COMPETITIVE AND SUSTAINABLE GROWTH
(GROWTH)
PROGRAMME

COMPRIS
Consortium Operational Management Platform
River Information Services

Deliverable 12.1: Report on Socio-economic assessment of RIS

Publication Date: 30th March 2006
Contract No: GRD2/2000/30161
## Report on Socio-economic assessment of RIS

<table>
<thead>
<tr>
<th>Document Title:</th>
<th>WP number: WP 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report on Socio-economic assessment of RIS</td>
<td>Deliverable: 12.1</td>
</tr>
</tbody>
</table>

### Document Number:

COMPRIS/Assessment report/ WP 12/ULG-ANAST /30-03-2006/version 1.0/P

<table>
<thead>
<tr>
<th>Document History</th>
<th>Version</th>
<th>Comments</th>
<th>Date</th>
<th>Authorised by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Final Draft</td>
<td>28-03-2006</td>
<td>Alassane B. Ndiaye</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>Quality Control</td>
<td>30-03-2006</td>
<td>Sáad Al-Hilli</td>
<td></td>
</tr>
</tbody>
</table>

### Classification

Public

### Number of pages:

205

### Number of annexes:

A group depicting the Acceptance Assessment Questionnaires collected during the demonstrations

### Responsible Organisation:

1. ULG-ANAST

### Contributing Organisation(s):

1. MARAN
2. MSR
3. AVV
4. IFN

### (Sub) WP leader Name:

Alassane B. Ndiaye

### (Sub) WP leader Organisation:

ULG-ANAST

### Principal Author(s):

1. Alassane B. Ndiaye

### Contributing Author(s):

1. Cees Glansdorp
2. Dominic Jarvis
3. Cas Willems
4. Jean Prunieras
# Table of Contents

1  **PART 1: INTRODUCTION** ................................................................. 11

1.1 Background .................................................................................... 11

1.2 Objectives and tasks of WP12 .......................................................... 13
  1.2.1 Objectives ................................................................................. 13
  1.2.2 Assessment exercises conducted ................................................. 13

2  **PART 2: THE ASSESSMENT FRAMEWORK** ........................................ 15

2.1 Preliminary words ........................................................................... 15

2.2 General aspects ................................................................................ 16

2.3 Framework for Functional Assessment (SWP12-2) ......................... 16

2.4 Framework for Cost/Benefit Analysis (SWP12-3) ............................. 17

2.5 Framework for Acceptance Assessment (SWP12-4) ......................... 20

2.6 Framework for Socio-economic Assessment (SWP12-5) ................... 21

3  **PART 3: FUNCTIONAL ASSESSMENT** ............................................. 24

3.1 Background functional assessment .................................................. 24

3.2 Cluster Logistical Support ............................................................... 29
  3.2.1 Logistical information and decision making ................................. 29
  3.2.2 Information for Transport Management ...................................... 31
  3.2.3 Information for fleet management .............................................. 31
  3.2.4 Decisions by logistic partners .................................................... 32
  3.2.5 Logistical supporting tools: the Logistical Data Platform .......... 34
  3.2.6 Equipment needed for logistical support services ....................... 37

3.3 Cluster Supporting Services for Navigation ..................................... 40
  3.3.1 Vessel Management and Vessel Traffic Services in a Fairway or an Inland Port ......................................................... 40
  3.3.2 Voyage planning, Lock planning and Voyage Monitoring .......... 45
  3.3.3 Equipment needed for Supporting Services Navigation ............. 49

3.4 Cluster Cross-Border Services ......................................................... 51

3.5 Cluster Navigation on board ............................................................ 54
  3.5.1 Introduction .............................................................................. 54
  3.5.2 The elements of navigation ...................................................... 56

4  **PART 4: COST BENEFIT ANALYSIS** ............................................... 70

4.1 General words on RIS Cost Benefit Analysis .................................... 70
  4.1.1 Costs of RIS system .................................................................. 70
  4.1.2 Benefits of RIS system ............................................................. 70
  4.1.3 Objectives of the C/B analysis .................................................... 70
  4.1.4 Problem Solving Approach ....................................................... 71
  4.1.5 Plan of the C/B analysis ............................................................ 72

4.2 Review of RIS services, related equipment and actors categories ........ 73
  4.2.1 RIS services ............................................................................. 73
  4.2.2 Sets of necessary equipment .................................................... 74
  4.2.3 Actor categories and related equipment ................................... 76

4.3 COST OF RIS SERVICES USAGE ..................................................... 78
  4.3.1 Model for the cost calculation .................................................... 78
  4.3.2 Some costs figures ..................................................................... 78
  4.3.3 Cost calculation per Actor Categories ....................................... 78
### Index of figures

- Figure 1: General aspect of RIS .................................................................................. 16
- Figure 2: Illustration of layers within a RIS “cluster” .................................................. 17
- Figure 3: Schematic representation of a decision process .......................................... 25
- Figure 4: Different information and data flows ......................................................... 27
- Figure 5: Navigation decision process ....................................................................... 28
- Figure 6: The three levels in a navigation process ..................................................... 29
- Figure 7: Functioning of the Logistical cluster ......................................................... 30
- Figure 8: Logistic Data Platform .................................................................................. 35
- Figure 9: COARII application ..................................................................................... 36
- Figure 10: BORIS application .................................................................................... 37
- Figure 11: Schematic view of a VTS .......................................................................... 41
- Figure 12: Effect of VTS on different parts of the hierarchy in a navigation process .... 43
- Figure 13: Voyage planning process .......................................................................... 46
- Figure 14: Voyage Execution and Monitoring process .............................................. 47
- Figure 15: Lock Planning and Management ................................................................ 48
- Figure 16: ERI/Cross border ..................................................................................... 51
- Figure 17: ERINOT system ....................................................................................... 52
- Figure 18: Navigation decision process ..................................................................... 54
- Figure 19: The three levels in a navigation process ................................................... 55
- Figure 20: Budapest overall results .......................................................................... 102
- Figure 21: Budapest influencing factors .................................................................... 103
- Figure 22: Gent Overall Results .............................................................................. 104
- Figure 23: Gent influencing factors .......................................................................... 104
- Figure 24: Ukraine overall results ............................................................................ 105
- Figure 25: Ukraine influencing factors ...................................................................... 106
- Figure 26: Romania overall results ........................................................................... 107
- Figure 27: Romania influencing factors .................................................................... 107
- Figure 28: Nijmegen overall results .......................................................................... 108
- Figure 29: Nijmegen influencing factors .................................................................... 109
- Figure 30: Oberwesel overall results ........................................................................ 110
- Figure 31: Oberwesel influencing factors ................................................................... 110
- Figure 32: Austria overall results .............................................................................. 111
- Figure 33: Austria influencing factors ....................................................................... 112
- Figure 34: Slovakia overall results ............................................................................ 113
- Figure 35: Slovakia influences factors ....................................................................... 113
- Figure 36: Comparison of mean values. All demonstrators ....................................... 116
- Figure 37: Impact of RIS on fuel consumption in the European Union ..................... 128
- Figure 38: Marginal external costs of transport by mode in €/1000 tkm .................. 129
- Figure 39: Pollution costs for road and IWW transport scenario 1 ............................. 131
- Figure 40: Infrastructure costs for road & IWW transport scenario 1 ...................... 131
- Figure 41: Accident and noise costs for road transport ............................................. 131
- Figure 42: Climate change and congestion costs for road transport scenario 1 ...... 132
- Figure 43: Comparison of external costs road vs IWW scenario 1 ............................. 132
- Figure 44: Pollution costs for road & IWW transport, Scenario 2 .............................. 134
- Figure 45: Infrastructure costs for road & IWW transports scenario 2 ..................... 134
- Figure 46: Accident & noise costs for road transport, Scenario 2 ............................. 134
- Figure 47: Climate change & congestion costs for road transport scenario 2 ........... 135
- Figure 48: Comparison of external costs road vs IWW scenario 2 ............................. 135
- Figure 49: Pollution costs for road & IWW transports, Scenario 3 ............................. 137
- Figure 50: Infrastructure costs for road & IWW transports, Scenario 3 .................... 137
- Figure 51: Accident & noise costs for road transport, Scenario 3 ............................. 137
- Figure 52: Climate change and congestion costs for road transport scenario 3 ...... 138
- Figure 53: Comparison of external costs road vs IW, Scenario 3 ................................ 138
- Figure 54: Global impacts of RIS on external costs of transport .............................. 139
- Figure 55: Road & IWW and impact of RIS on HC emissions, Scenario 1 .............. 143
- Figure 56: Road & IWW and impact of RIS on CO emissions, Scenario 1 .............. 143
- Figure 57: Road & IWW and impact of RIS on NOx emissions, Scenario 1 .......... 144
Figure 58: Road & IWW and impact of RIS on CO₂ emissions. Scenario 1 .................................................. 144
Figure 59: Road & IWW and impact of RIS on PM emissions. Scenario 1 .................................................. 145
Figure 60: Road & IWW and impact of RIS on HC emissions. Scenario 2 .................................................. 147
Figure 61: Road & IWW and impact of RIS on CO emissions. Scenario 2 .................................................. 147
Figure 62: Road & IWW and impact of RIS on NO₂ emissions. Scenario 2 .................................................. 148
Figure 63: Road & IWW and impact of RIS on CO₂ emissions. Scenario 2 .................................................. 148
Figure 64: Road & IWW and impact of RIS on PM emissions. Scenario 2 .................................................. 149
Figure 65: Road & IWW and impact of RIS on HC emissions. Scenario 3 .................................................. 151
Figure 66: Road & IWW and impact of RIS on CO emissions. Scenario 3 .................................................. 151
Figure 67: Road & IWW and impact of RIS on NO₂ emissions. Scenario 3 .................................................. 152
Figure 68: Road & IWW and impact of RIS on CO₂ emissions. Scenario 3 .................................................. 152
Figure 69: Road & IWW and impact of RIS on PM emissions. Scenario 3 .................................................. 153
Figure 70: Benefit of RIS on emissions of air pollutants ................................................................................. 154
Figure 71: Benefit of RIS on emissions of HC, CO and NO₂ .......................................................................... 155
Figure 72: Impact of RIS on emissions of PM ............................................................................................... 155
Figure 73: Impacts of RIS on employment ..................................................................................................... 156
Index of tables

Table 1: Cluster Logistical support: recapitulative table of information exchange, actors involved and equipment needed ................................................................. 38
Table 2: Cluster Logistical support: recapitulative table (continued) ................................................................................................................................. 39
Table 3: Cluster Supporting Services to Navigation: recapitulative table of information exchange, actors involved and equipment needed ........................................................................ 50
Table 4: Cluster Cross Border Services: recapitulative table of information exchange, actors involved and equipment needed ........................................................................ 53
Table 5: Cluster Navigation on board: recapitulative table of information exchange, actors involved and equipment needed ........................................................................ 68
Table 6: Recapitulative set of the necessary equipment by actor ................................................................................................................................. 75
Table 7: Minimum set of the necessary equipment by actor ................................................................................................................................. 76
Table 8: Minimum set of the necessary equipment by group of actor ......................................................................................................................... 77
Table 9: Cost for Shipper, Freight forwarder, Logistician, Ship owner, Terminal Operator, Port Manager ........................................................................ 80
Table 10: Cost for the Skipper and the Barge Operator ................................................................................................................................. 81
Table 11: Cost for the Lock Master and the Fairways authority ......................................................................................................................... 82
Table 12: Cost for the Police and Cross border authorities ................................................................................................................................. 85
Table 13: Type of benefits per actor ................................................................................................................................................................. 89
Table 14: Cost/Benefit ratios by actor ................................................................................................................................................................. 92
Table 15: Target groups for acceptance assessment ..................................................................................................................................................... 99
Table 16: Hungary Results .................................................................................................................................................................................. 102
Table 17: Belgium / France Results .................................................................................................................................................................. 103
Table 18: Ukraine Results .................................................................................................................................................................................. 105
Table 19: Romania Results .................................................................................................................................................................................. 106
Table 20: Netherlands Results ........................................................................................................................................................................ 108
Table 21: Germany Results .................................................................................................................................................................................. 109
Table 22: Austria Results .................................................................................................................................................................................. 111
Table 23: Slovakia Results .................................................................................................................................................................................. 112
Table 24: Comparative Mean Results ................................................................................................................................................................. 115
Table 25: Rating per Demonstrator ................................................................................................................................................................. 120
Table 26: Rating per Functionality ................................................................................................................................................................. 120
Table 27: Fuel consumption ” without ” vs ” with" RIS scenario 1 ...................................................................................................................................................... 127
Table 28: Fuel consumption ” without ” vs ” with" RIS scenario 2 ...................................................................................................................................................... 127
Table 29: Fuel consumption ” without ” vs ” with" RIS scenario 3 ...................................................................................................................................................... 128
Table 30: Marginal external costs of transport by mode in €/1000 tkm ........................................................................................................ 129
Table 31: External costs of transport: Scenario 1 ...................................................................................................................................................... 130
Table 32: External costs of transport: Scenario 2 ...................................................................................................................................................... 133
Table 33: External costs of transport: Scenario 3 ...................................................................................................................................................... 136
Table 34: Truck emission (g/ktm) ........................................................................................................................................................................ 140
Table 35: Emission of vessels (g/kwh – g/ktm) ...................................................................................................................................................... 141
Table 36: Emission of pollutants scenario 1 ...................................................................................................................................................... 142
Table 37: Emission of pollutants scenario 2 ...................................................................................................................................................... 146
Table 38: Emission of pollutants scenario 3 ...................................................................................................................................................... 150
Table 39: Benefit of RIS on emissions of air pollutants ...................................................................................................................................................... 154
Table 40: Summary of impacts of RIS ................................................................................................................................................................. 157
### List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADN -R / -D</td>
<td>Regulation on the Transport of Dangerous Goods on the Rhine / Danube</td>
</tr>
<tr>
<td>AIIP</td>
<td>Automatic Identification Internet Protocol</td>
</tr>
<tr>
<td>AIS</td>
<td>Automatic Identification System</td>
</tr>
<tr>
<td>CBIS</td>
<td>Cross Border Information Services</td>
</tr>
<tr>
<td>CBM</td>
<td>Cross Border Management</td>
</tr>
<tr>
<td>CCNR</td>
<td>Central Commission for the Navigation on the Rhine</td>
</tr>
<tr>
<td>COMPRIS</td>
<td>Consortium Operational Management Platform River Information Services</td>
</tr>
<tr>
<td>CUSCAR</td>
<td>Customs Cargo Report (Message)</td>
</tr>
<tr>
<td>ECDIS</td>
<td>Electronic Chart Display and Information System</td>
</tr>
<tr>
<td>ERI</td>
<td>Electronic Reporting International</td>
</tr>
<tr>
<td>ERINOT</td>
<td>ERI Notification (Message)</td>
</tr>
<tr>
<td>ETA</td>
<td>Estimated Time of Arrival</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographical Information System</td>
</tr>
<tr>
<td>IALA</td>
<td>International Association of</td>
</tr>
<tr>
<td>IWT</td>
<td>Inland Waterway Transport</td>
</tr>
<tr>
<td>LDP</td>
<td>Logistical Data Platform</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>RIS</td>
<td>River Information Services</td>
</tr>
<tr>
<td>RVTS</td>
<td>Regional Vessel Traffic Services</td>
</tr>
<tr>
<td>SWP</td>
<td>Sub-workpackage</td>
</tr>
<tr>
<td>T&amp;T</td>
<td>Tracking and Tracing</td>
</tr>
<tr>
<td>TTI</td>
<td>Tactical Traffic Image</td>
</tr>
<tr>
<td>UNECE</td>
<td>United Nations Economic Commission for Europe</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>VHF</td>
<td>Very High Frequency</td>
</tr>
<tr>
<td>VTS</td>
<td>Vessel Traffic Services</td>
</tr>
<tr>
<td>WP</td>
<td>Workpackage</td>
</tr>
</tbody>
</table>
PART 1
INTRODUCTION
1 PART 1: INTRODUCTION

1.1 Background

An important challenge awaiting particularly the European freight transport in the coming years is the implementation of a real, efficient and environmentally friendly intermodal transport system.

But, the performance of an intermodal transport system supposes the performance of the various components/links, which constitute it. Regrettably, in most of the potential intermodal transport chains identified, the inland waterway transport component often stays the weak link for different reasons. This weakness constitutes a major handicap, which affects the reliability of this transportation mode and slows down the "transfer of cargo" towards the waterways.

Presently studies are being carried out on a European level to determine in what way the European inland waterways transport could be used more efficiently and judiciously integrated into the future European intermodal transport system.

Among the different possible solutions identified by national and European projects, one can highlight the particular solution that addresses the improvement of the performance and attractiveness of the inland waterways transport through the implementation of IT (Information Technology) and advanced information services. By helping in increasing the level of safety and efficiency, these services would allow the users to assure an optimal management of their transportation activity.

The Project COMPRIS, which is inscribed in the above frame, is justly dedicated to the development and demonstration of an operational RIS (River Information Services) system.

RIS is physically a network linking private and public information users and information holders. It makes an optimal use of the opportunities offered by information and communications technology and intends to respond to public and private demand for facilitating River Traffic and Transport Management.

It aims at contributing to an efficient transport process and to the use of the river system to its fullest extent. RIS includes services to distribute pertinent information, which is used in real time and in retrieval modes by all actors involved.

RIS stands for a joint method of working for public and private sector bodies that are cooperating to improve the safety, smoothness, cost efficiency and flexibility of inland shipping and simultaneously to promote more efficient utilisation of the existing infrastructure.

The ultimate objective, to which RIS should contribute is thus to make shipping a competitive and safe mean of transport, that makes optimal use of the available capacity. This implies:

1. Safe shipping – Shipping safety should be maintained at the same high level despite the increasing volume of transportation by water and the increase in transport diversity.

2. Smooth shipping – Smooth shipping strengthens the ability to plan shipping and thus reinforces its position as a link in the transport network and contributes to the efficient use of the available and infrastructure and any future extensions to it.
3. **Planable shipping** – Careful and dynamic planning can increase the logistic efficiency and reinforce the position of the shipping sector as a flexible, reliable and cost-efficient link in the transport network. This helps in stimulating inland shipping as a reliable link in intermodal networks what would expand the market for the inland shipping sector.

The successful implementation of RIS is therefore a key challenge having regard to the particular challenges the EU transport System is faced with and the objectives laid down in the Common Transport Policy.

However, one important issue for the successful implementation of wide spread impacts systems such as ITS (Intelligent Transport Systems) lies in their acceptation by the actors involved and by the Society.

Such an acceptation is better evaluated through an assessment exercise.

Taking account of the above consideration, it is not much saying therefore that the assessment of the RIS system, which is being developed, is a key exercise.

COMPRIS Workpackage n°12 (WP12) is dedicated to the assessment of RIS.
1.2 Objectives and tasks of WP12

1.2.1 Objectives

The objectives of WP12 are:

- To contribute to the technical assessment through an assessment of the functionality of the projected RIS clusters/modules;
- To assess RIS on a economical point of views for the different actors groups;
- To assess the satisfaction with the system finally designed and demonstrated as shown to the prospective users attending the demonstrations;
- To assess RIS on a socio-economic point of view;
- To provide recommendations for a successful deployment of RIS.

Another added value intended to be reached lies in the theoretical R&D fields. It is about contributing to the setting-up a "Quick -Reference-Guide" for the evaluation of Information Systems as well as a set of methodologies and guidelines for the assessment of Intelligent Transport Systems such as RIS.

