution and to contribute to the efficiency of transport, the Competent Authority concerned usually should provide the necessary expertise and arrange funding to provide the desired levels of technology and expertise to meet the objectives.

6.2 Responsibilities

(1) The Competent Authority has the responsibility - as far as RIS are traffic related - to plan RIS, to commission RIS and to arrange funding of RIS. In case of existing RIS, the Competent Authority should change the scope of the RIS if circumstances so dictate.

(2) Where two or more governments or competent authorities have a common interest in establishing RIS in a particular area, they may decide to develop common RIS.

(3) Attention should be paid to the possibilities of monitoring and maintaining the desired level of reliability and availability of RIS.

(4) During the planning of RIS, the Competent Authority concerned should:

- (a) Have a legal basis for the actions of the RIS and that the RIS are in conformity with national and international law.
- (b) Determine the objectives of the RIS.
- (c) Appoint a RIS Authority.
- (d) Describe the area of coverage of the RIS.
- (e) Determine the services and functions which will be rendered.
- (f) Define the requirements for the applications.
- (g) Provide the equipment necessary to carry out the tasks given to the RIS.
- (h) Provide and train sufficient and competent personnel.
- (i) Harmonise the demands of traffic and transport management by co-operation with the organisations of cargo shippers, fleet owners and port owners.

6.3 Liability

The liability element of compliance with RIS guidance is an important consideration which can only be decided on a case-by-case basis in accordance with national law. Consequently, a RIS Authority should take into account the legal implications in the event of a shipping accident where RIS operators may have failed to carry out their duty competently. (see IMO A20/Res 857)

6.4 Planning Process

The need for RIS should be carefully assessed using the process laid down in table 6.4.

6.5 Training

The successful delivery of RIS depends upon competent and experienced personnel to fulfil the responsibilities of a RIS authority. The recruitment, selection and training of suitable personnel is a pre-requisite to the provision of professionally qualified personnel capable of contributing to safe and efficient vessel operations. Such personnel will help to ensure that full regard is given to the diverse tasks inherent in RIS activities (see IALA V-103).

Table 6.4: THE PLANNING PROCESS FOR RIS

A.	**PRELIMINARY INVESTIGATION**	B.	**APPLICATION DESIGN**
1	**Description and analysis of the existing and future situation in the area** a) Hydrographical, hydrological and meteorological conditions c) Waterway conditions e.g. dimensions of waterways (locks, bridges, fairways), visibility along fairways, specific constraints (bends, narrows, shoals, narrow and low bridges), navigation patterns, bottlenecks, operating times of locks c) Current and future traffic and transport situation number of passengers, tons of cargo, kind of cargo, composition of fleet d) Number, type and impact of accidents including analysis of consequences e) Legal situation authorities, incident/calamity regulations f) Regional management and organisational situation e.g. lock operators, harbour and terminal companies g) Existing RIS Systems h) Other problems in the area e.g. delays	**1**	**Design of one or more potential future IT applications** short description, representation of performance and cost estimation of the potential IT systems a) Design on a functional basis external and internal functions dependant on the local situation b) Translation of the functional design into a technical design (systems) c) Definition of equipment needed on vessels and on shore
2.	**Objectives** see ch. 4.3.	**2**	**Evaluation of potential future IT applications** a) Risk assessment e.g. types of risks and weighing of risks by pairwise comparison b) Efficiency of transport by benefit/cost-analysis reduction of waiting times for vessels, higher reliability, shorter voyage duration, costs of incidents, accidents and delays c) Environment impact study if appropriate, for urban areas and the river
3.	**Tasks** see ch. 4.4	**3**	**Choice and decision on implementation**
4.	**Services and functions to be provided** see ch. 4.5 and 4.6 a) Selection of potential future services 5) Selection of potential future functions	**4**	**Organisational structure of the future RIS application** a) Liability in the legislation and regional legal basis b) Competent Authority for planning and construction c) RIS Authority for operation authority that is carrying out the task d) Personnel facilities eventually fully automated, training aspects
5.	**Regulations to be provided**		
6.	**Requirements for the applications**		
7	**Proposal for decision on further procedure**		

7 STEP BY STEP DEVELOPMENT OF RIS

(1) The need to implement the desired service level of RIS depends on the outcome of the preliminary investigation in the planning process (ch. 6.4)

(2) A rough overview of the possible step-by-step development of the different parts of RIS is given in **Table 7**. Future developments that have been tested but are not yet implemented are printed in *italics*.