1.2.2 Assessment exercises conducted

- First of all, and as a contribution to the technical assessment, a functional assessment is done. This assessment concerns the functional level of the projected RIS modules/clusters;
- Second, an assessment of the entire system was conducted with respect to its costs and benefits to the different stakeholders. This was done through a dedicated Cost/Benefit assessment for the different private stakeholders as well as a Cost/Benefit analysis for the public aspects of RIS;
- Third, an acceptance assessment was carried out during the demonstrators. This is different from the acceptability tests that should be performed in the test bed environment. It concerns the satisfaction with the system finally designed as shown to prospective users attending the demonstrations;
- Fourth, another level of the assessment exercise is a more global one. Indeed, an important and challenging issue in the EU Transport Policy of the 21st century is the implementation and overall efficiency of an intermodal freight transport system with inland navigation as a core mode. RIS aims at improving the efficiency of inland navigation, and as such constitutes a sort of incentive to a shift toward navigation. Therefore a more wide socio-economic assessment of RIS, including the question of the externalities due to transport, could help in demonstrating effectively the shifting potential of the inland waterways and in highlighting the incentives to such a shift.
PART 2

THE ASSESSMENT FRAMEWORK
2 PART 2: THE ASSESSMENT FRAMEWORK

2.1 Preliminary words

Building on INDRIS assessment methodology and considering the projected RIS system (in design and content), a wider geographical area of operation (including the Danube countries), this subtask has to elaborate a consistent framework (for all types of assessment to be done) in the form of methods, templates and guidelines.

It shall also, as much as possible, take account of the assessment & evaluation approaches, which are being worked out by the EC.

In former RIS projects like INDRIS and INCARNATION, an assessment methodology was defined but the application was only possible for the demonstration cases and for a section of the river Waal where sufficient data were available.

More particularly, within INDRIS Project, this assessment consisted of two parts:

- A functional and a qualitative assessments that measured the acceptance of RIS by the stakeholders present during the demonstrations;

In COMPRIS the assessment methodology will built on the above methodology already developed, which will be extended in order to take account of more RIS functionalities (in design and content) and a wider geographical area of operation (including the Danube countries).

The assessment will be based on:

- A template for the functional assessment as a contribution to the technical assessment;
- A template for the Cost/Benefit analysis of RIS implementation and operation for different stakeholders groups;
- A template for the acceptance assessment, e.g. the assessment of the satisfaction with the system finally designed and demonstrated as shown by the prospective users attending the demonstrations;
- A template for the assessment of the socio-economic impacts of RIS implementation and operation.
2.2 General aspects

As was stated above, RIS is an exchange platform of different types of information. An illustration is given throughout the following figure\(^1\).

![Diagram of RIS (River Information Services)](image)

*Figure 1: General aspect of RIS*

By analysing this figure, it can be easily noticed that the usage of each service depends on the main two following aspects:

- The specific conditions of each particular river area, the geography of the river area, the density and composition of the traffic flows and the sensitivity of the area;
- The particular actor to which the information is provided (skipper, lock operator, calamity abatement fighter, ship owner, terminal manager, etc…).

This is reflected in the particularities of the different RIS models planned to be used in the different geographical areas (difference in needs as regards information exchange).

Building on the above consideration, the guidelines and templates for the assessment exercises can be defined.

2.3 Framework for Functional Assessment (SWP12-2)

This activity is about undertaking a functional assessment, which has to be considered as a contribution to the technical assessment. It concerns the functional level and relevance of the projected RIS modules/clusters.

\(^1\) In COMPRIS WP2: Reference Model Architecture
The main input data comes from WP2, WP3, WP4, WP5, and WP6. Additional aspects in relation with WP7 (human factors) and WP8 (standardisation & harmonisation) are considered when relevant.

The template is based on the following methodology:

1. **Building of the assessment “clusters”**
   - Review of the generic RIS architecture, components, modules, contents, services offered and functionalities as projected or already developed in the other WPs.
   - Translate the above into “clusters”. A “cluster” should necessarily contain three hierarchical layers.
     - Category (e.g. Tactical, Strategical, …)
       - Functionality (e.g. prediction, monitoring, planning, etc.)
         - Info/service provided (e.g. ETA, …)

   An illustration of the layers within a “cluster” is given at the figure below.

   ![Illustration of layers within a RIS “cluster”](image)

   *Figure 2: Illustration of layers within a RIS “cluster”*

2. **Operational characterisation of the “objects”**
   - Each of the “clusters” should be characterised on the following aspects:
     - Equipment needed (software, hardware, communication mean, etc.);
     - Specific users (actors) targeted;
     - Operational items (see figure 1, items 1 to 6) affected and for each case:
       - Intensity: negative, neutral, positive (with for instance degrees of intensity from 1 to 3)
       - Term: short, medium, long
     - Mode of operation/delivering of the “object”: on-demand, continuous.

The two steps above result in a description of the services offered to each actor group combined with the equipment necessary, the different modes of operation, the operational items affected, etc. This gives a clear idea of the generic system to be assessed.

**2.4 Framework for Cost/Benefit Analysis (SWP12-3)**

The objective of this activity is to do an assessment of RIS with respect to the costs and benefits for the different actors groups. This involves a dedicated Cost/Benefit analysis for private actors groups and a Cost/Benefit for the public aspects of RIS.
This C/B analysis should not be seen as the final answer on the desirability to implement RIS, but should provide a framework along which RIS implementations could be assessed.

The template builds on the methodology defined within INDRIS but foresees a wider application.

Generally speaking, in this exercise, one should assess, under different circumstances, for each actor group the costs of acquiring a given type of RIS information and the benefits that it would obtain from the use of such a type of information.

The template is based on the following three-steps methodology:

1. Evaluation of the costs
   - Review of the “clusters” defined in the above functional assessment mainly as regards the targeted actor group, the necessary related equipment (hardware, software, communication mean, etc…), and RIS mode of operation (on-demand, continuous, etc.);
   - For each of the above “clusters”, determination of the related capital (initial investment) cost, the lifetime of the investment, the financial rates, the yearly operating cost according to the level/intensity of use, and assumptions related to the level of the fleet equipped with.

This will provide a clear figure of the total (capital and operating) costs linked with the generic system.

2. Evaluation of the benefits

The determination of the benefits resulting from the use of a given type of RIS information is a rather complex one.

In INDRIS the approach which, was adopted considered among others, the following assumption:

- Under the term "enhance safety of inland navigation" one understands the reduction of the risk. Then a basic relation to be highlighted is between RIS and safety and capacity of the waterway traffic. In other terms, the relation are studied between the level of information and knowledge provided to the waterway users and the reduction of the risk and of the number of accidents as well as the reduction of the time delays and the use of optimum drafts. Thus, the related benefits can be approached by calculating the reduction of costs, due to time delays, optimal loading and accidents;

- Under the term "improvement of capacity/efficiency of inland navigation" one understands the reduction of time delays during navigation activities, a better voyage planning as well as the use of available depths by optimising drafts and speeds in terms of maximising revenue or minimising fuel consumption. This induces another basic relation, which is the saving of costs in dredging and infrastructure that is the result of implementation of RIS. In other words, if an ECDIS is available with precise depth data areas with excess siltation can be located which may save general dredging activities. Many locks have large deceleration works that are necessary for mooring inland vessels that have to wait for a lock cycle. By precise planning of the RTAs, based on ETAs send by skippers the number of waiting vessels can be reduced and hence the length of the deceleration works can be reduced. Furthermore by positively affecting the traffic flows through locks it is possible to make the traffic supply through a lock more uniform over the day, implying a better usage of the locks. This would imply that the lock might be operated for a longer period without renewal or replacement of the lock. The investment costs may be reduced. Apart from this, if a central RIS is being established, the local VTS centres can be discontinued. This would reduce the number of VTS operators. The benefits of RIS implies therefore in this respect, savings on infrastructural works such as deceleration works in front of locks, less dredging costs as well as savings due to the delay of new investments in locks and phasing out of VTS.
The approach adopted in COMPRIS is based on the items of figure 1 and can be ideally summarised as follows:

- For each of the “clusters” all types of benefits linked with the following items will be listed:
  - Traffic management;
  - Incidents and emergencies;
  - Voyage planning;
  - Transport management;
  - Port management;
  - Terminal management;
  - Enforcement tasks;
  - Provision of statistics.

- Sorting out of the above determined benefits according to the targeted actors groups;

- For each of the above couple benefit/actor group, determination as far as possible, of the term (short, medium, long) and of the nature (direct, indirect);

- For each element benefit/actor group/term/nature, attempt to quantify (by the use of an appropriate calculation method) the value of the impact on monetary terms. This value (which can be cost reduction) should be ideally quantified for each year within the considered lifetime of the related investment and should ideally consider assumptions related to the level of the fleet equipped with RIS;

- Aggregation (using any suitable method) and determination of the total benefit that a given “cluster” could bring to a given actors group eventually sorted out, whenever possible, according to term (short, medium or long).

This will provide a clear figure of the total benefits linked with the generic system.

3. Cost/benefit ratios

The above results allow the calculation of the C/B ratios in different combination figures, i.e.:

- Per “cluster”;
- Per “cluster” and actor group;
- Etc.

4. Consolidation/extrapolation

Consolidate/extrapolate as far as possible the costs and benefits of RIS under the different assumptions in order to derive an indicative figure for the EU network.
2.5 Framework for Acceptance Assessment (SWP12-4)

The objective of this activity is to assess the satisfaction with the system designed and demonstrated as shown by the prospective users attending the demonstrations.

This assessment might also indicate useful technical or functional aspects to be considered within the RIS generic and local systems before the final version is launched.

It is mainly based mainly on the work done within SWP12-2, draft framework of the demonstrations, the results of the applications testing (WP9.3) and the draft scenarios of RIS implementation (WP11).

The approach used to tackle this exercise is the following:

1. Review
   - Review of the “clusters” which will be demonstrated and definition of a suitable quantification scale of the perception an actor might have of its demonstration:
     - Either in relative scale (in comparison with actual procedures);
     - Either in absolute scale.

2. Definition of a survey strategy
   - Definition of the survey method (survey face-to-face or grouped);
   - Determination of the target population (who will be surveyed?);
   - Drafting of a suitable survey form dedicated to the prospective actors groups attending the demonstrations. The aim is through this form to figure out their degree of acceptance of the “objects” demonstrated.

3. Data processing
   The information gathered during the surveys will be processed using statistical methods. This should provide a picture of acceptability of RIS or in more general terms, how far the “clusters” cope with the user needs. This key result should be obtained through the definition and the evaluation of indices of acceptability.

4. Discussions
   The implications of the above indices should be discussed in order to provide information about useful technical or functional aspects to be considered within the RIS system before the final version is launched.
2.6 Framework for Socio-economic Assessment (SWP12-5)

This activity deals with another level of the assessment exercise, a more global one.

Indeed, an important and challenging issue in the EU Transport Policy of the 21st century is the implementation and overall efficiency of an intermodal freight transport system with inland navigation as a core mode.

RIS aims at improving the efficiency of inland navigation, and as such constitutes a sort of incentive to a shift toward navigation.

Therefore a more global socio-economic assessment of RIS, including the question of the externalities due to transport, could help in demonstrating effectively the shifting potential of the inland waterways and in highlighting the incentives to such a shift.

In INDRIS, the approach which was adopted considered only the RIS benefits on a societal point of view and was based on the assumption that:

- If the implementation of RIS brings a reduction of negative effects due to heavy trucks traffic: exhaust of gases, congestion, atmospheric pollution, heavy infrastructure maintenance fees, noise control etc.,
- If one can approximate the number of "trucks equivalent units to be shifted”,

Then the related societal benefits can be approached by calculating the potential community savings due to less exhaust of gas, less atmospheric pollution and related effects as well as less road infrastructure maintenance fees.

However, one may not underestimate all the public costs (distributive equity and social solidarity) that will be necessary for the new job profiles and those costs necessary to cover up or convert the numerous jobs which will be lost in the sector of land transportation if a substantial shift from road to inland navigation would come true.

The sole assumption that the modal shift will be implemented in such a pace that redundancies of jobs are in balance with people retiring might not be sufficient.

In COMPRIS, the approach used intends to be as large as possible incorporating the maximum number of possible items. It uses extensively the results of the precedent assessment exercises and makes use of the latest scientific works on socio-economic and environmental impacts assessment.

The method can be summarised in the ideal following steps:

1. Generalisation of the C/B analysis
   - Derivation of an extrapolation method based on preceding assessments (and particularly SWP12.3) to assess the costs and benefits for river navigation direct actors in whole Europe.

2. Labour and demolition/conversion of old technologies issues
   - Design, justify and apply a method to assess the potential costs related to the impacts on labour and the demolition/conversion of old technologies (including the phasing out of VTS);
   - Design, justify and apply a method to assess the added value (benefit) of RIS in Europe as regards impacts on labour and safety of river operations.
COMPRIS – Socio-economic assessment of RIS

3. Environmental issues

- Design, justify and apply a method to assess the potential indirect costs for the preservation of the environment;
- Set-up different cases of modal shift to river transport, considering the potential of RIS to affect transport in European countries by enhancing waterborne solutions in the intermodal chains;
- Design, justify and apply a method to assess the added value (benefit) of RIS in Europe as regards the externalities for each considered case of modal shift.

4. Discussions

The above results should be discussed in different perspectives:

- The nature and size of the benefits of a shift to inland waterways;
- The societal costs of such a shift;
- The key incentives to that shift.

Finally this activity should, as far as possible, highlight the measures for a wide successful deployment of RIS in Europe, what constitutes a key input to policy recommendations.
PART 3

FUNCTIONAL ASSESSMENT
3 PART 3: FUNCTIONAL ASSESSMENT

3.1 Background functional assessment

RIS is defined as 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 utilising the inland waterways to their fullest extent.

First of all, let us set the scene for a technical functional assessment of RIS. It departs from the definition as given above and attempts to understand the main functional and information features.

Different definitions of Information System (IS) exist.

A common one is the following in which an IS is seen as a part of an Organisational System:

“An IS is a structured entity of people, resources, procedures and dataset which are set to collecting, processing, storing and distributing of data in order to achieve reliable and actual information to those who need this information such as executives, managers and operators”.

This definition has some characteristics, among them:

- An IS is a structured entity of elements, which are related;
- The way in which data are collected, processed and stored are irrelevant.

There is a difference between data and information

Data are facts about the condition of a part of reality and which constitutes the basis of information. Data has a restricted meaning, whilst information is contained in specific structured datasets.

Information leads to an increase of knowledge of the receiver, data constitutes the source from which information may be derived.

Information is as a consequence more than a set of data. Information consists of relevant data, data that will remove uncertainty with the receiver. The receiver of information should be in a better position to take decisions.

The following interpretation of information that is used is the following. The question whether or not something may be called information is directly dependent on the fact whether information reduces uncertainty, independent of the question whether a user was awaiting information. Information might be lost by overload, indifference or inability of the user to understand and use the information.

The definition quoted above indicates that the making of information is a mental process that occurs in the head of the receiver. The incoming messages are screened and if there is a surprise message the information is absorbed and may lead to a decision. Messages that contain old news don’t contribute to the information base and hence are irrelevant for taking decisions.

The definition that is used is a more general definition but for IS it might be desirable to change the definition of information:

Information is defined as those data that removes the uncertainty by the receiver and enables the receiver to implement the right steps in the right sequence and at the right time.

People act on the basis of available knowledge. Their knowledge is a restricted model of reality. One might sat that people act on the basis of a simplified, inaccurate and sometimes wholly wrong model of the situation in which they find themselves or of the situation they desire to create.

Decisions in organisations are taken likewise. Managers, decision makers and operators take decisions based on a model in which they assess alternatives and select one of the alternatives based on their expected results. For many decisions that are taken the assessment has been done many times, the solutions are known and decision taking is becoming a fixed procedure.
The first question, which needs to be addressed is then: what are the information services that are provided by RIS?

The second question is which information is required to make decisions and is that information provided in a standardised way?

**The principles of a Decision Process**

In order to understand interaction between navigation and shore based nautical support services it is important to analyse a decision process. Navigation as well as the support from a VTS influences the decisions made. The navigator makes decisions on courses to sail as well as speeds, whilst a VTS operator attempts to affect the decisions of a navigator by providing relevant information that enables him to make safe navigation decisions.

![Decision Process Diagram](image)

*Figure 3: Schematic representation of a decision process.*

The figure above contains a number of ellipses that represent various elements of the decision process. The ellipse marked 1 is the ellipse that represents the objectives for the decisions to be made. The ellipse marked 2 is the long-term information, such as documents, other stored information, experience and local knowledge. The ellipse marked 3 is current information that also may be internal. It might also have local and general information. In many cases stored as well as current information should be acquired. This is indicated by the green squares. A decision maker is affecting some processes on the datasets that are represented by ellipses 2 and 3. The results of the processes are options with their predicted effects. The process that is drawn around the 5th ellipse is assessment of the different options and their predicted effects. The assessment and, as a final result, the selection of an option takes place taking the objectives into account.

Figure 3 is the key to understand the process of navigation and Vessel Traffic Management and Vessel Traffic Services.
**Information types**

There are different types of information. These types play a deciding role in RIS. Information is ideally used to base decisions on that need to be taken in the process by one of the stakeholders in the process. The following types of information are distinguished:

1. Information on which decisions are taken that are crucial in relation to safety;
2. Information that is required for business decisions (in some cases business processes and safety are interconnected);
3. Information that is provided by an authority that has the format of voluntary information but the intention is that the receiver of the information uses that information to avoid dangerous and/or inefficient situations;
4. Information that is provided which may or may not be used by a stakeholder;
5. Information that is collected in order to make a decision.

Examples of the different types of information are:

Ad 1) Information coming from a VTS-operator in cases the VTS-operator has decided that the navigator should change its behaviour. If the information provided is not leading to a safe situation that the VTS-operator will decide that a direction is necessary;

Ad 2) Information regarding the best way of transporting a certain quantity of goods with one shipment or two, depending on the water levels in the shortest route or independent of the water level in an alternative longer route. If the forwarder elects to take the shorter route and he is not accurately aware of the water levels, he might be forced to lighten, to go back or face a grounding accident with detrimental consequences for the environment when bunkers are spilt;

Ad 3) Information provided by an authority but not necessarily a VTS competent authority may be used by the navigator such as the temporarily closure of a bridge. When the skipper arrives at the bridge he will see that the bridge is not in operation and he has to wait or he has to go back and use an alternative route;

Ad 4) T & T information may be available on a semi dynamic basis (each hour, each 4 hours etc). This information may be used by the receiver of the goods or the sender of the goods in order to make decisions such as: can I start my business process for which the goods are essential in time since I know that the goods are on schedule, or the sender of the goods may decide to send an invoice for the goods if payment is due at the moment of arrival of the goods. Etc.;

Ad 5) Data that is collected that plays the primary role in constructing information aid for decisions.
In the following diagram, the decisions according to the different categories, is given.

- CSS= Co-operative sensor system
- NCSS=Non Co-operative sensor system
- Sensor System
- TTI= Tactical Traffic Image
- VP=Voyage planner
- POSINFO= Position Information

Figure 4: Different information and data flows
The General Navigation Process

The following figure explains the general set-up of a navigation process.

![Navigation process diagram]

*Figure 5: Navigation decision process*

In the figure above a vessel navigates in its environment. The vessel in its environment constitutes the physical part of the system. The left hand side of the figure represents the information part of the system. The navigator represented by the blue rectangle obtains information as regards the environment: on the one hand information that is stored in nautical charts and pilots as well as tidal atlases, on the other hand the current information such as speed and course of the vessel. The level of motions also belongs to the current information. The objectives are given in the blue ellipse. In the blue box the decision processes such as discussed in Figure 3 take place. The navigator selects the best course of action and decisions are flowing into the green box. This box changes than the speed lever and/or the course of the vessel by using rudder and counter rudder.

The next Figure shows the navigation decision process in more detail. The figure shows the different levels of decision-making and also shows the dependence of a lower hierarchy decision on the higher one.

The navigator often has strategic objectives such as the mission of the vessel. The mission tells the navigator where to go and what to do with the vessel as soon as it has reached its port. The tactical objectives follow logically from the mission objective. The mission objectives can only be achieved if suitable voyage plan is drawn up, including a schedule. As a result of the tactical decision process courses to steer and speeds to maintain are derived which implement the decisions on the schedule and the voyage plan.

In order to deal with disturbances threatening the vessel not to follow the courses to steer or maintain the required speed rudder action and sometimes speed settings need to implement as a result of the immediate decision process of the navigator. Stored and current information is used in all three levels of the decision process. It is to be remarked that higher level objectives might not lead to suitable options for the next lower level and as such lead to an adaptation of the higher level objectives.
Figure 6: The three levels in a navigation process

Figure 6 represents an overview of the hierarchy in a navigation process. The mission objectives are interpreted and they lead in relation to a consideration of the safety aspects to decisions on routes and schedules. The introduction of safety aspects is important since in many cases the selection of a route in the lee of a landmass may be seen as more important than the shortest route.

Tactical decisions are subordinate on the strategic decisions and they lead to a decision of speeds and tracks to be followed, or courses over the ground. In order to deal with currents the heading of the vessel, which is more easily determined using the gyrocompass in the past than the track of the vessel. Desired speeds depend highly on the ETA/RTA the available water depth and the expected wind conditions, which might reduce the speed at a given power level.

Intermediate decisions are required in case of interaction with other traffic or speed reductions due to shallow and restricted waters. Other traffic requires navigation according to the Rules and Regulations regarding collision avoidance and burdened vessels must keep free from vessels having the right of way. This requires often a clear helm action and large course changes to convey the message to the other vessel that adequate measures have been taken to respect her privileges.

On the basis of the above context, the following RIS clusters are considered.

3.2 Cluster Logistical Support

3.2.1 Logistical information and decision making

The logistic information is the starting point of all transport operation. It is important that this information be as clear as possible in order to allow a better carriage of goods. Logistic parties need some useful information mainly on the goods to carry and have to work together in harmonised way. Generally speaking, the logistic parties try to answer to the transport demand coming from the shipper. So, the information from the shipper must be as clear as possible to facilitate the decision process for
all the other logistics partners, that is to say the freight forwarder, the terminal manager, the consignors, the consignee and the multimodal chain managers, etc.

Generally speaking, when a forwarder needs to send some goods to a given destination, he calls upon a freight broker services. He gives all the information needed by the freight broker in order to organize the transport. The most important information the freight broker needs concern the goods to move and their current location. The freight broker will then decide on the better way to carry out the transport operations. He decides on the modality to use (road, IWW, etc.). So, all the other actors of the chosen transport chain should take the necessary measures in order to contribute to a better transport operation.

The other actors who intervene in the logistical operation are the terminal or port operator and the shipmaster. So, the highlighted below interrelations show that each of these actors has to send and receive information from other actors:

![Diagram of interrelations between actors](image)

Figure 7: Functionning of the Logistical cluster

In case of existence of a lock on waterways, the lockmaster is integrated in the logistic scheme as additional actor.

Logistical information is necessary for cargo and fleet management. It helps in the establishment of statistics, which are necessary for the competent authorities for monitoring the fairways and planning the maintenance and building of infrastructures.

Cargo and fleet management basically comprises two types of information:

Information on the vessels and the fleet;

Detailed information on the cargo transported.

RIS allows logistics applications such as fleet planning support, ETA/RTA negotiations between vessels and terminals, tracking and tracing, and electronic marketplaces. Fleet managers and logistics service providers can for instance use the STI (Strategic Traffic Image) to track and trace their fleet. It helps identify availability and position of all connected vessels. This potentially results in optimised utilisation of transport capacities within an existing fleet.

This fleet planning capability can even be extended towards a logistics data pool among different companies. For instance, the ALSO Danube project developed and tested the concept of a Common Source Logistics Database. The CSL.DB is among others fed by traffic data registered by the traffic information services. The CSL.DB links logistical information with the tactical traffic information of
the vessels. These data are collected in the database and used for logistical and transport planning by shippers and logistics service providers. Obviously, an important issue in the field of transport management is the confidentiality and security of commercial data.

3.2.2 Information for Transport Management

Information for transport management is important for the voyage planning, port and terminal planning and cargo and fleet management. The following information is necessary to carry out the transport strictly speaking:

- Offered cargo:
  - Quantity of goods (volume or number of units);
  - State (solid, liquid, gas);
  - Packaging (small boxes, containers, pallets, etc.);
  - Date of pick-up of goods;
  - Sequence of terminal to be visited;
  - ETA per terminal (day, month, year).

- Date of arrival to the terminal;
  - Day, month, year.

- Date of delivery to the consignee;
  - Day, month, year.

- Transport order: (order number);

- Invoicing address: Name, post address, telephone, and fax, Email.

Coming from the freight broker, all this information is necessary for the terminal operator and the shipmaster.

Using this information, the shipmaster can propose the ship, which is the best adapted to the type of goods to move. He will then send the following information to the freight broker:

- The name of the ship;

- Characteristics of the ship:
  - Maximum load (DWT);
  - Length, width, draught;
  - Types of goods;
  - Period of repair;
  - Available quantity and quality crew members;
  - Sailing distance.

- Transport offer (price to realize the transport);

- Contact address: Name, post address, telephone, fax and Email.

3.2.3 Information for fleet management

The shipmaster has now to organize the transport operation between the first terminal (terminal origin) and the final terminal (terminal destination). He sends this information to the skipper and the terminal operator.

- Name of shipper (freight broker);

- Characteristics of goods to transport;

- Terminal origin (address);

- Time of arrival to the terminal origin;

- Quay number;

- ETAs to the intermediate terminals;
• ETA to the terminal destination;
• Time of departure from the different terminals;
• Expected time of departure from the terminal origin;
• Routes and schedules;
• Average speed of navigation.

3.2.4 Decisions by logistic partners

3.2.4.1 Decision by Consignors and Consignees
As starting point of the transport demand, the information comes from the consignor. This information is necessary to carry out the transport service:

• Offered cargo:
  o Quantity of goods (volume or number of units);
  o State (solid, liquid, gas);
  o Packaging (small boxes, containers, pallets, etc.);
  o Date of pick-up of goods;
  o Sequence of terminal to be visited,
  o ETA per terminal (day, month, year).
• Date of arrival to the terminal:
  o Day, month, year
• Date of delivery to the consignee:
  o Day, month, year
• Transport order: (order number)
• Invoicing address: Name, post address, telephone, and fax, Email.

3.2.4.2 Decision by the Freight forwarders
The information from the consignor leads the freight forwarder to:

• Choose the better port or terminal according to characteristics of goods to move and distance of pre-haulage;
• Choose the skipper and the ship, which is well adapted to the transport to carry out;
• Contact the port and terminal to announce the next transport operation.

3.2.4.3 Decision by Skippers/shipmaster/ barge operator
The information from the freight forwarder allows the skipper or the shipmaster or the barge operator to better manage the movement of his vessel.

The shipmaster will propose the ship that best is adapted to the type of goods to move. He will decide on:

- The better vessel to affect to the transport demand to satisfy;
- Manage the vessel movement in order to be on time following the schedule;
- Prepare the bill to send to the freight forwarder.

Useful informations from shipmaster to the freight broker are:

• The name of the ship;
• Characteristics of the ship:
- Maximum load (DWT);
- Length, width, draught;
- Types of goods;
- Period of repair;
- Available quantity and quality crew members;
- Sailing distance.

- Transport offer (price to realize the transport);
- Contact address:
  - Name
  - Post address
  - Telephone
  - Fax
  - Email

3.2.4.4 **Decision by Terminal and port managers**

Terminal and port operators need Estimated Time of Arrival (ETA) information in order to be able to plan resources for terminal processes. ETA information of approaching vessels supports the overall terminal utilisation and allows smooth passage of vessels through the terminal facilities. As a result, transhipment processes – and especially waiting times – can be compressed.

In case of insufficient terminal capacities, the terminal operator can inform the individual skipper of his Requested Time of Arrival (RTA). All in all a better slot management is possible as a result of the exchange of ETA and RTA data. In general, improved terminal planning results in faster and more reliable transit times, which normally constitute a disproportional part of the door-to-door order cycle time. All the information at their disposal allows the port and terminal managers to decide and to inform the skipper on:

- Arrival date to the terminal according to the availability of berths;
- Quay number;
- Expected waiting time at the terminal;
- Expected service time at the quay;
- Exact location for the storage of the goods in the terminal;
- Quay or warehouse number, etc.

3.2.4.5 **Decision by multimodal chain managers**

The multimodal chain manager manages all the logistic chain, from the suppliers to the customers. It has the role of maximizing the service rate and of rationalizing the total logistic costs. He analyses the processes in all the services from the production to the delivery steps.

He manages stocks and the conveyors relations. He has in charge the development of the industrial plan of the company and lays down the policy of transport between the production and storage sites and the customer.

The multimodal chain manager has to make sure that the shipment for their customers will be delivered in time to avoid delay in the production process. They have to:

- Monitor the carriage of goods in the inland water ways;
- Organise the pre/post haulage by road of the goods;
- Take corrective measures in case of delay.
3.2.4.6  Tracking & Tracing of cargo

The information shared between all the logistic partners involved in the carriage of goods is helpful for a better management of activities and work. The sender needs to know at any moment where his shipment is. He has for that sake information from terminal manager.

Indeed, when a shipment is in a terminal, the terminal manager knows in what warehouse the shipment is stored (number of the warehouse), what is its date of arrival in the terminal, what is the expected date of its departure. When the shipment leaves the terminal, the last information is updated so that the sender knows exactly at what date the shipment left the terminal. After that, he can follow the shipment thanks to information from the skipper.

The tracking and tracing of cargo is very important for the just-in-time production. When it is possible to know at any moment the exact location of the shipment, it is possible to take corrective measures in case of delay. When there is for instance a strike in the waterways, the forwarder can have recourse to road transport in order to avoid delay for the production chain.

The shipmaster on his side needs to be informed of all traffic problems in order to update the schedules for the ship and be able to give relevant information to the client when he needs it.

RIS will certainly contribute to improve the image of the waterway with regard the tracking and tracing of the shipments, which will contribute to a better organization of production chains for those enterprises which chose to use the inland waterways transport solution.

3.2.5  Logistical supporting tools: the Logistical Data Platform

The RIS concept of "Logistical Data Platform" –LDP- deals with the organization of the transport in general through the facilitation of data and information exchange between the different users of waterways.

3.2.5.1  General Architecture of the Logistic Data Platform (LDP)

The Logistic Data Platform (LDP) is a complex of web-based servers that support numerous applications among which:

- Lock passing time statistics database.
- Other value added services to terminal and infrastructure managers.
- COARRI gateway (converter application).
- BORIS (Barge Operator River Information Services).
- ERINOT portal/entry (see also ERI).

The web-based servers are addressable via the LDP gateway, which acts as a portal. The portal is a very simple web page. Via hyperlinks on this web page logistical players can access the different Servers/applications. This portal creates a 'single point of access'.

The Logistical Data Platform in its final configuration will have a module dedicated to statistics.
3.2.5.2 **Lock passing statistics**

When defining the voyage plan with the Voyage Planner lock passing statistics are needed. These statistics are as a database available via the LDP Server. Data to gather in the server is the following:

- Number of ships passing through the lock by day and direction;
- Quantity and type of goods passing through the lock by day;
- Total tonnage (and if any, Number of passengers) by day;
- Etc.

This information is sent automatically via the transponder installed on the vessel to the statistic server using electronic reporting devices. The database should be organised in order to allow an automatic accounting of the ships and cargoes passing through the lock, or entering in a port/terminal.

3.2.5.3 **Other value added services to terminal and infrastructure managers**

The port manager provides the statistic server database with data such as:

- The number of ship arriving and leaving the port by day;
- The quantity of goods loaded by day and by category;
- The quantity of goods unloaded by day and by category;
- The quantity of goods loaded and unloaded by day and by category (b+c), (containers, breakbulk, cars, passengers, etc.);

In case of the existence in the port of different dedicated terminals, each terminal manager will be in charge to load the port database with data related to his activity. The port database sends this data to the statistic database server.
RIS can assist in levying charges for the use of infrastructure. The travel data of the ship can be used to automatically calculate the charge and initiate the invoicing procedure. Systems such as the German ASS-Online system has been developed to allow skippers to electronically send their declaration notification. The system can then send electronic invoices to the skipper. The infrastructure charges services mainly work through conventional technologies such as the Internet and mobile phone.

3.2.5.4 **COARRI converter**

THE COARRI tool converts messages into an EDIFACT format for further use.

A loading terminal sends e-mail to the COARRI gateway Server with an attachment of a pre loading or loading list. This list is made in one of the eight pre defined input forms and can be an ASCII, XML or XLS format.

The gateway process converts these lists to a COARRI message in EDIFACT format and puts this message in the mailbox of the involved barge operator. The gateway process recognises when a pre-loading list is followed by a loading list so an update tag/flag can be added to the loading list.

The gateway process logs all COARRI messages.

Via his mail application the barge operator can download the loading list for his barge from the Server, on which the gateway process is running.

---

*Figure 9: COARRI application*
3.2.5.5 **BORIS**

Logistical players can input for the transport the amount of cargo to be transported and the place of departure and destination. See Figure 9. The application will then calculate the type of ship (CEMT specifications), the maximum tonnage that can be loaded and the number of ships needed. Also an estimated voyage/route description can be generated. This result will be graphically presented. BORIS is based on the Voyage Planner. Therefore the available data of the waterway network is similar as used by the Voyage Planner.

![Diagram of BORIS application](image)

*Figure 10: BORIS application*

3.2.6 **Equipment needed for logistical support services**

Many stakeholders need to be connected to the LDP. We have the transport planner, the freight forwarders, shippers, skippers, lockmasters, terminal managers, barge operators, barge owners, shipping inspectorate, logistical chain directors.

Each stakeholder has specific information needs and has to provide information to other users. So, the exchange of information is two ways: receiving from other users and providing information to other users. Three sub-groups can be highlighted according to information needed and to provide to others.

The first group is the organiser of the transport, which includes the transport planner, the freight forwarder and the shippers. The same stakeholder can assume these three roles.

The second sub-group is the carriage group, which includes the barge operator, the barge owner, the ship owner and the skipper.

The third group is what we can call fixed point group. It is composed of the terminal operator and the lockmaster.

The first group is mostly interested by information on the goods themselves and the way these goods are being transported from one location to another. This information is necessary for planning the transport, for following the goods during the transport operation (tracking and tracing). The better way to get this information is by Internet. So, the stakeholders in this sub-group need a computer with Internet connection to get information from the others actors. GSM and telephone must be used as additional tools in case there is a problem with the Internet connection. The ship must be equipped with the AIS system.
### Table 1: Cluster Logistical support: recapitulative table of information exchange, actors involved and equipment needed

<table>
<thead>
<tr>
<th>Info exchange</th>
<th>From</th>
<th>To</th>
<th>Equipment for sender</th>
<th>Equipment for receiver</th>
<th>Info necessary for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voyage specification</td>
<td>Supply forwarder</td>
<td>Freight broker</td>
<td>- Computer</td>
<td>- Computer</td>
<td>- Publishing transport demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td>- Receiving demand and proposing transport solution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Tender (offer)</td>
<td>Freight broker</td>
<td>Supply forwarder</td>
<td>- Computer (</td>
<td>- Computer</td>
<td>- Receiving offers,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td>- Choosing transport partner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Transport order</td>
<td>Supply forwarder</td>
<td>Freight broker</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Concluding the transaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Updated voyage specification</td>
<td>Supply forwarder</td>
<td>Freight broker</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Preparing transport operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Receipt information</td>
<td>Terminal operator</td>
<td>Freight broker</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Information to TO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Delivery information</td>
<td>Freight broker</td>
<td>Supply forwarder</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Confirm transport operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Info exchange</td>
<td>From</td>
<td>To</td>
<td>Equipment for sender</td>
<td>Equipment for receiver</td>
<td>Info necessary for</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>----------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>Freight + vessel tracks</td>
<td>Skipper</td>
<td>- Supply forwarder</td>
<td>- Computer</td>
<td>- AIS transponder</td>
<td>Tracking &amp; tracing of goods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Freight broker</td>
<td>- Internet connection</td>
<td>- Radar, VHF, GPS sensors,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Computer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- GSM, Telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Transshipment order and specification invoicing</td>
<td>Supply forwarder</td>
<td>Terminal operator</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Tracking &amp; tracing of goods</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Updated planning of (un) loading</td>
<td>Terminal operator</td>
<td>- Supply forwarder</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Tracking &amp; tracing of goods</td>
</tr>
<tr>
<td>Port arrivals Port departures</td>
<td></td>
<td>- Freight broker</td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Historic of expected bridge data over the relevant</td>
<td>- Bridge operator</td>
<td>- Skipper</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Statistics</td>
</tr>
<tr>
<td>period Lock passing statistics</td>
<td>- Lockmaster</td>
<td></td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Web server</td>
<td>- Web server</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Extract voyage plan</td>
<td>- Skipper</td>
<td>- Bridge operator</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Statistics</td>
</tr>
<tr>
<td></td>
<td>- Shipmaster</td>
<td>- Lockmaster</td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, telephone, Fax</td>
<td>- GSM, Telephone, Fax</td>
<td></td>
</tr>
<tr>
<td>Updated ETA Pre-announcement</td>
<td>- Ship master</td>
<td>- Bridge operator</td>
<td>- Computer</td>
<td>- Computer</td>
<td>Statistics</td>
</tr>
<tr>
<td>Operational announcement</td>
<td>- Skipper</td>
<td>- Lock master</td>
<td>- Internet connection</td>
<td>- Internet connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic address</td>
<td>- Electronic address</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- GSM, Telephone, Fax</td>
<td>- GSM, Telephone, Fax</td>
<td></td>
</tr>
</tbody>
</table>

*Table 2: Cluster Logistical support: recapitulative table (continued)*
3.3 Cluster Supporting Services for Navigation

3.3.1 Vessel Management and Vessel Traffic Services in a Fairway or an Inland Port

Before we go into larger detail of VTS and VTM as decision processes we focus on the difference between VTS and VTM. The major characteristics of Vessel Traffic Services are based on:

- High level of interaction between VTS-operator and navigator;
- Interaction often in the format of goal oriented traffic information;
- Interaction based on complete Traffic Image that is produced with no or very small time delay.

VTS is designed to support the navigation process of a vessel and if need be may provide information to other users (allied services).

VTM is less strictly defined. VTM is defined by the following characteristics:

- Interaction is possible by a VTM operator;
- Interaction is oriented to special purposes such as for example when the environment is endangered by the manoeuvres of a vessel;
- Interaction is not necessarily based on a complete Traffic image. The Traffic Image may have small time delays depending on the purpose.

3.3.1.1 The role of sensor systems in VTS or VTM

Since VTS and VTM are services that are primarily designed to assist navigation, one should carefully assess the situation where the sensor systems are able to assist the navigator directly on board.

This information, provided that it is properly displayed on board, might reduce the level of interaction of the VTS-operator, since these systems immediately assist the navigator in data collection often without delay.

As a consequence it should be expected that the traditional VTS in Inland Navigation will be reduced to a data collection and dissemination system where a VTS-operator monitors traffic in order to assess whether or not Traffic Organisation Services (measures) are due. If more information is available on board the navigator may be more able to take his decisions without interaction with the VTS-operator.

A RIS operator is now an operator that operates in a RIS centre and assists in the systems that may be used on board to collect and present pertinent navigation information relevant for on board navigation decision-making. Since the shore based sensor systems/networks that are available may have a large range and that a non co-operative sensor system is not always available, RIS degrades form a VTS to a VTM system, but at the same time multiplies its range from a local coverage to a regional coverage.