(3) Because of the widely varying parameters, it is not possible to give general recommendations on RIS solutions for certain circumstances.

8 STANDARDISATION PROCEDURES

(1) Standardisation of RIS is needed because:

(a) Inland navigation does not stop at borders of countries,

(b) New IT developments in other modes of transport should be adopted in inland navigation in order to enable an integration of transport (multi-modal transport on road rail and waterway),

(c) The different RIS systems reach their full benefit only when they are harmonised,

(d) Suppliers of equipment will not start producing hardware and software for RIS if the standards are not drawn up.

Table 7: Possible step by step development of the different parts of RIS *(in italics: not yet realised)*

Type of service		Step	System configuration	Chapter
1 Fairway Information Services	1.1 Voice communication shore/ship	1	Local nautical information by VHF at locks and bridges	5.1.2.(8)
		2	Central nautical information by VHF system with RIS-Centre	5.1.2.(8)
	1.2 Internet	1	Internet homepage with notices to shipmasters and water levels, static pages without content management system	5.1.3.(1)
		2	As no. 1, but additionally dynamic pages with content management system	5.1.3.(3)
		3	E-mail subscription of notices to mariners and water levels	5.1.3.(4)
		4	Transmission of notices to mariners and water levels via SMS-subscription and WAP to mobile phones	5.1.3.(4b+4c)
		5	*On demand, presentation of all Fairway Information from port of departure to port of destination for route planning on one page ("route planner")*	5.1.3.(5)
	1.3 Electronic Navigable Chart	1	Electronic raster chart (scan from paper chart)	
		2	Inland ECDIS in Information Mode	5.1.4
2 Traffic Information	2.1 Tactical Traffic Information on board by radar, Inland ECDIS and AIS	1	TTI by radar	5.2.2.(1)
		2	TTI by radar and Inland ECDIS in navigation mode, only safety relevant objects in the ENC	5.2.2.(2)-(5)
		3	As no. 3, all objects in ENC	5.2.2.(6)
		4	Inland ECDIS as no. 3, additionally with water depth	5.2.2.(7)
		5	Inland ECDIS as no. 1, additionally with AIS	5.2.2.(8)
	2.2 Strategic Traffic Information by reporting	1	Database at RIS Centre, reports via public mobile phone, input manually	5.2.3.(5a)
		2	Database at RIS Centre, reports via VHF, input manually	5.2.3.(5b)
		3	Database at RIS Centre, initial reports via electronic reporting, input automatically, position reports via VHF	5.2.3.(5c)
		4	*As no. 3, add. reports on positions and ETA via AIS, input automatically,*	5.2.3.(5d)
		5	Database at RIS Centre, add. electronic data interchange between RIS Centres	5.2.3.(9)
3 Traffic Management	3.1 Vessel Traffic Services (VTS)	1	Shore based radar stations, VTS Centre, Inland ECDIS with radar overlay	5.3.1.(1)
		2	As no 1, Inland ECDIS with radar overlay and target tracking	5.3.1.(3)
		3	*Inland ECDIS with AIS overlay*	5.3.1.(3)
	3.2 Lock/bridge Management	1	Database for lock diary, registration of waiting times, local	5.3.2.(1a)
		2	As no. 1, add. data exchange with other locks	5.3.2.(1b)
		3	*As no. 2, add. transmission of waiting times to shipmasters (support of voyage planning)*	5.3.2.(1c)
		4	*Optimising of lock circles by calculation of ETAs/RTAs for a chain of locks, emission of RTAs to shipmasters, input of positions of vessels by AIS*	5.3.2.(1d)
4 Calamity Abatement	4.1 Ship Reporting system for certain types of vessels and compositions	1 - 5	System configurations as no. 2.2	5.4.(2a)
	4.2 Ship Reporting system for all vessels	1 - 5	System configurations as no. 2.2	5.4.(2.a)
5 Voyage Planning	5.1 Fairway Information	1	System configurations as nos. 1.1 - 1.3	5.5
	5.2 Lock/bridge management, transmission of RTAs and waiting times	2	*System configurations as no 3.2.*	

(2) RIS may be developed and operated following internationally agreed standards, as such:

(a) These RIS Guidelines 2002 as a framework.
(b) The Inland ECDIS Standard.
(c) Standards of data.
(d) Standards on data exchange (incl. protocols).
(e) Standards on ship reporting databases
(f) Inland AIS Standard for tracking and tracing.
(g) Inland Radar Standard.
(h) Inland VHF radio standard.