3.3.1.2 Classical Vessel Traffic Services

General description

The primary functions of a VTS are:

- Provision of general information, which is related to the area under coverage;
- Provision of specific traffic information in general terms usable to all vessels in the area under coverage and traffic information specific for a vessel in such a way that the navigator shows the desired behaviour to the VTS-operator. In many countries, the VTS-operator also exercises the
possibility to give a direction to the navigator, provided that the direction is not interfering with immediate navigation decisions;

- Navigational assistance: This service is provided on request to a vessel that is in problems determining its own position. This situation can occur when the visibility decreases and the navigator perceives that his on board radar is not working. Visual navigation is under these circumstances not possible to the extent that it is necessary for the safe navigation of the vessel and shore based radar information regarding relative positions should supplement or replace the visual information that is available on board.

Vessel Traffic Services in an inland port or a waterway may also be described as a decision process. A decision process also requires action by those who have to implement a decision. Given the nature of the responsibility of a master of a vessel, the desired decisions are communicated in the way of information, which normally should lead to the behaviour desired. Only in exceptional cases the VTS operator will issue a direction. Such a direction is based on the result that needs to be obtained and never on the manner how the result should be obtained. This is left to the discretion of the master of the vessel.

The traffic image is measured by a sensor system. This might be a cooperative system such as AIS or a non-cooperative system such as Radar. A combination is also possible and is implemented in a number of VTSSs. The sensor system measures the presence of vessels in case of Radar. The VTS operator needs to label the vessel to ensure that the vessel is not confused with any other vessel plying in the area. This can happen to ask the vessel to provide details of the surroundings so that the VTS-operator can understand the position of the vessel positively identifies the vessel and attaches a label to the vessel. In other systems a cross bearing will uniquely identify the vessel when it broadcasts a message.
The VTS operator according to IMO circular 739 can provide information (general as well as traffic), navigational assistance for those vessels having a problem to assess their present position and traffic organization services. The first and last of the so-called primary functions can be provided to all vessels or to an individual vessel and often these services are also given on request. However, the VTS-operator is always able to give information if he believes that the vessel for its on-board decision-making requires additional information. Navigational assistance is given to those vessels of which it is believed that they have insufficient position finding capabilities on board and to vessels requesting this type of information.

Apart from the primary functions, the VTS and hence the VTS-operator might have responsibilities in enforcing the navigational rules that are pertaining to the navigable waters. He also might be involved in calamity abatement, although the responsibility for calamity abatement often lies with other authorities.

All these primary and secondary functions of a VTS are not possible without the presence of the internal functions that collects the data of the traffic area under surveillance. Apart from the sensor system, ship-related information needs to be available. This information contains generally:

- Ship Id and principal dimensions (often from databases that are kept by the authority and are used by several VTSs of the same authority or direct connections to ship information providers);
- Maximum operational draught;
- Presence of dangerous goods and if so, quantities and descriptions of these goods in coded format;
- Number of crew and passengers on board.

In many cases more specific information is requested such as:

- ETA of the vessel;
- Deficiencies in the equipment of the vessel that might affect the transit through the VTS area to the berths;
- Requests regarding tugs and mooring gangs.

The VTS operator collects the required information on top of the traffic image that is maintained by the sensor system. He then evaluates the information on its accuracy and completeness. The VTS-operator will take into account the strategic and tactical objectives of the navigation of the vessels and he contributes to the navigational decision making on board the vessel

The decision process of the VTS-operator is then based on his criteria of safe, orderly and efficient traffic through, generally speaking the navigators in the area.

The main objective of a VTS is to maintain a high level of safety in the VTS area. He provides all sorts of information to assist in decision making on board, such as general information regarding the weather. Traffic information can be provided in general for use of navigation on board, but the VTS operator may decide that specific information about presence and intentions of other vessels may assist in the on board navigational decision making.

The VTS-operator is also responsible for an orderly flow of vessels. This requires that the evolution of traffic occur along the spirit of the Rules and Regulations that are pertinent in the area. Safe but situations that contravene an orderly flow of traffic should also be avoided.

The VTS-operator is also responsible for the efficiency of the flow of traffic. This would require that measures that would impair the use of the port or the waterway without an effect on safety and order of the flow of traffic should not be considered.

The mental model of the VTS-operator uses these criteria in order to decide when information is required and in what format that information should be used. The mental model of the VTS-operator
should always have a predictive component that provides him with information about the situation that will occur if nothing will be done.

When the VTS-operator comes to the conclusion based on his mental model that is fed by experience, intelligence and empathy, he will send an information message to the vessel. He nearly always uses VHF communication to the navigator.

The VTS-operator accurately monitors the way in which a vessel will use the information to improve the navigation decisions on board to avoid an unsafe situation that may lead to an accident. If necessary, the VTS-operator will provide subsequent information, until that time that he is convinced that the navigator has again a low probability of being involved in an accident, is taking the Rules and Regulations into consideration and doesn’t hamper the efficiency of other traffic.

When the VTS-operator comes to the conclusion that despite the information provided a dangerous situation continues to exist he may give a direction to the navigator. This direction is oriented to the result of the direction and not to the manner the navigator implements this. Criminal proceedings will face the navigator who elects to ignore a direction. The VTS operator, if circumstances dictate is also able to provide information/ directions to vessels that are contravening the Rules and Regulations.

Information about pertinent data available in the VTS information system may be provided to parties that have a special need to know. This is often used for support to allied activities. In some cases VTSs will provide data to other VTS systems.

The VTS has effects on the navigation process on board. The local knowledge of the navigator can be enhanced by the information that is provided by the VTS-operator.

This includes an enhancement of the traffic image as perceived by the navigator based on his Tactical Traffic Image on board. He might be able to take into account movements of vessels, which his sensor system is unable to see. The VTS might also have an effect on the documentation that is available on board. Emergency messages might be given when the navigational conditions are changed as a result of an accident or a sudden change in aids to navigation or other circumstances that may affect the navigation process.

Figure 12: Effect of VTS on different parts of the hierarchy in a navigation process.
Sensor systems of a classical VTS

Generally speaking the most important sensor system of a classical VTS is a non co-operative system such as Shore-based Radar. Shore based radar is often based on more radar sensors that are networked. Target fusion is then often applied where targets of more antennas are digitally processed in order to get the MPP. If radar based systems are used the presence of a target is known but its identity is not known. VHF cross bearings are then taken (provided that more receivers are being used in the VTS and as soon as the VTS-operator has established the identity of the vessel he is able to affix a label with an identifier to the target. In many classical VTS systems a phenomenon as label swapping was a major deficiency, but in modern classical VTS systems this problem is solved.

Other sensor data are also important: water levels at different locations provide information of the navigable depth of the waterway or the basins and a prudent VTS-operator will check available water depths with the operational data of the vessel. Weather information such as wind speed, wind direction and wind gustiness are often continuously available.

For rivers and ports the current speed is also important and current meters are often available to indicate the difficulties when a manoeuvre needs to be made when challenging the current. Competent skippers will often use the current for a good purpose.

Data collection from reporting

Reporting is often divided in

- Static ship bound information;
- Dynamic ship information;
- Cargo information;
- Voyage related information.

Data evaluation

The VTS –operator knows based on experience but also based on the design of the data collection systems that data may not be adequate and in some cases are not relevant.

Traffic Image

The traffic image that is constructed from the fused radar signals when the system has more than one radar sensor is the most important part of the VTS. The VTS-operator uses the traffic image often in relation with the labels that contain the names of vessels in order to detect potential dangerous situations. He determines these situations based on:

- Experience;
- Nearness of vessels;
- Intentions of vessels;
- Vessels threatening to start contravening the Rules and Regulations;
- Vessels that are contravening the Rules and Regulations.

A radar-based Traffic Image may not be very adequate to make decisions upon, since often banks are not well visible due to the small height over the water or not providing sufficient reflection to get a clear picture of the limits of the (navigable) waters. Water depths are also not available but when there is a buoyed channel the marks are visible on the traffic image, indicating the fairway. In some cases ENCs are projected on top of a radar image or the reverse. This provides a traffic image with much more geographical cues. It should also provide for water depths, but the Rhine Commission decided that water depths might be dispensed with whilst still satisfying the criteria for Inland ECDIS.
Decision making

The VTS-operator decides on the basis of the Traffic Image whether or not he desires the traffic situation to be rectified. He uses information provided by his Traffic Image and the predictions of his internal model to decide whether or not the values of the times of no return to an undesired event, such as collision, contact and groundings are exceeded. If such a situation will take place, the VTS-operator starts to provide information in such a specific manner that the navigator comes aware of the situation and takes measures to resolve the threatening dangerous situation before the point in time of no return is reached.

Experienced VTS-operators are able to provide traffic information in such a sequence that the navigator nearly automatically assumes the right attitude and navigates in the way the VTS Operator requires.

3.3.2 Voyage planning, Lock planning and Voyage Monitoring

The following applications interact with each other to provide a voyage planning and Monitoring and the lock planning:

- Voyage Planner Application;
- Lock planning Application;
- Voyage Plan Server;
- RIS/NTS (Notices To Skippers)/ENC (Electronic Nautical Charts) Servers.

The following phases can be identified:

- Voyage Planning: In this phase a voyage plan is determined before the voyage starts;
- Voyage monitoring and lock planning: In this phase the progress of the voyage is monitored and the final ETA/RTA co-ordination with the lock takes place.

The Voyage Planner application of a ship will act as master. It will contact the Voyage Plan Server for the following data (see figure 13):

* Network data with respect to the intended route;
* Passage statistics for each lock to be incorporated in the intended route;
* Notice to skippers active for the intended route;
Figure 13: Voyage planning process

The needed data of the waterway network is available on the Voyage Plan Server and contains all relevant parameters of all links, nodes, bridges, locks, passes and obstructions.

The Voyage Planner will define a route and a voyage plan on the basis of these data, together with the own ship hull data, cargo data etc.

The voyage plan consists of a list of passing points and the ETA of these points, the destination(s), (terminal(s)) and ETA’s of the destination(s). This voyage plan will be send to the Voyage Plan Server.

During the voyage the progress can be monitored, by sending position data to the Position Server (see figure 13). If the Voyage plan is not any more accurate an update of the Voyage Plan can be send to the Voyage Plan Server.
Any Lock can get information on ETA’s for its lock planning by downloading selected information from the Voyage Plan Server. Based on this, a preliminary planning can be made. A simulation tool will be used for this planning. A lock can estimate which ships will pass at a given timeframe by:

- Searching the Voyage Plan Server to identify ships with voyage plans that will pass a certain lock and the ETA’s of these ships for that lock;
- Searching the Position Server to track these identified ships.

For lock planning also the following information is used:

- Hull data incorporated in the Voyage Plan;
- Cargo data may be used to determine if a certain combination of ships is allowed in the same lock cycle (dangerous goods).

If the ship comes within 4 hours of the lock to be passed the final lock cycle process will be planned. If the lock wants to change the arrival time of a certain ship it will send a RTA to the ship via the Voyage Planner. It can be noted that the concept can also be used for terminal planning, opening bridges, etc.
Figure 15: Lock Planning and Management
3.3.3 Equipment needed for Supporting Services Navigation

The main actors involved are the skipper, the shipmaster, the bridge operator, the lockmaster, the port and terminal managers and the barge operator.

For a better planning of voyage, the ship needs to have on board equipment for sending and receiving information from shore based servers, and exchanging information with terminal operators, and shipmaster. The following instruments are the minimum to install on board:

- AIS transponder;
- Radar, VHF, GPS sensors;
- Computer (one or more);
- Internet connection;
- Electronic address;
- GSM, Telephone, Fax;
- Voyage planner application.

Besides this the following applications and related equipment are needed on shore:

- Lock planning Application;
- Voyage Plan Server;
- RIS/NTS (Notices To Skippers)/ENC (Electronic Nautical Charts) Servers;
- Network data;
- Radar, VHF, GPS sensors;
- Computer (one or more);
- Internet connection;
- Electronic address;
- GSM, Telephone, Fax.
<table>
<thead>
<tr>
<th>Info exchange</th>
<th>From</th>
<th>To</th>
<th>Equipment for Sender</th>
<th>Equipment for Receiver</th>
<th>Info necessary for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship data (hull, Id, dimensions)</td>
<td>Skipper</td>
<td>- Lockmaster</td>
<td>Computer, internet, AIS,</td>
<td>Computer, internet, AIS,</td>
<td>Terminal &amp; lock passing planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Port/Terminal operator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cargo data</td>
<td>- Skipper</td>
<td>- Terminal Manager</td>
<td>Computer, internet, AIS,</td>
<td>Computer, internet, AIS,</td>
<td>Planning of terminal operations</td>
</tr>
<tr>
<td></td>
<td>- Freight Broker</td>
<td>- Port Manager</td>
<td></td>
<td></td>
<td>Quick rescue in case of calamity abatement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Voyage planner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational draught, deficiencies,</td>
<td>Voyage planner</td>
<td>Skipper</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM, GPS sensor</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM, GPS sensor</td>
<td>Choice of navigation speed, road, etc</td>
</tr>
<tr>
<td>Requests cs tugs, mooring gangs</td>
<td>Skipper</td>
<td>- Lockmaster</td>
<td>VHF, GSM, Internet, computer</td>
<td>VHF, GSM, Internet, computer</td>
<td>Choice of navigation speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Port manager</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crew &amp; passengers on board</td>
<td>Skipper</td>
<td>Police &amp; Customs authorities</td>
<td>Telephone, GSM, Internet, computer, AIS</td>
<td>Telephone, GSM, Internet, computer, AIS</td>
<td>Cross border control (police &amp; customs) Better organisation of rescue</td>
</tr>
<tr>
<td>Dangerous goods</td>
<td>Skipper</td>
<td>- Lockmaster</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM</td>
<td>Better organisation of rescue if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Voyage planner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyage info (destination, ETA, etc.)</td>
<td>Skipper</td>
<td>Voyage planner</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM</td>
<td>Better planning of Lock passing &amp; port operations</td>
</tr>
<tr>
<td>Fairway intensities</td>
<td>Voyage planner</td>
<td>- Skipper</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM</td>
<td>Computer, internet, AIS, VHF, Telephone, GSM</td>
<td>Better voyage organisation (choice of road, speed) Planning of lock passing operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lockmaster</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Terminal operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Port operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Voyage planner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic ship info</td>
<td>Skipper</td>
<td>- Lockmaster</td>
<td>AIS, VHF, Telephone, computer, internet</td>
<td>AIS, VHF, GSM, Telephone, computer, internet</td>
<td>Tracking &amp; tracing of goods, Sending notices to skippers,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Voyage planner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Port/terminal operator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lock data and statistics</td>
<td>Lockmaster</td>
<td>LDP</td>
<td>Computer, internet</td>
<td>Computer, internet</td>
<td>Planning of investments and maintenance works</td>
</tr>
</tbody>
</table>

Table 3: Cluster Supporting Services to Navigation: recapitulative table of information exchange, actors involved and equipment needed
3.4 Cluster Cross-Border Services

ERI /WP6 (ERI Cross Border) is used to provide governmental and logistic organisations with the vessel, journey, cargo and crew/passenger information. When a ship passes the administrative border this information will be forwarded to the appropriate governmental organisation (by example Customs, Aquapol, Immigrations).

The following messages will be stored and distributed:

- ERINOT: voyage, vessel and cargo data;
- E-Manifest (CUSCAR): specific cargo data used by the customs organisations;
- PAXLIST: persons list and personal information;
- INVRPT: inventory report for goods for on board personal use (bounded stores).

![Diagram of ERI/Cross border system](image)

*Figure 16: ERI/Cross border*

The ERI/Cross Border system works as follow:

- The on board ERI Cross border software sends all the messages to the ERINOT Server;
- Three distribution mechanisms are used to distribute the data:
1. Automatic rerouting directly after the receiving of the message. This will be done to IVS90, MIB, and VNF system(s);
2. By using the Message Receiving Application. This application regularly polls the ERI Server for new messages;
3. By using a Browser (Internet Explorer) to connect to the ERINOT Server. A list of cargo data will then be presented (if authorised).

- As soon as the ship enters a predefined administrative border area all the information will be sent to all the responsible authorities in the next area.

The ERINOT-Server will store all the (un-) processed, original messages in a central database. It is therefore possible to retrieve the original messages by authorised users (see figure 16).

![ERINOT System Diagram](image)

**Figure 17: ERINOT system**

A request for (group of) stored messages can be done by the following elements such as:
- Ship name;
- Unique Ship ID;
- Port of destination;
- Port of Departure.

The returned output can be distributed by:
- EDIFACT message;
- XML message;
- XML view with a style sheet.
## COMPRIS – Socio-economic assessment of RIS

<table>
<thead>
<tr>
<th>Info exchange</th>
<th>From</th>
<th>To</th>
<th>Equipment for Sender</th>
<th>Equipment for Receiver</th>
<th>Info necessary for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship data (hull, Id, dimensions)</td>
<td>Skipper</td>
<td>Fairways authorities</td>
<td>AIS transponder, VHF</td>
<td>AIS transponder, VHF</td>
<td>Checking the conformity to the national legislation</td>
</tr>
<tr>
<td>Cargo data (per type and quantity)</td>
<td>Skipper</td>
<td>Customs, Border Police</td>
<td>AIS transponder, VHF</td>
<td>AIS transponder, VHF</td>
<td>- Checking the conformity with the national legislation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Calculation of taxes and fees</td>
</tr>
<tr>
<td>Passengers data</td>
<td>Skipper</td>
<td>- Customs, Border Police</td>
<td>AIS transponder, VHF</td>
<td>AIS transponder, VHF</td>
<td>- Checking the conformity with the national legislation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Passenger and crew identification &amp; control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Calculation of taxes and fees</td>
</tr>
<tr>
<td>Voyage info (destination, route)</td>
<td>Skipper</td>
<td>Fairways authorities</td>
<td>AIS transponder, VHF</td>
<td>AIS transponder, VHF</td>
<td>- Calculation of navigation taxes &amp; fees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Invoicing</td>
</tr>
<tr>
<td>Goods for personal use</td>
<td>Skipper</td>
<td>Fairways authorities</td>
<td>AIS transponder, VHF</td>
<td>AIS transponder, VHF</td>
<td>- Calculation of navigation taxes &amp; fees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Invoicing</td>
</tr>
<tr>
<td>Vessel statistics</td>
<td>Fairways authorities</td>
<td>LDP</td>
<td>Computer, internet</td>
<td>Computer, internet</td>
<td>General use</td>
</tr>
<tr>
<td>Dynamic ship info</td>
<td>Skipper</td>
<td>- Lockmaster, Voyage planner, Port Operator, Terminal operator</td>
<td>AIS transponder, VHF, GSM</td>
<td>AIS transponder, VHF, GSM</td>
<td>Receive notices to skippers</td>
</tr>
</tbody>
</table>

*Table 4: Cluster Cross Border Services: recapitulative table of information exchange, actors involved and equipment needed*
3.5 Cluster Navigation on board

3.5.1 Introduction

The following figure explains the general set-up of a navigation process.

![Navigation decision process diagram](image)

Figure 18: Navigation decision process

In the figure above a vessel navigates in its environment. The vessel in its environment constitutes the physical part of the system. The left hand side of the figure represents the information part of the system. The navigator represented by the blue rectangle obtains information as regards the environment: on the one hand information that is stored in nautical charts and pilots as well as tidal atlases, on the other hand the current information such as speed and course of the vessel. The level of motions also belongs to the current information. The objectives are given in the blue ellipse. In the blue box the decision processes such as discussed in Figure 18 take place. The navigator selects the best course of action and decisions are flowing into the green box. This box changes than the speed lever and/or the course of the vessel by using rudder and counter rudder.

The next Figure shows the navigation decision process in more detail. The figure shows the different levels of decision-making and also shows the dependence of a lower hierarchy decision on the higher one.