(3) These standards should be developed in harmonisation with the maritime world in order to enable mixed traffic in the estuaries of rivers.

(4) For each standard, world wide working organisations (e.g. IHO, ITU, IEC, IALA, PIANC, UNECE) should be asked to undertake the workload of the development and maintenance of the standards and to work together in this field as it happens already.

(5) Organisations that are already involved in maritime standardisation should be asked to extend their activities to inland navigation, as such:

(a) IHO, IEC to Inland ECDIS.
(b) IALA to Inland VTS (with PIANC).
(c) PIANC to River Information Services (with IALA).
(d) ITU, IEC, IALA to Inland AIS.
(e) ITU to Inland VHF.
(f) UNECE to data standards for reporting.

(6) The international legislative bodies like the International Standards Organisation, regional legislative bodies like European Commission, CEN, Central Commission for the Navigation on the Rhine, Danube Commission and similar bodies in other parts of the world, are asked to adopt these standards.

(7) The national governments are asked to certify the equipment produced by these standards.

(8) In the meantime, the national governments should co-operate in a bilateral or multilateral way to achieve the greatest amount of harmonisation using all existing draft standards.

Annex 1

INLAND ECDIS (ELECTRONIC NAVIGABLE CHART)

(1) Inland ECDIS means Electronic Chart Display and Information System for Inland Navigation.

(2) Inland ECDIS (Edition 1.0, 31.05.2001) is the European standard for Electronic Navigational Charts for inland navigation, adopted by the Central Commission for the Navigation on the Rhine and by the Danube Commission.

(3) The Inland ECDIS standard has five sections that correspond to the Maritime ECDIS Standard:

1 Performance Standard (according to IMO-A.817(19)).
2 Data Standard (additions to IHO-S57).
3 Presentation Standard (additions to IHO-S52).
4 Operational and Performance Requirements, Methods of Testing and required Test Results (according to IEC-1174).
5 Glossary of Terms.

(4) Inland ECDIS is compatible with Maritime ECDIS, that means:

(a) Inland vessels sailing in maritime waters with inland ECDIS equipment get all maritime ENC information.
(b) Sea vessels sailing in inland waters with maritime ECDIS equipment get all information that is equal to marine information (e.g. river bank), but they do not get the additional inland information (e.g. inland notice marks).

(5) Sea-river vessels are recommended to use the additional Inland ECDIS software libraries in order to get full inland ENC information.

(6) Inland ECDIS should use chart information (ENC) as specified by the IHO-S57 Standard (Edition 3.0) with the additions of the Inland ECDIS Standard.

(7) The presentation should be in accordance with the IHO-S52 Standard (Edition 3.0) and with the amendments of the Inland ECDIS standard.

(8) Inland ECDIS may be used in Navigation Mode or in Information Mode.

(9) Navigation Mode means the use of inland ECDIS with Traffic Information by radar or AIS overlay. Inland ECDIS in Navigation Mode may be operated in three configurations:

1 separate installation of inland ECDIS and radar equipment; the latter sending the radar signal to the Inland ECDIS computer,
2 as before, but only one monitor used,
3 radar equipment with integrated Inland ECDIS functionality. It is recommended to develop and use this configuration in the future.

(10) Information Mode means the use of Inland ECDIS without Traffic Information by radar or AIS overlay. For an inland ECDIS application designed for Information Mode only, the requirements of Navigation Mode are to be understood as recommendations.

Annex 2

INLAND AIS (TRANSPONDERS)

(1) Automatic Identification System (AIS) is a shipborne radio data system exchanging static and dynamic vessel data between equipped vessels and between vessels and shore stations. Vessel borne AIS stations broadcast a vessel's identity, position and other data in regular intervals. By receiving the transmissions, ship or shore based stations within the radio range can automatically locate, identify and track AIS equipped vessel's on an appropriate display like Radar or Inland ECDIS. AIS systems are intended to enhance safety of navigation in ship to ship use and in surveillance, ship reporting, VTS and calamity abatement. Several types of AIS stations can be distinguished:

(a) Class A mobile stations to be used by all sea going vessels falling under the IMO SOLAS chapter V carriage requirements.