The navigator often has strategic objectives such as the mission of the vessel. The mission tells the navigator where to go and what to do with the vessel as soon as it has reached its port. The tactical objectives follow logically from the mission objective. The mission objectives can only be achieved if suitable voyage plan is drawn up, including a schedule. As a result of the tactical decision process courses to steer and speeds to maintain are derived which implement the decisions on the schedule and the voyage plan. In order to deal with disturbances threatening the vessel not to follow the courses to
steer or maintain the required speed rudder action and sometimes speed settings need to implement as a result of the immediate decision process of the navigator. Stored and current information is used in all three levels of the decision process. It is to be remarked that higher level objectives might not lead to suitable options for the next lower level and as such lead to an adaptation of the higher level objectives.

![Diagram of decision process]

**Figure 19: The three levels in a navigation process**

Figure 19 represents an overview of the hierarchy in a navigation process. The mission objectives are interpreted and they lead in relation to a consideration of the safety aspects to decisions on routes and schedules. The introduction of safety aspects is important since in many cases the selection of a route in the lee of a landmass may be seen as more important than the shortest route.

Tactical decisions are subordinate on the strategic decisions and they lead to a decision of speeds and tracks to be followed, or courses over the ground. In order to deal with currents the heading of the vessel, which is more easily determined using the gyrocompass in the past than the track of the vessel. Desired speeds depend highly on the ETA or RTA the available water depth and the expected wind conditions, which might reduce the speed at a given power level.

Immediate decisions are required in case of interaction with other traffic or speed reductions due to shallow and restricted waters. Other traffic requires navigation according to the Rules and Regulations regarding collision avoidance and burdened vessels must keep free from vessels having the right of way. This requires often a clear helm action and large course changes to convey the message to the other vessel that adequate measures have been taken to respect her privileges.
3.5.2 The elements of navigation

3.5.2.1 Inland ECDIS

3.5.2.1.1 General description

Inland ECDIS is a device that provides the skipper with Geographical Information. This information that is used belongs to the Navigation mode. The position of the vessel is depicted in the screen of the navigation mode. This is often referred to as Tactical Traffic Image or Display. Other designations are also used such as situation display. Generally to become a full-fledged display the prevailing depths should be shown in order to see whether the draft of the vessel is at all times larger than the depth that is available.

Inland ECDIS can also display ENCs that are partly fulfilling the requirements of showing depths to the skipper and this might constitute a danger to skippers if they have insufficient knowledge of the fairway.

Apart from the navigation mode an information mode exists. This mode is not meant for safe navigation but for consulting geographical databases as well as additional databases that may contain information, which needs to be used by the skipper.

Some skippers use products that enable them to view information in the so-called ECDIS viewers, which are on the market. Although these viewers might provide useful information to the skipper, the use of these viewers for navigation should be avoided.

3.5.2.1.2 Data required

The data that are required for an ECDIS may be summarised as follows:

- Geographical data of the fairway (Canal, river, lake or any other navigable stretch of water) related to an international reference system such as WGS 1984;
- Information regarding the Aids to Navigation that may be encountered, such as buoys, beacons, leading lines, signs and other information provided by the fairway authority;
- Depth information to a certain reference level. Actual water depth can than easily be computed when water heights are given over the reference level;
- Position information of the vessel in lat and long.

3.5.2.1.3 Information required

The information that is required is the way in which an ECDIS chart combines the data in such a way that the navigator:

- At all times knows what his position is relative to the fairway and relative to conspicuous points on shore;
- At all times knows the probable consequences of maintaining speed and course;
- At all times knows in what way he might deviate from his original intentions if he might become involved in an encounter situation.

With this information he is able to navigate his vessel to avoid grounding danger.
However in order to be safe in collision situations the navigator has to superimpose his mental view of the situation or the data from a radar to determine the positions of other vessels and use his knowledge of the rules and regulations to safely avoid the danger for collisions with these vessels.

A great help in information will be the overlay of radar on the ECDIS so that the navigator is able to do both: take measures to thwart the grounding danger and take measures to avoid other vessels. The special problems concerned with the mapping methods and the way in which absolute and relative reference systems should be coupled are nearly all overcome and no real inhibitions exist for a commercial marketing of these products.

Inland AIS on board vessels in a fairway might assist in determining encounter situations and the name of the vessel so that in cases where more clarity needs to be given, contact with the vessel can be made through VHF.

Discussions on the use of AIS don’t centre on the value for the safety of navigation but circle on the open broadcast mode where, allegedly, commercial interests may be harmed. For some of the stakeholders this harm is larger than the benefits for the safety of navigation and these stakeholders are unwilling to accept Inland AIS.

3.5.2.1.4 Update service

The use of ECDIS and ENC might be hampered when the charts are not updated and don’t give the skipper the correct situational information. This is often due to fast changing depths or to the fact that Aids to Navigation are not functioning, have been changed, removed or relocated or are taken out of service for a considerable time. Updates need to be provided by the chart suppliers to reflect these changes. Often after a small number of updates and the use of updating procedures, such as S57 version 3, chart suppliers elect to provide new editions. These editions and updates are provided on CD-ROM, but sending updates by WIFI in a lock or with WIMAX are methods that are being considered by the chart suppliers.

There seems to be a certain belief with the responsible authorities that the delay of changes that might be important for safe navigation don’t need to be provided immediately due to the absence of accidents between the detection of the need for a change and the formal publication of the change through a NtSs. In some cases only global figures are given for a given stretch.

The present state-of-the-art chain of events leading to an update being sent to the users is below (more steps may be needed in the less modern circumstances):

- Changes to hydrography, topography or to Aids to Navigation resulting in the discrepancy between the current chart data and the real life, caused by:
  - Natural causes (e.g. a storm);
  - Human actions (controlled);
  - Errors in the current data;
- New survey, new information, not necessarily from/by an HO;
- Data sent to a Fairway authority (FA) (if not emanating from it);
- FA produces digital update (directly or via analogue product);
- FA sends the update to Regional ENC Centres (RENC); or
- FA distributes the update via the agent network;
- ENC Centres or agents send the update to the users.
3.5.2.1.5 Chart service

Different chart services exist. In some member States the ENCs are provided by the Fairway Authority for free and can be downloaded from a website. In other member States the same procedure holds but a fee is required for downloading.

In the majority of member States experimental phases are introduced and ENCs of small stretches are available.

Systematic attempts are being made to increase coverage. It is required that the Fairway Authorities play an inspiring role in this and ensure the quality of the data on which ENCs are based. This relates to the Safety of Navigation. The chart producers might add, for a cost, other crucial information that is required for the best possible use of the vessel.

This information includes:

- Bridge opening times;
- Lock particulars especially when lock services are discontinued due to maintenance or repair of damage;
- Some articles from Rules and Regulations pertaining to fairway objects, so that the user can be immediately informed on what is permitted or what should be avoided.

3.5.2.2 Notices to Skippers

3.5.2.2.1 General description

A Public authority that collects, assesses and distributes information on the Fairway, that affects the Safety of Navigation, provides NtSs. However, these Notices also provide information on suspension, closures for maintenance or other activities. A further characteristic is that some other information is included, such as opening times of bridges and details on suspension and maintenance of locks. NtSs are interesting in such a way that they contain reference information, which is to be used when a skipper is on a specific voyage. In such a case he will then only use the information pertaining to that voyage.

Primary decisions are not taken on the basis of NTSs. They, however, affect the decisions of the routes to be followed and decisions on the draft in the preparation of a mission, and secondary when a voyage is undertaken and Aids to Navigations or other issues important to the Safety of Navigation are malfunctioning or taken away the skipper knows what is missing and can decide and act accordingly.

3.5.2.2.2 Data required

Data that are included in NtSs are data with respect to:

- Changes in depths and their location;
- New or removed buoys and beacons;
- Changes in operational regimes of bridges;
- Curdling, Maintenance and repair periods of locks and waterways;
- Presence of wrecks;
- Malfunction of lights and leading lines.
3.5.2.2.3 Information required

The data as given are only useful when they are placed in geographic context and they are immediately interpretable by the user. The location of the data as meant in the preceding section can assist to put in the right context but often a presentation in an ECN is assisting the user best.

An improved method that is sometimes used is that the voyage that is carried out determines the specific items of the NtSs that are used. This means that the required items are immediately used and that the remainder of the NtSs items will be used when another voyage will be madder where these items will be inserted and used. This requires that each item have e-reference that can be used for each arbitrary voyage.

3.5.2.2.4 Dissemination of NtSs

An official authority normally disseminates NtSs so that the user knows that the information that is provided is accurate and up to date. Each Member State is responsible for the dissemination of this information.

3.5.2.3 AIS

3.5.2.3.1 General description

Automatic Identification System (AIS) is an electronic device that broadcasts its identity and position at regular times to other vessels as well as other information with respect to ship and cargo. The AIS is also able to receive the same sort of information from other vessels. AIS was in the first place a ship-to-ship communication device to display position course over ground and its use was in the first place for collision avoidance. The structure of the messages and the way it was broadcast gave rise to the use of an AIS device on shore where an observer could observe the movements of the vessels in range. This principle is taken by authorities to observe the vessel traffic. Special devices were developed that could not only observe the traffic but also affect the traffic or relate to one vessel in the traffic. This device developed to the so-called base station. In order to obtain a surveillance larger stretches of water than the range of one base station were developed into networks. Apart from the normal messages that are sent at (different) time periods, special message were developed, the so-called binary messages.

AIS is developed for maritime traffic and when after long deliberations accepted by IMO. It was logical that inland navigation also had a look at the potentialities of AIS.

Using the expertise of a number of aspects an expert group was constituted that reviewed the necessity of the items that were included in AIS and changed some of the items to suit inland navigation. The Inland Navigation AIS standard was born.

AIS is in the first place a safety device. More information about identity and intentions of the other vessels in an encounter situation are provided that enables the navigator to determine whether or not his vessel should make an avoiding manoeuvre or should stand on. This is in the first place related to collision avoidance. When vessels of very different size are involved in an encounter the navigators involved should take into account the manoeuvring characteristics of both vessels. This doesn’t happen at all times, since very large vessels are sluggish and because of it they should start a manoeuvre early when they are the burdened vessel.
AIS have become also a device that may be used by a coastal authority (when it is assumed that the base station is located on the coast) to observe the traffic and use the information to manage traffic. AIS may also be used to check the security of the traffic although this aspect is not very relevant.

AIS assist in making decisions by the navigator with respect to the identity of other vessels so that in case a collision manoeuvre is not properly carried out the navigator can call the other vessel with VHF.

AIS assist the coastal authorities in the way in which the traffic behaves and is immediately aware of the identity of a vessel that doesn’t comply with the Rules and regulations. The aspect here that is important is the enforcement role.

Inland AIS doesn’t have the same emphasis of the role in making decisions of the skipper. In busy rivers the number of encounters is so large that the navigator will spend more time in extracting the important items of the AIS which is presented on the Traffic Image that he is probably much better off by looking out of the window and monitor the situation visually and in bad visibility by his radar. This is also due to the Rules of Behaviour on a river and the “one dimension” character of a river.

More useful is the use of AIS when the vessel’s radar is unable to pick up targets in a side arm which are not visible by the vessel’s radar. In principle the AIS in the ship-to-ship mode will also not be able to detect the vessel due to the same obstructions, but repeaters and the use of a VTS may be helpful to relay the position of the vessel in the side arm to the vessel on the river. Normally the vessel on the river has priority so that the information displayed on the ECDIS of the vessel in the side arm is more important to assist the skipper in the decisions of when to enter the river without harming the movements of the other vessels.

The fact that the AIS contains destination and an ETA of the destination enables many stakeholders to make and adjust their planning in order to optimise the planning at the terminal but also of the total delay of the vessel.

Since cargo is attached to a vessel in a specific voyage, the position information that is collected by a shore structure can be used for tracking and tracing of cargo. The requirements are different than the accurate position information and the position of the antenna for safety related instantaneous decisions. Intervals and the accuracy of positions for tracking and tracing are very different from safety related information and it is even the question why one should ever use this information for logistical purposes. Here the question is whether or not an accurate system that is used for safety related purposes should be used for tracking and tracing of cargo or tracking of the vessel. Authorities that are dealing with the vessel itself has a need to know when a vessel is arriving at a certain location need not be informed with high precision of the location of the vessel. They are more interested in an ETA of the vessel in order to make their decisions on the vessels.

AIS may be instrumental as a by-product in providing that information that is seen as more logistical than safety related. In cases where no shore infrastructure is available and AIS only works in a ship-to-ship mode the use of AIS information for logistical purposes is questionable. In those cases where no shore infrastructure is available it seems to be much better to send identity, port of destination and ETA by other communication means where a shore infrastructure is available, such as GSM or GPRS/UMTS.

The use of AIS shore based structure is depending on the risk reduction and hence the benefits for safe navigation, that will be provided by the use of such an infrastructure and is thus a function of density/intensity of the traffic flow and the difficulties in navigation, often related to the unobstructed visibility (visually or with radar) for safe navigation.

This leads to a special regional approach for Vessel Traffic Management distinctly different form the use of Local VTS with radar coverage.
3.5.2.3.2 Data required

The AIS contains data that are sent at regular intervals. All information that is required for safe navigation of the vessels itself and for the vessels in the vicinity is sent with small intervals. These intervals should have a relation with the manoeuvring time constants of the vessels and is chosen to be 3 s. In these cases the identity and the position in longitude, latitude are broadcast. Less dynamic information is sent and received with larger intervals.

The data are not very well interpretable when they are presented in a text format. Large discussions in IMO have not resulted in the requirement that GIS type of data, when there is a requirement to use them immediately, are displayed in an ENC.

In inland navigation, thanks to the development of Inland ECDIS before the discussions of Inland AIS, it seems clear that AIS and ECDIS are strongly connected and the discussions on the Minimum Keyboard and display for AIS are avoided.

3.5.2.3.3 Information required

The information that is required is based on the data that are provided. The discussions on the MKD in IMO are even more valid for Inland Navigation. The time constants of the vessels involved are so small that a ling study of the data on the AIS display are dangerous and should be avoided, since the interpretation of the information on the display takes much to long time to be effective to amend or change the decisions of the navigator.

AIS data should be presented on the ECDIS in the navigation mode. The data would become in this way information on which the navigator will base his instantaneous decisions.

AIS data in as far as they are used for logistical purposes will pass large filters and filters with respect to the use of these data and will be displayed on small scale charts. It seems essential that the ETA is also provided so that a control tool exists to determine the reliability of the ETA. The present position is for the logistical users of no interest. They only want to know the whether or not the ETA as being produced in achievable. Voyage planning software has sometimes a list of ETAs or ETPs and ATPs in order that departures of the transport plan can be easily detected.

In this way the tracking and tracing of cargo is helpful for decisions that need to be made on the adjacent modalities such as seagoing vessels for international export or trucks and trains for European transport and trucks and trains for European transport and import. The overriding decisions are of course the use of the products in ERPs of the distributors for end products and raw materials for producers.

3.5.2.3.4 Display of information

As has been said AIS data should be presented on a GIS display, preferably an ECDIS to make it interpretable information that affects the decision of the navigator and the logistic providers.

3.5.2.3.5 Use of cooperative systems

It should be remembered that AIS opposite to Radar is a cooperative system. The navigator can decide to switch the AIS off and hence to stop transmissions of his device. At the same time he stops the reception of the signals of other vessels. Legal measures are required to taken punitive measures to skippers that when AIS is mandatory to stop broadcast.
COMPRIS – Socio-economic assessment of RIS

An aspect that seems to affect the discussions on the mandatory use of AIS, is the broadcast mode and the unencrypted messages. An AIS listening device which is very cheap enables an observer to know the position and destination of the vessel and further details as being sent by the AIS. Many opinion-makers find these characteristics for the development of the business undesired and oppose the introduction of AIS violently. The fact that AIS send open messages and that with a simple listening station these messages can be received and interpreted is undeniable. The question is that whether or not this information and the negative effects of these messages on the commercial activities of the skippers and their clients is more important than the safety benefits which may be reaped by the society as a whole.

In the port of Rotterdam the authorities consider that the safety of the traffic flows which are mixed (seagoing vessels and inland vessels) require that the VTS-operator also observes the identity of an inland vessel to address the vessel immediately when traffic information is required to thwart situations that develop dangerously.

On the river Scheldt where seagoing vessels use high speeds to reach the locks in front of Antwerp or going to sea and where speeds of seagoing vessels is near the at sea service speeds, the cohabitation with inland vessels is difficult given the different types and vulnerability of vessels and the environment and AIS seems to become mandatory.

Although many vessels will never call at the port of Rotterdam or to the port of Antwerp, Ghendt or Flushing it becomes clear that the VTS authorities see AIS as a mandatory means to improve their decisions with respect to the safe evolution of the traffic.

A lot of discussions are presently held whether or not AIS should be mandatory. The only point which needs to be made that there is no such a thing as voluntary AIS. If AIS is used for safety purposes all vessels need to be equipped. There is a question whether or not a shore infrastructure should be used. This should be assessed on the basis of risk reduction. Can an AIS system provide sufficient risk reduction as compared to its costs to the traffic flow to make it desirable to have a shore infrastructure?

The requirements of the logistical stakeholders can be easily met by the existing infrastructure of mobile communications.

In conclusion, it seems that the application of AIS in a safety related sense will become mandatory for vessels and that the AIS infrastructure on shore is dependent on the risk reduction that AIS traffic images will provide in relation to the costs. A C/B analysis will indicate whether AIS will prove an improvement. It should be remembered that the Use Of AIS in an operational sense will not imply any communication costs, other than the costs of electrical power, since AIS is working on the VHF band, which doesn’t involve extra communication costs.

3.5.2.4 AIGPRS

3.5.2.4.1 General description

The original version of AIGPRS is based on the data messages of AIS and virtually AISGPRS should provide the same functionality as AIS. AIS messages are now sent by GPRS to a dedicated server. The server receives the messages of all vessels. A special piece of software calculates for each vessel, which other vessels are in the vicinity and transmits identity, latitude and longitude. The GPRS message is now being sent back to the vessel and the data that are sent back may be presented on the ECDIS in navigation mode.
For the use of AISGPRS a server is required. This server receives the position signals of all vessels and then determines for each vessel in return the position and the identities of the neighbouring vessels.

It has been observed that latency is present meaning that the information is sent back to the vessels with some delay.

The decisions that are made by the information if it is properly displayed are the same as with AIS. However, the latency if more than 1.5 s is disastrous since the data that are displayed will not represent the actual state of the vessel for making instantaneous navigational decisions. If the latency is large as compared to the characteristic time constant of the vessel the AIGPRS information is not very relevant even dangerous if too much emphasis is connected to this information.

When the AIGPRS is compared with AIS then one should compare the costs of AIS communication and capital costs with the costs of communication of GPRS and the small investment costs of GPRS itself but also with the server and software that computes the presence of other vessels for each individual vessel. However latency costs of GPRS should be taken into account, which in fact is the increased risk of being involved in an accident due to the presentation of the situation of the latency time earlier.

The advantage of GPRS such as more secure communication with the associated benefits for conducting business without eaves dropping should also be weighed with the relative ease in which AIS communications can be monitored and the business conclusions that can be implied by it. It is certainly true that the communication of AIS can provide a lot of information on routes of vessels and cargo. It is not sure that financial details, which are at least equally important can be easily deduced from the data exchange of AIS.

Some experts claim that only strategic information should be provided. This requires that at a larger distance than the immediate vicinity the position of oncoming vessels should be displayed. This will then provide information for tactical use for the skipper.

It is not sure whether the benefits are commensurate with the costs. On the other hand, it is not clear in what way a skipper should prepare for a difficult encounter a multitude of time constants of the vessel away.

It is thought that skippers will handle as appropriate when they are really involved in the avoidance manoeuvres for a vessel when they are in each other’s vicinity.

3.5.2.4.2 Data required

See also 3.5.2.3.2.

3.5.2.4.3 Information required

See also 3.5.2.3.3.

3.5.2.4.4 Display of information

See also 3.5.2.3.4.
3.5.2.4.5 Use of cooperative systems

See also 3.5.2.3.5.

3.5.2.5 GSM/GPRS/UMTS

3.5.2.5.1 Description

The use of GSM/GPRS/UMTS might be the same as in the preceding sections. However no AIS messages are then sent every few seconds but a position report, the port of destination and the ETA can be sent to a server that uses the positions of the vessels to provide them to the authority and suing an appropriate scheme of authentication and authorisation to the interested logistic stakeholders.

3.5.2.5.2 Data required

The data that are required are the position of the vessel, the identity of the vessel the port of destination as well as the ETA as a function of a time stamp. The frequency of reporting may be a function of the distance to the port of destination. When the vessel is a number of days sailing away the frequency may be 6/day increasing to 48/day in the last half a day before the vessel arrives.

3.5.2.5.3 Information required

The information that is important is that the remaining sailing time is compared with the transport plan so that on the basis of the latter information the logistic stakeholders can take their measures to amend, change and amend their plans, such as berth occupation and availability of cranes in a terminal, the planning of the ETAs of trucks for the lorry company, the adjustment of the planning in a production company or the change of the selling hours of consumer goods.

3.5.2.5.4 Display information

See also 3.5.2.4.4.

3.5.2.6 Voyage planning

3.5.2.6.1 General description

A voyage plan is a plan that on the basis of the characteristics of the vessel and the characteristics determines the ETA. As a by-product given the water levels in the fairways and rivers that the vessel will transit, the draft as well as the air draft may be checked as well. Very often a vessel needs to pass bridges and transit locks. Bridges that need to open for vessel traffic is not a difficult item to calculate when the bridge times are fixed. When opening times are not fixed it is more difficult and average waiting times are required.

The same is true for the transits through locks. Transit times of locks very much depend on the ratio of demand and the maximum capacity. Largely varying demands will imply widely changing waiting and transit times.

Voyage plans normally will have a module that records the ATPs of former voyages and they need to be used to get reliable averages. Since for many locks statistics according a given scheme are not
being collected, analysed and made available by the responsible fairway authorities for shipping its use in voyage planning is restricted and empirical data by the developer of the software needs to be used. He is keen to get feedback in order to improve the software.

Other associated benefits of voyage planning are the fact that an estimate of the variable costs of the vessel can be estimated, including the number of engine hours and its fuel consumption. This can be compared with the income of the freight.

It should also be possible that the average speed of the vessel can be varied as a function of under keel clearance and hence the fuel costs and the freight income are varying. In this way an optimum may be found for the best speed, draft and freight income. The effects will be nullified when the vessel has to pass a multitude of locks. Then the waiting times are more important then an optimum and there is a case for taken maximum cargo on board. Sophisticated voyage planning programmes provide the possibility to recalculate and use the experience in a learning database and also have the possibility to optimise the voyage.

A point, which is sometimes important is that the length of the vessel can be the limiting factor and checks should be done when a certain ration between radius of the bend and length is approached.

The uncertainty of the dynamic inputs in a voyage planning is taken away by recalculating the remainder of the voyage whenever an update of dynamic data is required or when transit times of locks are realised that differ considerably with the transit times that are assumed.

It is not customary to determine the drafts of the vessel and in doing so to determine the drafts and the air drafts. When the cargo distribution is given the stability of the vessel can also be determined.

From some circles critical remarks are made with regard to the risk of a vessel when it undertakes a voyage. Especially the use of sometimes zero under keel clearances on some parts of the river system is criticised. First of all these procedures increases the probability of bottom damage and when the vessel transports dangerous goods these goods may be released to the environment with sometimes disastrous effects. Secondly if all vessels are using the same type of programmes, the probability of collision will increase since often only a small part of the riverbed will allow the deep draft vessels to pass.

The same circles than made a plea for a risk analysis attached to the voyage planning and not to find the economic optimum but an optimum including expected risk costs.

River voyage-planning programmes don’t include risk calculations, as far it is known.

3.5.2.6.2 Data required

There is a multitude of data required to run a voyage-planning programme.

First of all the infrastructure should be provided. The ENC's provide a sound basis but the water levels come also into play. Fact is that predictions on water levels may be provided but since water levels are strongly dependent on the catchments areas and the weather predictions especially those on precipitation are not accurate when a voyage of more than one week is involved.

Water levels are thus important and need to be updated whenever the weather predictions indicate change as regards earlier predictions.

The characteristics of the vessels need to be inputted but most of the data are static, such as dimensions (with the exception of draft), propeller data and engine data.
When the planning also includes data on the cargo distribution the drafts of the vessel van be calculated and given the cargo it is also possible to calculate the stability of the vessel. This is required to determine the maximum air draft of the vessel when it should pass fixed bridges or when the air draft of the vessel is such that the movable part of the bridge needs to be opened.

3.5.2.6.3 Information required

The information that is used for making a voyage and whether the voyage is profitable (only when alternatives are available) is based on the fact that the vessel is able to reach the port of destination without lightering cargo, that the air draft at all times is sufficient and that the vessel length is no obstacle for the infrastructure rivers and locks alike.

3.5.2.6.4 Update services

The large amount of data required to make an accurate voyage planning requires that the voyage planning basic data need updates frequently. Certainly when the voyage planning software covers a large area such as the total waterway system in the member States the frequency of updates will be large.

It is the duty of the fairway authorities to provide sufficient and accurate infrastructural information as well as operational information of locks and bridges.

3.5.2.6.5 Display of information

The information can best be displayed on an ENC in an ECDIS in information mode whilst the immediate targets ETPs are being displayed in the navigational mode.
## Cluster Navigation on board: recapitulative table of information exchange, actors involved and equipment needed

<table>
<thead>
<tr>
<th>Info exchange</th>
<th>From</th>
<th>To</th>
<th>Equipment for Sender</th>
<th>Equipment for Receiver</th>
<th>Info necessary for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe Navigation good visibility Immediate decisions</td>
<td>Panoramic picture out of wheel house window</td>
<td>Skipper</td>
<td>None</td>
<td>None</td>
<td>Vessel’s position relative to environment Presence of other vessels. Conspicuous points.</td>
</tr>
<tr>
<td>Safe Navigation bad visibility Immediate decisions</td>
<td>ENC with radar overlay and AIS targets</td>
<td>Skipper</td>
<td>None</td>
<td>Radar, ENC or combined (Radar/ENC) AIS/AIGPRS VHF</td>
<td>Vessel’s position relative to the environment Presence of other vessels</td>
</tr>
<tr>
<td>Safe Navigation Good and bad visibility Tactical decisions</td>
<td>ENC with AIS/AIGPRS targets</td>
<td>Skipper</td>
<td>AIS</td>
<td>AIS ENC</td>
<td>Navigator’s expectation of traffic to be encountered. Blue sign on/off to decide on meeting manoeuvre</td>
</tr>
<tr>
<td>Safe Navigation Good and bad Visibility Strategic decisions</td>
<td>Skipper</td>
<td>Voyage planner</td>
<td>Keyboard</td>
<td>Computer Voyage planner ECDIS in information mode Water levels</td>
<td>Point of departure input Point of arrival input Lock statistics from software Opening times from software NtS</td>
</tr>
<tr>
<td>Safe Navigation Good and bad Visibility Strategic decisions</td>
<td>Voyage planner</td>
<td>Skipper</td>
<td>Computer Voyage planning software ENC Water levels Ship characteristics Operational draft</td>
<td>None</td>
<td>ETPs important for the scheduling of transits through bridges and locks ETA at point of destination Time windows for passage if relevant</td>
</tr>
<tr>
<td>Basic GIS information, such as waterway</td>
<td>Fairway authority</td>
<td>Chart producer</td>
<td>Computer Software</td>
<td>Computer Software</td>
<td>Basic information and other supplier dependent information will be put into an Inland ENC using</td>
</tr>
</tbody>
</table>
Table 5: Cluster Navigation on board: recapitulative table of information exchange, actors involved and equipment needed

Note: If AIGPRS can show that they have the same performance as AIS, the remarks made for AI are also valid for AIGPRS with the exception of the last one. The effect can be accomplished using another solution. Presently tests have shown there is too much latency to be used in safety related applications.
PART 4

COST-BENEFIT ANALYSIS
4 PART 4: COST BENEFIT ANALYSIS

4.1 General words on RIS Cost Benefit Analysis

A cost-benefit analysis links the cost of an action to its consequences expressed in monetary units. This analysis is based on (the taking into account their monetary equivalent), all the positive and negative impacts of a project for all the actors involved in the project and on the society as a whole (economic development, harmful effects...).

4.1.1 Costs of RIS system

The implementation of RIS in European inland navigation induces costs for the different stakeholders. Two types of RIS costs exist:

- Costs that will be borne by private parties (private costs). They consist of all costs related to the purchase and operation of equipment for the use of RIS services. In addition, the training costs (training of private parties to the use of RIS system) should be taken into account as well. One can consider that these costs are included in the software costs, since the software includes training modules;

- Costs that will be supported by the Community. They consist of all costs related to the installation and operation of necessary shore based RIS equipment (radar stations, ECDIS data collection and dissemination costs, Lock planning and communication software costs, data collection stations, etc.). These costs will affect the existing costs of the systems that are in place in the different countries, which are going to implement RIS in their inland navigation transport scheme. If a central RIS is being established, the local VTS centres can be integrated in the RIS centre. This would reduce the number of VTS operators.

Besides, a full calculation of the costs of RIS is necessary for a better calculation of benefit/cost ratio for all the groups identified as beneficiaries of RIS implementation.

4.1.2 Benefits of RIS system

Generally, it can be said that three types of RIS benefits exist:

- Direct short-term positive effects of RIS. They are derived from the enhancement of safety and capacity and can be approached by calculating the reduction of costs, due to time delays, optimal loading and accidents, when a RIS system is implemented;

- Medium/long term positive effects of RIS that are derived from the positive effects a modal shift could induce;

- Medium/long term positive effects of RIS that are derived from the positive effects of dredging and delay of infrastructure investments.

Globally, the use of RIS results in savings on some infra structural works such as deceleration works in front of locks and less dredging costs as well as savings due to the delay of new investments in locks.

4.1.3 Objectives of the C/B analysis

Ideally, a complete C/B analysis should consider each Target Group & Geographical Area separately. Different approaches could then be applicable.

One approach consists in assessing, for each Target Group, the costs of acquiring a given type of RIS information and the benefits that different Target Groups would obtain from the use of such a type of information.
Another approach consists in assessing the costs necessary to purchase and operate the necessary RIS equipment (hardware, software, communication cost, etc…), not considering the type of information provided and the benefit (as a whole) that Target Group might expect from the use of RIS.

Taking account of the huge set of different information RIS can provide, it appears that the above specific objective is a wide and complex one. In order to achieve it, an original approach is required. This is due to the different possible combinations (geographical area/target group versus type of information), the difficulties linked with data availability and the determination of the absolute benefits to be expected from the application of an IT system.

For the present cost/benefit assessment, RIS information has been arranged in different services, each service containing useful information for the different RIS users.

4.1.4 Problem Solving Approach

From the definition of RIS the following relations are derived:

- The first basic relation to be highlighted is between RIS and safety and capacity of the waterway traffic. In other words, the relations are studied between the level of information and knowledge provided to the waterway users and the reduction of the risk and of the number of accidents as well as the reduction of the time delays and the use of optimum drafts. This should be independent of whatever geographical area is considered;

- The second basic relation is the saving of costs in infrastructure investment that is the result of implementation of RIS. This means that if an ECDIS is available with precise depth data areas with excess sedimentation can be located which may save general dredging activities. Many locks have large deceleration works that are necessary for mooring inland vessels that have to wait for a lock cycle. By precise planning of the RTA’s, based on ETA’s send by skippers the number of waiting vessels can be reduced and hence the length of the deceleration works can be reduced. The planning messages that are a part of RIS might help this process. Furthermore by positively affecting the traffic flows through locks it is possible to make the traffic supply through a lock more uniform over the day, implying a better usage of the locks. This would imply that the lock might be operated for a longer period without renewal or replacement of the lock. The investment costs may be reduced;

- The third basic relation is a medium/long term effect of RIS: by improving the reliability of inland navigation, RIS would allow a modal shift, what would induce effects benefiting communities larger than the sole waterway users. These effects concern less gas exhaust, less congestion, less atmospheric pollution and related societal costs, less road infrastructure heavy maintenance fees, etc. These effects will be analysed in SWP12.5.

The above three relations induce the hypothesis that the different target groups that are benefiting from RIS could be broadly grouped into three:

- A first group benefiting from the direct short-term positive effects of RIS. In reality they are the skippers, the shippers, the commercial parties, etc. We will name this set of target groups: the private parties. This Group is the core beneficiary of the direct effects due to an improvement of safety and capacity (efficiency) of inland navigation;

- A second group that is composed by the beneficiaries of the infra-structural effects of RIS; the competent authorities;

- A third group that is composed by the core beneficiaries of the medium/long term positive effects of RIS: the community as a whole. The public authorities may represent this Group. We will name this Group: the Community. Of course, it is really the beneficiary of the wide range positive effects a modal shift would induce. The effects of the modal shift on the Community will be analysed in the SWP 12.5 that is dedicated to the socio-economic assessment of RIS.
SWP12-3 will deal therefore with the cost/benefit ratios for the "Private parties”, and for the "Competent Authorities”.

4.1.5 Plan of the C/B analysis

The cost – benefit analysis is done by calculating the ratio of all the costs the users have to face and the benefit they get in return.

SWP 12.2 (see part 3 above) has analysed the services RIS can provide to inland navigation and for each service, the actors interested and the equipment necessary.

The Plan of the analysis will be the following:

• Review, per actor, of the RIS services provided and related necessary equipment;
• Determination of the cost by actor;
• Determination of the benefit by actor;
• Calculation of the benefit/cost ratios.

As said here above, the focus will be on the following two groups of actors: the “Private parties” and the “Competent Authorities”.
4.2 Review of RIS services, related equipment and actors categories

4.2.1 RIS services

4.2.1.1 Logistical support services

This RIS service is dedicated particularly to the following (main issues):

- Shippers, transport planners and freight forwarders in the task of planning transport, tracking and tracing of goods, invoicing, and statistics;
- Skippers, barge operators, barge owners and terminal managers in terminal and berths management.

The logistical support service is provided through the Logistical Data Platform (LDP) which is a complex of web based Servers.

4.2.1.2 Supporting services to Navigation

These are necessary for:

- Maintaining a safety level or safe conditions of the traffic flows;
- Maintaining the efficiency of traffic flows,
- Helping lock managers and skippers in the planning of lockpassings;
- Maintaining or reducing the level of harmful emissions for man and the environment;
- Utilising and maintaining the infrastructure in a sustainable way;
- Enforcing traffic and navigation rules and regulations;
- Security of crews, vessels and their cargoes, calamity abatement;
- Efficient lock and fairway operations and enforcement.

4.2.1.3 Cross border services

The ERI cross border service provides useful information on the vessel crossing the border such as the number of people and crew members on board, the type of goods carried, the origin and destination of the vessel. This information is interesting for the fairway authorities of the country in which the vessel is going to enter, for the customs authorities, the border police, and the shipping inspectorate. In case of calamity, this information will be helpful in order to better organise the rescue operations.

4.2.1.4 Navigation on board services

Thanks to a better knowledge of the route and of the traffic intensities, it is possible to optimise speed and calculate more precise ETAs at terminals and locks. This is an important for the skippers, lockmasters, terminal managers, barge operators, transport planners, freight forwarders and shippers. Another aspect is the optimisation of fuel consumption through an optimisation of speed.
### 4.2.2 Sets of necessary equipment

From the analysis done in Chapter 3: one can

- At the one hand figure out that the stakeholders which are the main users of the RIS services are: the shipper, the freight forwarder, the logistic chain manager, the ship owner, the skipper, the barge operator, the lockmaster, the terminal operator, the port manager, the voyage planner, the border police & customs;
- And at the other hand, extract a recapitulative table of the necessary equipment (hard, soft, other) needed by these main actors whether as “information provider” or “information receiver for each RIS Cluster of services considered.

<table>
<thead>
<tr>
<th>ACTOR</th>
<th>EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLUSTER LOGISTICAL SUPPORT</td>
</tr>
<tr>
<td></td>
<td>Info (sent or received) Hardware</td>
</tr>
<tr>
<td>Shipper</td>
<td></td>
</tr>
<tr>
<td>- Info on goods</td>
<td>Computer</td>
</tr>
<tr>
<td>- Info on vessels</td>
<td>Fax</td>
</tr>
<tr>
<td></td>
<td>GSM</td>
</tr>
<tr>
<td></td>
<td>Copier</td>
</tr>
<tr>
<td></td>
<td>Telephone</td>
</tr>
<tr>
<td></td>
<td>Internet connection</td>
</tr>
<tr>
<td></td>
<td>LDP</td>
</tr>
<tr>
<td>Logistic Chain Manager</td>
<td></td>
</tr>
<tr>
<td>- Info on goods</td>
<td>Computer</td>
</tr>
<tr>
<td>- Info on vessels</td>
<td>Fax</td>
</tr>
<tr>
<td>- Port activities,</td>
<td>GSM</td>
</tr>
<tr>
<td>- Freight &amp; dues</td>
<td>Copier</td>
</tr>
<tr>
<td>- Lock passing</td>
<td>Telephone</td>
</tr>
<tr>
<td>- Fairways intensities</td>
<td>Internet connection</td>
</tr>
<tr>
<td></td>
<td>LDP</td>
</tr>
<tr>
<td>Freight Forwarder</td>
<td></td>
</tr>
<tr>
<td>- Info on goods</td>
<td>Computer</td>
</tr>
<tr>
<td>- Info on vessels</td>
<td>Fax</td>
</tr>
<tr>
<td>- Charges &amp; dues</td>
<td>GSM</td>
</tr>
<tr>
<td>- Lock passing</td>
<td>Copier</td>
</tr>
<tr>
<td>- Port activities,</td>
<td>Telephone</td>
</tr>
<tr>
<td>- Freight &amp; dues</td>
<td>Internet connection</td>
</tr>
<tr>
<td>- Fairways intensities</td>
<td>LDP</td>
</tr>
<tr>
<td>Ship Owner</td>
<td></td>
</tr>
<tr>
<td>- Info on goods</td>
<td>Computer</td>
</tr>
<tr>
<td>- Info on vessels</td>
<td>Fax</td>
</tr>
<tr>
<td>- Charges &amp; dues</td>
<td>GSM</td>
</tr>
<tr>
<td>- Lock passing</td>
<td>Copier</td>
</tr>
<tr>
<td>- Port activities,</td>
<td>Telephone</td>
</tr>
<tr>
<td>- Fairways intensities</td>
<td>Internet connection</td>
</tr>
<tr>
<td></td>
<td>LDP</td>
</tr>
<tr>
<td>Skipper</td>
<td></td>
</tr>
<tr>
<td>- Info on goods</td>
<td>Computer</td>
</tr>
<tr>
<td>- Charges &amp; dues</td>
<td>Fax</td>
</tr>
<tr>
<td></td>
<td>GSM</td>
</tr>
<tr>
<td></td>
<td>Copier</td>
</tr>
<tr>
<td></td>
<td>Internet connection</td>
</tr>
<tr>
<td></td>
<td>LDP</td>
</tr>
<tr>
<td>ACTORS</td>
<td>CLUSTER 1 LOGISTICAL SUPPORT</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td></td>
<td>Info (sent or received)</td>
</tr>
<tr>
<td></td>
<td>Info (sent or received)</td>
</tr>
<tr>
<td></td>
<td>Info (sent or received)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Barge Operator</td>
<td>Info on goods</td>
</tr>
<tr>
<td></td>
<td>Charges &amp; dues</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal Operator</td>
<td>Info on goods</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Port manager</td>
<td>Info on goods</td>
</tr>
<tr>
<td></td>
<td>Statistics</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Voyage Planner</td>
<td>Info on vessel</td>
</tr>
<tr>
<td></td>
<td>Info on goods</td>
</tr>
<tr>
<td></td>
<td>Info on personnel</td>
</tr>
<tr>
<td></td>
<td>on board</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Border police &amp; Customs</td>
<td>Info on vessel</td>
</tr>
<tr>
<td></td>
<td>Info on goods</td>
</tr>
<tr>
<td></td>
<td>Info on personnel</td>
</tr>
<tr>
<td></td>
<td>on board</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Recapitulative set of the necessary equipment by actor
4.2.3 Actor categories and related equipment

For the calculation of the costs and benefits actors categories and related set of equipment will be defined from the above description.