(b) Class B mobile stations with limited functionality, to be used by e.g. pleasure crafts.

(c) Class A derivatives, having full Class A functionality but can be used by all vessel s not falling under IMO carriage requirements (e.g. tugs, pilot vessels, inland vessels (to be called Inland AIS in this document).

(d) Base stations, including shore based simplex and duplex repeater stations.

(2) An Inland AIS station consists in general of the following components:

(a) VHF transceiver (1 transmitter/2 receivers).

(b) A GNSS position receiver.

(c) A data processor.

(3) Universal shipborne AIS, as defined by IMO, ITU and IEC, and recommended for use in inland navigation, use Self-Organised Time Division Multiple Access (SOTDMA) in the VHF maritime mobile band. AIS operates on the internationally designated VHF frequencies AIS 1 and AIS 2.

(4) A characteristic of AIS is the autonomous mode, using SOTDMA without any need for an organising master station. The radio protocol is designed in a way that vessel stations operate autonomously in a self-organised manner by exchanging link access parameters. Time is divided into 1minute frames with 2250 time slots per radio channel, which are synchronised by GNSS. Each participant organises its access to the radio channel by choosing free time slots considering the future use of time slots by other stations. There is no need for a central intelligence controlling the slot assignment.

(4) System regulations for maritime AIS and proposals for Inland AIS are:

(a) IMO Resolution MSC.74(69) Annex 3 Recommendation on performance standards for AIS.

(b) Draft Revision of Recommendation ITU-R M1371, April 2001-06-29
Technical Characteristics for a Universal Shipborne Automatic Identification System Using Time Division Multiple Access in the VHF Maritime Band.

(c) IEC 61993 Part 2, CDV 2001: Class A Shipborne Installation of the Universal Shipborne Automatic Identification System (AIS) using VHF TDMA techniques.

(d) Draft IALA Guidelines on AIS system, 2001.

(e) Proposal to Standards for Tactical Data Exchange, Communications and Messages, R&D-Project INDRIS, 1998.

(5) For seagoing vessels, AIS will become a carriage requirement from July 2002 according to the SOLAS convention. For compatibility reasons, Inland AIS should be compliant as far as possible with AIS as it is defined by IMO. This has the advantage of exchanging data between inland and seagoing vessels via AIS in areas where both operate: Some amendments to the maritime messages are necessary in order to implement all required functions for inland navigation. Some other messages are not needed. The INDRIS proposal for the messages needed in inland navigation is given below. The modified messages are printed in *italics.*

Static information:

- *Official Ship Number (replaces IMO number)*
- Call sign of ship
- Name of vessel
- *Type of vessel (DVK Code to be used in the regional range)*
- *Location of position fixing antenna*
- Length and beam of vessel

Dynamic information:

- Vessel's position with accuracy indication and integrity status
- Position Time stamp in UTC
- Course over ground
- Speed over ground
- Heading
- Navigational status (under way, at anchor etc.)

Voyage related information:

- *Length and beam of combination (to be used instead of length and beam)*
- *Vessel´s draught (in steps of 1/20 metres)*
- *Hazardous cargo (blue cones/lights according to ADN/ADNR)*
- *Destination (UNECE Locode)*
- ETA

Short safety related information

- *Inland UNECE vocabulary messages*
- *Inland ECDIS Updates*

(6) An update rate of 2 seconds for the positions of the moving objects is recommended because it is corresponding to the update rate of radar. For vessels at anchor, an update rate of 6 minutes or when amended, is recommended (Austrian proposal).

(7) The following modes of operation can be distinguished:

(a) Ship - ship operation: All AIS equipped vessel s are able to receive static and dynamic information from all other AIS equipped vessel s within the radio range.

(b) Ship - shore operation: Data from AIS equipped vessel s can also be received by AIS base stations that are connected to the RIS Centre where a traffic Information (TTI and/or STI) can be constructed

(c) Shore - ship operation: safety related data from shore to vessel can be transmitted.

(8) AIS is an additional source for navigational information. AIS does not replace, but supports navigational services such as radar target tracking and VTS. AIS has its strength as a means of surveillance and tracking of vessel's equipped with it. Due to their different characteristics, AIS and

radar complement each other.