4.2.3.1 Minimum Set of equipment

The table here above defines in a clear manner the necessary equipment for each RIS user. From this table one can extract the necessary minimum set of equipment necessary for each actor to receive the RIS services.

<table>
<thead>
<tr>
<th>Actor</th>
<th>Minimum Set of Equipment (Hard, soft &amp; other)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipper</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td>Logistic chain manager</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td>Freight forwarder</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td>Ship owner</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td>Terminal operator</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td>Port manager</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td>Skipper</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF, - Voyage planner application</td>
</tr>
<tr>
<td>Barge operator</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF, - Voyage planner application</td>
</tr>
<tr>
<td>Voyage planner</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF, Voyage planner application</td>
</tr>
<tr>
<td>Lock master</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF, Lock planner application</td>
</tr>
<tr>
<td>Border police and customs</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF</td>
</tr>
</tbody>
</table>

Table 7: Minimum set of the necessary equipment by actor

What is defined here above can be seen as a minimum set of equipment which is necessary, for each actor, to receive all the services provided by the four RIS clusters.

One could think why not considering the maximum set, e.g. all the equipment quoted in the four clusters? Why not for example considering four computers, four GSM, etc.? It is clear that buying more equipments (computer, etc), e.g. each equipment being dedicated to a specific cluster, is nor the most logical neither the most efficient way of doing for three principal reasons:

- Technical reasons: it is possible to use one and the same computer on which all the necessary softwares can be installed for the RIS needs. A second computer can be necessary only if there is a problem of capacity. It is also not necessary to have more copiers, or more transponders, etc. One should be sufficient;
- Use of space: when buying more equipment, one should think to the place in the ship or in the office where to install the equipment. More equipment will be more space consuming;
- Financial reasons: more equipment means more investment costs, more maintenance costs, etc. what does not necessarily impact positively on the overall efficiency.

Of course, in some cases, some equipment may be doubled but this is to be done on a case-by-case basis.

4.2.3.2 **Actors Categories**

Considering the minimum *set of equipment* necessary per actor, one can define *Actors Categories*, e.g. groups of actors who will need exactly the same type of equipment. This information is useful for the costs calculations.

There are four *Actors Categories* according to the minimum set of equipment:

<table>
<thead>
<tr>
<th>Actor Categories</th>
<th>Minimum Set of Equipment (Hard, soft &amp; other)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category A</strong>: Shipper, Logistic Chain Manager, Freight Forwarder, Ship Owner, Terminal Operator, Port Manager</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, LDP</td>
</tr>
<tr>
<td><strong>Category B</strong>: Skipper, Barge Operator,</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF, - Voyage planner application</td>
</tr>
<tr>
<td><strong>Category C</strong>: Lock master</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF, Lock planner application,</td>
</tr>
<tr>
<td><strong>Category D</strong>: Border police and customs</td>
<td>Computer, Fax, Telephone, Copier, GSM, Internet connection, AIS, Radar, GPS sensor, Ecdis, VHF</td>
</tr>
</tbody>
</table>

*Table 8: Minimum set of the necessary equipment by group of actor*
4.3 COST OF RIS SERVICES USAGE

4.3.1 Model for the cost calculation

The cost calculation is based on the principle that for each Actors Categories the total cost of RIS Services usage, is composed by two terms: a fixed cost and a variable cost which is named hereafter operating cost. They can be expressed as follows:

- **Fixed costs**: Considering the mean lifespan of the equipment and the value of the interest rate, the capital (investment) costs of the equipment are converted into mean annual (fixed) costs. These fixed costs do not depend on the level of usage of RIS;

- **Operating costs**: They are directly linked to the level of usage of the equipment. They are calculated on the basis of the most likely operational environment/conditions and from estimations obtained from inland navigation actors and experts and others sources.

4.3.2 Some costs figures

**Computer**: the price of a computer suitable for RIS usage is of about 1500 euros.

**Internet connection**: Internet connection will be installed on a moving object for some RIS users (skipper, barge operator, border police & customs). For this case, the best way to be linked to Internet is by satellite. Many providers of Internet communication by satellite exist. Here we take as example the provider “Europe On Line” (EOL) who provides a complete kit for satellite reception for an amount of 300 €/year. The other actors, that is to say the shipper, the freight forwarder, the terminal operator and the shipmaster, lockmaster are assumed already linked to Internet. We assume also that the cost of using RIS consist in this case only in the cost of using logistical data platform. We assume that the use of this server costs 600 euros per year by user.

**GSM**: Price of a mobile phone: 150 euros. Average Basic subscription: 30€ for the first 150 minutes, 0.14€ from the 151st to 300th minute and 0.095€ from the 301st minute. These tariffs are specific for SME. With all these tariffs, one can say that for the purpose of RIS, the cost for a user will approach 100 €/ month. That is to say 1200 euros per year.

**Copier, fax and telephone**: Copier: price for the printer starts from 69€. For the RIS use, a copier costing 150 euros should be sufficient. Lifespan is 3 years. Telephone + Fax + Answering machine, all in one: 180 €, lifespan: 3 years

**Transponder, AIS, ECDIS and radar mapping**: the final report of Indris indicates 3500€ costs for a transponder, 2000 € for an ECDIS software and 12000 €for a radar mapping.

**Price of the lock planning, voyage planner and ERI Cross border servers**: We assume that each of these elements costs the same amount than the ECDIS software, that is to say 2000 €.

**Training costs**: We assume that the costs of acquisition of the softwares include the training of persons designated to use them.

4.3.3 Cost calculation per Actor Categories

4.3.3.1 Category A

This category is composed by: the shipper, the Freight forwarder, the Logistic chain manager, the ship owner, the terminal operator, and the port manager.
## CATEGORY A

*Shipper, Freight forwarder, Logistic chain manager, Ship owner, Terminal Operator, Port Manager*

<table>
<thead>
<tr>
<th>Investments</th>
<th>Quantity</th>
<th>Unit cost (£)</th>
<th>Total cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>0</td>
<td>3500</td>
<td>0</td>
</tr>
<tr>
<td>Computer</td>
<td>1</td>
<td>1500</td>
<td>150</td>
</tr>
<tr>
<td>Satellite Reception</td>
<td>0</td>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Telephone/fax</td>
<td>1</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Copier</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Softwares (LDP, Electronic Reporting)</td>
<td>2</td>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>Radar mapping</td>
<td>0</td>
<td>12000</td>
<td>0</td>
</tr>
<tr>
<td>GPS sensor</td>
<td>0</td>
<td>800</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total investment costs</strong></td>
<td></td>
<td></td>
<td><strong>5980</strong></td>
</tr>
</tbody>
</table>

### Calculation of annual fixed cost

<table>
<thead>
<tr>
<th></th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life span (years)</td>
<td>3</td>
</tr>
<tr>
<td>Interest rate (%)</td>
<td>5%</td>
</tr>
<tr>
<td>Annuity</td>
<td>2196</td>
</tr>
<tr>
<td>Subscription for use of software</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total annual fixed costs</strong></td>
<td><strong>2596</strong></td>
</tr>
</tbody>
</table>

### Calculation of annual operating cost

<table>
<thead>
<tr>
<th></th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phone communication</td>
<td>1200</td>
</tr>
<tr>
<td>Telephone, fax</td>
<td>600</td>
</tr>
<tr>
<td>Internet connection</td>
<td>600</td>
</tr>
<tr>
<td><strong>Total annual operating costs</strong></td>
<td><strong>2400</strong></td>
</tr>
</tbody>
</table>

### Total annual costs for actors of Category A during the first three years

**4996 £**

*Table 9: Cost for Shipper, Freight forwarder, Logistic chain manager, Ship owner, Terminal Operator, Port Manager*
4.3.3.2 **Category B**

This category is composed by the Skipper and the Barge Operator.

<table>
<thead>
<tr>
<th>CATEGORY B</th>
<th>Skipper, Barge Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investments</td>
<td>Quantity</td>
</tr>
<tr>
<td>AIS</td>
<td>1</td>
</tr>
<tr>
<td>Computer</td>
<td>1</td>
</tr>
<tr>
<td>Satellite Reception</td>
<td>1</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>1</td>
</tr>
<tr>
<td>Telephone/fax</td>
<td>1</td>
</tr>
<tr>
<td>Copier</td>
<td>1</td>
</tr>
<tr>
<td>Softwares (ECDIS, VP, LDP, ERI CrossBor)</td>
<td>4</td>
</tr>
<tr>
<td>Radar mapping</td>
<td>1</td>
</tr>
<tr>
<td>GPS sensor</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total investment costs</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Calculation of annual fixed cost</strong></td>
<td></td>
</tr>
<tr>
<td>Life span (years)</td>
<td></td>
</tr>
<tr>
<td>Interest rate (%)</td>
<td></td>
</tr>
<tr>
<td>Annuity</td>
<td></td>
</tr>
<tr>
<td>Subscription for use of software</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total annual fixed costs</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Calculation of annual operating cost</strong></td>
<td></td>
</tr>
<tr>
<td>Mobile phone communication</td>
<td></td>
</tr>
<tr>
<td>Telephone, fax</td>
<td></td>
</tr>
<tr>
<td>Internet connection</td>
<td></td>
</tr>
<tr>
<td><strong>Total annual operating costs</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Total annual costs for actors of Category B during the first three years** 12980 €

*Table 10: Cost for the Skipper and the Barge Operator*
### 4.3.3.3 Category C

This category is composed by the Lock Master and the Fairways authority.

<table>
<thead>
<tr>
<th>Investments</th>
<th>Quantity</th>
<th>Unit cost (€)</th>
<th>Total cost (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>1</td>
<td>3500</td>
<td>3500</td>
</tr>
<tr>
<td>Computer</td>
<td>1</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Satellite Reception</td>
<td>1</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Telephone/fax</td>
<td>1</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Copier</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Softwares (ECDIS, LP, LDP)</td>
<td>3</td>
<td>2000</td>
<td>6000</td>
</tr>
<tr>
<td>Radar mapping</td>
<td>1</td>
<td>12000</td>
<td>12000</td>
</tr>
<tr>
<td>GPS sensor</td>
<td>1</td>
<td>800</td>
<td>800</td>
</tr>
</tbody>
</table>

**Total investment costs**: 24580 €

**Calculation of annual fixed cost**

<table>
<thead>
<tr>
<th></th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life span (years)</td>
<td>3</td>
</tr>
<tr>
<td>Interest rate (%)</td>
<td>5%</td>
</tr>
<tr>
<td>Annuity</td>
<td>9026</td>
</tr>
<tr>
<td>Subscription for use of software</td>
<td>200</td>
</tr>
</tbody>
</table>

**Total annual fixed costs**: 9626 €

**Calculation of annual operating cost**

<table>
<thead>
<tr>
<th></th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phone communication</td>
<td>1200</td>
</tr>
<tr>
<td>Telephone, fax</td>
<td>600</td>
</tr>
<tr>
<td>Internet connection</td>
<td>600</td>
</tr>
</tbody>
</table>

**Total annual operating costs**: 2400 €

**Total annual costs for actors of Category B during the first three years**: 12026 €

*Table 11: Cost for the Lock Master and the Fairways authority*
4.3.3.4 **Category D**

This category is composed by the Police and cross border authorities.

<table>
<thead>
<tr>
<th>Investments</th>
<th>Quantity</th>
<th>Unit cost (€)</th>
<th>Total cost (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>1</td>
<td>3500</td>
<td>3500</td>
</tr>
<tr>
<td>Computer</td>
<td>1</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Satellite Reception</td>
<td>1</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Telephone/fax</td>
<td>1</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Copier</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Softwares (ECDIS, LDP)</td>
<td>2</td>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>Radar mapping</td>
<td>1</td>
<td>12000</td>
<td>12000</td>
</tr>
<tr>
<td>GPS sensor</td>
<td>1</td>
<td>800</td>
<td>800</td>
</tr>
</tbody>
</table>

*Total investment costs* 22580

**Calculation of annual fixed cost**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Life span (years)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Interest rate (%)</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Annuity</td>
<td></td>
<td>8292</td>
</tr>
<tr>
<td>Subscription for use of software</td>
<td>2</td>
<td>200</td>
</tr>
</tbody>
</table>

*Total annual fixed costs* 8692

**Calculation of annual operating cost**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phone communication</td>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>Telephone, fax</td>
<td></td>
<td>600</td>
</tr>
<tr>
<td>Internet connection</td>
<td></td>
<td>600</td>
</tr>
</tbody>
</table>

*Total annual operating costs* 2400

| Total annual costs for actors of Category B during the first three years | 11092 € |

*Table 12: Cost for the Police and Cross border authorities*
4.4 BENEFITS OF RIS SERVICES USAGE

4.4.1 General words

As recall the main RIS users are the following: shipper, Freight forwarder, Logistic chain manager, ship owner, skipper, barge operator, lockmaster, terminal operator, port manager, voyage planner, border police & customs.

Before going in deep with the benefit calculation, it is important to highlight the most important benefits RIS can provide to the different RIS users.

- **Accident reduction**
  The reduction of accident costs is based on a consideration of the new equipment that is available on board and on shore: AIS and ECDIS.

- **Reduction of delays**
  The reduction of traffic delays is the result of a better planning of the voyage by the skipper thanks to the information got from the voyage planner (information on the currents and draughts, etc.), reliable ETA calculated and communicated to the skippers by the lockmaster, bridge and terminal/port operators, which allow them to adjust their cruising speed and send in their turn reliable RTA to the lockmaster, bridge and terminal/port operators. This information allows: (1) the reduction of fuel consumption due to a better management of speed, (2) the better management of lock & bridge passages, (3) better management of terminal operations, (4) time savings.
  The reduction of delays for locks is a product of improved planning on the part of the skipper. When lock cycles really offer opportunities to pass the locks this is now known and a skipper can act accordingly. This indication will probably reduce the traffic at peak times and more use will be made of lock cycles that have sufficient room. More information is assumed to change the behaviour of skippers in such a way that they will choose for an uninterrupted voyage rather than waiting for the availability. It is worth noting that a message to a skipper to reduce speed in order not to use the deceleration works for waiting is not comprised under this heading. The waiting time is in fact not changed. The waiting time is used to reduce speed and to save fuel.

- **Increased efficiency of management on board of RIS equipped vessels**
  The use of ECDIS and voyage planning software provides the opportunity to select the optimum draft and speed in order to maximise profit. Often this is not possible, since cargo cannot always be refused if a contract exists between forwarder and skipper. In the latter case he may be able to select a speed in such a way that he minimises fuel consumption by reducing power at stretches with small under keel clearances and increases speed in parts with more under keel clearances. It is noted that when sailing on a river many of these advantages will not play a large role in times of high water. In times of low water considerable benefits are possible. It all depends on voyage planning software with the right modules for optimisation.

- **Phasing out of VTSSs**
  As RIS encompasses Vessel Traffic Management over an entire stretch of a river rather than local Vessel Traffic Management it seems to be logical that local VTSSs are dismantled and integrated in the future RIS centres.

- **Reduction of dredging costs**
ECDIS is able to determine the voyage of vessel and indicate for a given draft the minimum depth that is required. This might sometimes mean that it is not necessary to dredge the entire stretch, but only the parts that are essential for a safe voyage of the vessel with maximum draft. In the Port of Rotterdam positive experience has been gained with a similar approach. It appears to be possible with only small dredging activities to enlarge tidal windows for some docks. Although it is not expected that the same spectacular results are possible it has been assumed that a full exploitation of ECDIS type of depths might decrease the dredging costs to about 75% of the present costs. However, a more detailed study should be launched to get more accurate figures.

- **Reduction of decelerations works**
  
  Voyage planning and communication with the lockmasters might provide the skipper with a precise time of arrival at the lock. The skippers that use this opportunity will not use the deceleration works to wait for their turn to sail into the lock. Extensive use of ECDIS and digital communication may lead to a reduction of the length of the deceleration works. However they should not be discontinued, since these deceleration works also provide a possibility to stop for the night for those vessels that are allowed to sail 15 hours a day. Most private skippers fall under this regime and they should have a possibility to use the deceleration works as a safe haven for resting and sleeping. As a first assumption it is thought that a reduction with 25% might be the best compromise. (*Source: Indris final report*)

- **Reduction of capital costs of locks**
  
  The savings in the investment of locks are not very easy to calculate. It is expected that using RIS functions, such as reservation and the supply of RTA’s to vessels will flatten the supply curve and reduce the waiting times. This may lead to a postponement of investments since the present capacity of a lock can better be utilised.

The benefit of RIS is going to be determined following the same scheme that was used for the determination of the costs, that is to say that the benefits are going to be determined by actors.

Depending on the benefit borne by each actor, it will be possible to define actors groups as for the costs although this is not a goal to be achieved absolutely.

A recapitulative table of the benefits RIS usage provides to the actors is given hereafter.

### 4.4.2 Types of benefits per actor

<table>
<thead>
<tr>
<th><strong>Direct RIS benefits</strong></th>
<th><strong>Consequences</strong></th>
<th><strong>Beneficiaries</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident reduction</td>
<td>Reduction of maintenance costs for ships, fairways, locks, terminal berths</td>
<td>Skipper, terminal operator, terminal manager, fairways manager, lock manager</td>
</tr>
<tr>
<td>Reduction of delays</td>
<td>Better management of intermodal chains, Better management of production chain, increase of productivity (vessel &amp; locks)</td>
<td>Skipper, barge &amp; terminal operators, lock &amp; logistic chain managers, shipper (consignee), freight forwarder</td>
</tr>
<tr>
<td>Increased efficiency of</td>
<td>Better use of the navigation</td>
<td>Vessel and barge operators</td>
</tr>
<tr>
<td><strong>Direct RIS benefits</strong></td>
<td><strong>Consequences</strong></td>
<td><strong>Beneficiaries</strong></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>vessel management</td>
<td>material, better productivity, additional revenues</td>
<td></td>
</tr>
<tr>
<td>Phasing out of VTS</td>
<td>Reduction of VTS centres, Reduction of maintenance costs, optimisation of investment costs</td>
<td>Fairways authorities</td>
</tr>
<tr>
<td>Reduction of dredging costs</td>
<td>Reduction of maintenance costs, optimisation of investment costs</td>
<td>Fairways authorities</td>
</tr>
<tr>
<td>Reduction of deceleration works</td>
<td>Reduction of maintenance costs, optimisation of investment costs</td>
<td>Fairways authorities</td>
</tr>
<tr>
<td>Reduction of capital costs of locks</td>
<td>Optimisation of (future) investment costs</td>
<td>Fairways authorities</td>
</tr>
</tbody>
</table>

*Table 13: Type of benefits per actor*

Globally, two categories of RIS beneficiaries can be distinguished:
- The private parties that is to say the actors which support the RIS costs by themselves: shipper, Freight forwarder, Logistic chain manager, ship owner, skipper, barge operator, terminal operator;
- And the competent authorities or the actors for which the costs are supported by the public authority: the lockmaster, the port manager, the fairways manager and the border police & customs services.

### 4.4.3 Calculation of benefits per actor

#### 4.4.3.1 Private parties' direct benefits

The private parties can be subdivided in two categories. The first category regroups the private actors that benefit from the advantages of RIS implementation without being inland waterways users strictly speaking. It acts of the shipper, freight forwarder and the logistic chain manager. The challenge for RIS consists in convincing these actors to use the inland waterways transport modality as a credible alternative for the transport of their goods. This challenge can be achieved thanks to the reduction of time (both in navigation and terminal operation) and the increased safety of transport, which is provided by the different RIS equipment.

Private actors using the inland navigation constitute the second category. The skipper, the barge operator, the terminal operator, the ship owner are members of this sub-group.

The implementation of RIS will necessarily imply costs for the skipper. These costs will mainly consist of all costs related to the purchase and operation of on-board equipment. In addition to these, the training costs (training of skippers to the use of RIS system) should be accounted as well. But as said here before, the training costs are included in the costs of purchasing softwares.

#### 4.4.3.2 Calculation methodology

If we can calculate average values of the costs that an actor could support when working 'without-RIS' and 'with-RIS', by comparing the results of the situations 'with-RIS' to those of the 'without-RIS', we will obtain the benefits resulting from RIS implementation.
4.4.3.3 **Benefits for the skipper**

For the skipper, benefits consist in reduction of accident costs, reduction of delays due to traffic congestion and waiting at locks. The reduction of fuel consumption by selecting optimal speeds and draughts is an important benefit too.

The following procedure is adopted for the calculation of benefit of using RIS for the skipper.

First, we are going to calculate the operating costs for a vessel in given conditions. We base our calculations on a case study worked out by Anast and in which the annual operating costs of a container vessel sailing from Liège to Antwerp was determined. This is the situation "without RIS".

Assuming a given percentage of impact due to RIS, we are going to calculate the annual operating costs for the vessel. This is the situation "with RIS".

The benefit will be the difference between the two situations. After, the B/C ratio will be calculated for the skipper.

1 **Annual operating costs without RIS**

Characteristics of the ship: L=95m, W=11.5m, Draught 0.6 min, 2.8 max. DWT=2000 T, Power=900hp, Fuel consumption: 0.25 l/hp/hr

**Parameters for the calculation:**

Distance Liege – Antwerp: 125 km

Navigation time (Liège-Antwerp): 20 hours (including lock passing & port operations & waiting times).

2 **Calculated values in monetary terms**

The fuel consumption and the maintenance cost are important at this stage due to the fact that the implementation of RIS will have a big influence on them. For the ship considered, these values have been calculated:

Fuel consumption: 231192 €/year

Maintenance costs: 86762.73 €/year

3 **Situation with RIS**

We assume that the introduction of RIS will have a positive effect on the fuel consumption (better avoidance of congested road, less accidents thanks to the AIS and Radar, and less groundings thanks to the EDCIS) and the navigation time (reduction of delays at locks, the borders and ports). But what is the level of these reductions?

---

In a former study named "Incarnation", it was proved that the introduction of RIS devices will have impacts on damage costs (collisions and groundings). In fact, the collisions costs can be reduced up to 15.75% by the use of VTS, by 11.25% when radar is installed on board, by 22.75 when AIS is used and by 2.25% when ECDIS is used.

Besides, the economic costs of groundings can be reduced up to 7.25% when VTS is used, by 0.75 thanks to the radar, 2.25% by the use of AIS and by 42.75% when the ECDIS is used.

Taking account of these values, we derive an average value of reduction of damage cost of 13%. This value is considered as the share of the maintenance cost due to the damage caused to the vessel by collisions and groundings. So, when the RIS technology is used, we assume that the savings for the maintenance is 13% of the total maintenance cost, that is to say 11279 euros/year.

The impact on the fuel consumption can be calculated thanks to information from another study named "Indris". Indeed, in this study, it is stated that the total time delays, queuing and waiting time is of 2.2 seconds per ship over a kilometer of fairway. Applying this value to the ship considered here, we obtain a total of 15.6 hours of navigation time saved by year when RIS equipment is used. This gives a total of 3510 liters of fuel and 3159 euros of benefit on the fuel consumption (Price of the fuel : 0.9 euros/l).

The total benefit of using RIS is then equal to 14438 euros by year.

4.4.3.4 Benefit for the lockmaster

The benefit of using RIS for the lockmaster results in an increase of the number of ships passing through the lock thanks to a better planning of lock passages. In order to quantify this increase in monetary terms, we base our reasoning on values provided by the Lanaye locks, which are located in the Walloon region in Belgium. The Walloon ministry of infrastructures and transport informed us that 10234617 tonnes passed through the Lanaye locks for the year 2005. In the Walloon region, there is no tax for vessels passing a lock. The only tax the skipper has to pay is the navigation tax, which is of 0.0025 eurocents per tonne-kilometre transported to which to add 21% as the VAT. The global amount by tkm is equal to 0.003025 eurocents.

Assuming that the tax for passing the lock of Lanaye is the half of the part of the navigation tax for the 25 km between the locks of Lanaye and the port of Liège, that is to say that we consider that all the tonnage passing by the Lanaye locks comes or has as final destination the port of Liège. With these hypotheses, the navigation rights for the link Liège-Lanaye amounts to:

$$10234617\times0.003025\times25=773992.91$$ euros/year

Sharing this amount in two parts, we can consider that the Lanaye locks produce yearly 386996.4 euros.

The introduction of RIS will results in an increase of traffic passing by the Lanaye locks thanks to a better filling of the locks chambers, increasing the number of vessels passing by the lock. 1% to 10% of increase can be considered as a good compromise. Making the calculation with 5% of increase of traffic, 5% being the average value between 1 and 10, the benefit of the locks for using RIS is equal to:

$$386996.4\times0.05=19349.82$$ euros/year
4.4.3.5 Benefit for the fairways authority (Voyage planner)

The fairways authority has in charge to organise the waterways in order to allow a safe navigation for the skipper. He has to assure the right drafts for the rivers and to help skippers by sending them information on the navigation conditions (weather, difficult paths, Ecdis maps, etc.). The fairways authority has in charge the maintenance of the waterways. For the navigation link between the port of Liège and the Lanay locks (25 km), the fairways authority reports on 40000 m³ of sands of sludge dredged by year. With the 5% of benefit from RIS implementation, one can consider that the dredging sand will be reduced of 2000 m³ by year. The authority reports on a dredging cost of 80 euros by m³ of sludge. The benefit for the fairways authority is then:

2000*80= 16000 euros by year (average)

4.4.3.6 Benefit for the terminal manager

The most important benefits a terminal manager can obtain from the use of RIS are an increase of the number of vessels berthing in the terminal, a better occupancy of berths thanks to improved ETA and finally an increase of productivity of the terminal.

Thanks to better information on departure and arrival of vessels by the terminal, logistic parties will be convinced to use inland navigation for their shipments. All these combined actions will result in an increase of tonnage handled by the terminal.

The Renory container terminal in the port of Liège handled 11000 TEU in 2004, that is to say 7860 containers. With RIS equipment, the terminal can expect to increase its productivity by 5%. The terminal will handle 393 additional containers. The handling charge is equal to 50 euros (2*25 euros) by container. The benefit for the terminal is then of:

393*50=19650 euros/year

4.4.3.7 Benefit for the port manager

Benefit for port manager is calculated taking the case of the Liège port in Belgium. The port fixes the following taxes for the use of its installations:

Tax to pay by the terminal manager by handled tonne is equal to 0.0868 euros. In 2004 the port of Liège handled 15.190.067 tonnes. Assuming an increase of 5% as result of implementation of RIS, the benefit for the port authority is equal to:

15190067*0.05*0.0868= 65925 euros

4.4.3.8 Benefit for the competent authority

In a former EU project INDRIS, it was proved that the implementation of RIS in the river Waal in The Netherlands lead to a B/C of 1.03 for the competent authority.

3 Source : Port autonome de Liège (http://www.liege.port-autonome.be/frtarifs.htm)
Benefits consist of reduction of the costs of VTSs. These VTSs should be phased out. On top of that a reduction of dredging might be expected. It was also expected that reduction will occur of the costs associated with deceleration works. A postponement of investments for new lock replacing the existing locks might also lead to reductions of costs.

The costs were the costs of a new RIS centre and an ECDIS centre, as well as the extra costs to equip the locks with adequate planning programmes including communication modules.

The example of the river Waal shows clearly that the implementation of RIS shows positive effect for the competent authority.

### 4.5 Cost/benefit ratios by actor

The table hereafter gives the B/C ratio for some actors. For the other actors, although the benefits of using RIS are obvious, it is difficult to express those benefits in monetary terms.

The shipper, the freight forwarder and the logistic chain manager have a bad image of the inland navigation for the moment as many surveys prove it. (See for example the survey conducted in may 2003 by the “Office for the Promotion of Inland Navigation “OPVN””. This survey is available on the web site of the office, which is www.opvn.be). These actors should make effort to first know the possibilities the inland navigation offer to logistic parties. One of the way for closing this gap is by getting RIS equipment. And logically, 4996 euros by year is not to much for getting a service which can solve many problems of transporting goods.

Many of the actors of the table are part of what we name “Competent Authority”. Here we didn’t calculate the B/C ratio for the competent authority as a previous study showed clearly the positive effect of RIS for this type of actor.

<table>
<thead>
<tr>
<th>Actor</th>
<th>Cost (€)</th>
<th>Benefit (€)</th>
<th>Cost Benefit ratio (B/C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal operator</td>
<td>4996</td>
<td>19650</td>
<td>3,93</td>
</tr>
<tr>
<td>Port manager</td>
<td>4996</td>
<td>65925</td>
<td>13,20</td>
</tr>
<tr>
<td>Skipper</td>
<td>12980</td>
<td>14438</td>
<td>1,11</td>
</tr>
<tr>
<td>Barge operator</td>
<td>12980</td>
<td>14438</td>
<td>1,11</td>
</tr>
<tr>
<td>Lockmaster</td>
<td>12026</td>
<td>19350</td>
<td>1,61</td>
</tr>
<tr>
<td>Fairways authority</td>
<td>12026</td>
<td>16000</td>
<td>1,33</td>
</tr>
<tr>
<td>Shipper</td>
<td>4996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight forwarder</td>
<td>4996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistic chain manager</td>
<td>4996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship owner</td>
<td>4996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Police Cross border authority</td>
<td>11092</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 14: Cost/Benefit ratios by actor*
The table 14 here before shows that for two actors of the inland navigation, the terminal manager and the port operator, the use of RIS will result in so high benefits that it would be a pity not to use it.

The same table shows very interesting cost/benefit ratio for the skipper, the barge operator, the lockmaster and the fairways authority. This benefit should be considered as the lowest benefit those actors could retire from using RIS. Indeed, there are many others benefits for these actors but whose quantification is not obvious. It is the same case for the shipper, the logistic chain manager, the ship owner, the freight forwarder and the cross border police. Even if direct benefit for them is difficult to quantify in monetary units, they should think to the indirect benefits the decision of using RIS will induce mainly on the external negative effects of transport. By using RIS, these actors contribute to make transport safer and proper contributing to the sustainable development.
PART 5

ACCEPTANCE ASSESSMENT
5 PART 5: ACCEPTANCE ASSESSMENT

5.1 INTRODUCTION

5.1.1 Objectives of WP12.4

The objective of this activity is to assess the satisfaction with the system designed and demonstrated as shown by the prospective users attending the demonstrations.

This assessment also indicates useful technical or functional aspects to be considered within the RIS generic and local systems, and the current acceptance thereof, before the final version is launched.

The preparation of this SWP is mainly based on the work done within SWP12.2, draft framework of the demonstrations, results of the applications testing (WP9.3) and the draft scenarios of RIS implementation (WP11).

5.1.2 Structure of the Report

This report is organised along the following chapters:

- **Section 0** provides an Executive Summary of the work conducted in WP12.4;

- **Section 1** provides an introduction to the objectives of the Work Package and a description of the methodology adopted;

- **Section 2** provides a detailed description of the methodology adopted, including the “clustering” of objects, the to-be-assessed demonstrators and their key components, the relative scale used (in comparison with actual procedures) and the analysis methodology;

- **Section 3** provides an overview of the results of the analysis of the responses gained from each demonstrator;

- **Section 4** provides the main Conclusions as resulting from the analysis of the responses.

- **Annexes** are included whereby the full questionnaires for each demonstrator are provided, including actual results in percentage terms per individual question.

5.1.3 Approach

The approach for the definition and conduct of the Acceptance Assessment used was the following:

1. **Review**

   - A review of the “clusters” to be demonstrated and definition of a suitable quantification scale of the perception an actor might have of its demonstration in relative scale (in comparison with actual procedures).

2. **Definition of a survey strategy**

   - Definition of the survey method (survey face-to-face or grouped);
   - Determination of the target population (who will be surveyed?);
• Drafting of a suitable survey form dedicated to the prospective actors groups attending the
demonstrations. The aim is through this form to figure out their degree of acceptance of the
“objects” demonstrated.

3. Data processing
The information gathered during the surveys was to be processed using statistical methods. This
should provide a picture of acceptability of RIS or in more general terms, how far the “clusters”
cope with the user needs. This key result should be obtained through the definition and the
evaluation of indices of acceptability.

4. Discussions
The implications of the above indices should be discussed in order to provide information about
useful technical or functional aspects to be considered within the RIS system before the final version
is launched. This is conducted internally following analysis of the results and identification of
exceptional values.
5.2 METHODOLOGY

5.2.1 General Considerations

The Project COMPRIS is justly dedicated to the development and demonstration of an operational RIS (River Information Services) system.

RIS is physically a network linking private and public information users and information holders. It makes an optimal use of the opportunities offered by information and communications technology and intends to respond to public and private demand for facilitating River Traffic and Transport Management.

It aims at contributing to an efficient transport process and to the use of the river system to its fullest extent. RIS includes services to distribute pertinent information that is used in real time and in retrieval modes by all actors involved.

RIS stands for a joint method of working for public and private sector bodies that are cooperating to improve the safety, smoothness, cost efficiency and flexibility of inland shipping and simultaneously to promote more efficient utilisation of the existing infrastructure.

The types of services that could be delivered within the framework of RIS were clustered in SWP12.2 and formed the basis of the clustering for the Acceptance Assessment. The clusters from SWP12.2 are as follows:

- Logistical Support;
- Supporting Services for Navigation;
- ERI / Cross Border; and,
- Navigation on-board.

5.2.2 Acceptance Assessment

The Acceptance Assessment had the objective to assess the satisfaction with the system designed and demonstrated as shown to the prospective users attending the demonstrations.

5.2.2.1 Form

A questionnaire was considered the most appropriate means for collecting the opinions from the attendees. It had the particularity that the results of the demonstrators were used to assess the really demonstrated individual RIS elements in comparison with habitual conventional procedures: i.e. much better, better, equal, worse. In addition, respondents were invited to state the influencing factors for their decision, i.e. ease of use, accuracy and/or response time.

5.2.2.2 Scope

In order to determine the scope of the questionnaire it was necessary to consolidate the most forthcoming features of the to-be-demonstrated aspects into a well-organised structure.

It was noted that the WP responsible for the demonstrators had categorised elements of RIS in a more specific manner, i.e.:

- Navigation;
- Basic Information;
- Logistical Data Platform (LDP);
- Tracking and Tracing (T&T);
- Cross Border;
- Vessel Traffic Services (VTS);
• Regional Vessel Traffic Services (RVTS);
• Lock Management;
• Lock Planning;
• Calamity Abatement;
• Invoicing;
• Statistics;
• E-Learning.

Taking the clusters derived in SWP12.2 it was decided to keep with the categories as defined for the
 demonstrators (above), with the following exceptions:

• It transpired that the category “Basic Information” did not utilise information or techniques not
  already available under one of the other categories and therefore no separate topic was made;
• “Tracking and Tracing” was considered integral to a number of the other services or elements and
  as such was not treated in the questionnaire as a separate item;
• “Regional Vessel Traffic Services” were to be demonstrated in only one location, and the aspects
  coincided with the VTS functionality. For this reason no separate topic was made;
• Lock Management and Lock Planning were combined to form one topic “Lock Management and
  Planning”.

For each of the remaining categories/functions the following was understood:

5.2.2.2.1 Navigation

The Navigation questions focused on the use of RIS for short-term voyage planning and monitoring on
board as well as the basic information on the status of the fairway. The type of information provided
ranges from position of traffic in time and space with respect to own vessel and including
identification, type, cargo, dimensions etc. In addition information with respect the status of the
infrastructure is included with respect water levels, status of aids to navigation and any other
restrictions. The “RIS way” of providing this function was primarily based on the use of radar and
integrated AIS/AlIP and ECDIS. For the skipper this function provides for the enhanced Tactical
Traffic Image (TTI) on board.

5.2.2.2.2 Logistical Data Platform (LDP)

LDPris.info is a portal site on the Internet that creates a single point of entry for logistic service
providers and transport organisers.

Via this portal, information related to pre trip planning and the follow up of an ongoing transport is
given. Four applications are being made available. A web-based route planner and a hull database on
one hand, and a web-based interface to cargo, voyage and position information on the other hand.

5.2.2.2.3 Tracking and Tracing (T&T)

The function of tracking and tracing the movements of vessels is a crucial part of River Information
Services. The position information is a pre-requisite for many services and the basic data used for
important functionalities like e.g. collision avoidance or calculation of the Estimated Time of Arrival.

5.2.2.2.4 Cross Border

Cross border management (CBM) stands for supporting services for inland waterway shipping by
providing the information to realise seamless transportation and navigation over the borders.
“Cross border management is the process of defining, planning, implementing and controlling the efficient and effective flow of people, means of transport and goods, passengers, animals and their accompanying information across country (regional) and/or administrative (organisational) borders for the purpose of complying with requirements of authorities and safeguarding commercial interests.” (Definition according to the COMPRIS project, WP6)

In order to facilitate seamless Cross Border Management, the so-called **Cross Border Information Services (CBIS)** were introduced.

“Cross border information services (CBIS) stand for supporting services in inland waterway transport (IWT) and short sea shipping (SSS), which provide crucial information to facilitate seamless Cross Border Management (CBM).” (cp. Deliverable 6.1 of the COMPRIS project)

According to the priority given by factors like importance for the daily business (I), availability of information (II) and status of harmonisation (III) the following Cross Border Information Services have been identified as crucial:

1. **Dangerous cargo reporting service** (UN/ECE legislation – ADN / ADN-R / ADN-D)
   
   For the reporting on dangerous cargo, the CCNR recommended the SRS 1.0 message on proposal of the ERI working group;

2. **Voyage reporting service** (reporting of a vessels voyage to the waterway authority);

3. **Immigration inspection service** (control of persons on board of a vessel based on the pre-arrival information provided to the immigration authority);

4. **Customs service** (control of cargo based on the pre-arrival information provided to the customs authority);

5. **Statistics service** (reporting for statistical purposes).

5.2.2.2.5 **Vessel Traffic Services (VTS)**

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 area.

VTS should comprise at least an information service and may also include others, such as a navigational assistance service, or a traffic organisation service, or both, defined as below:

- **An information service** is a service to ensure that essential information becomes available in time for on-board navigational decision-making;

- **A navigational assistance service** is a service to assist on-board navigational decision-making and to monitor its effects. Navigational assistance is especially of importance in reduced visibility or difficult meteorological circumstances\(^4\) or in case of defects or deficiencies affecting the radar, steering or propulsion. Navigational assistance is given in due form of position information at the request of the traffic participant or in special circumstances when deemed necessary by the VTS operator;

\(^4\) For example to help vessels without radar and overtaken by fog to find a safe mooring place or anchorage
- A traffic organisation service is a service to prevent the development of dangerous vessel traffic situations by managing of traffic movements and to provide for the safe and efficient movement of vessel traffic within the VTS area (Source: IALA VTS guidelines);

- VTS area is the delineated, formally declared service area of the VTS. A VTS area may be subdivided in sub-areas or sectors. (Source: IALA VTS guidelines).

5.2.2.6 Lock Management and Planning

Lock planning and management systems were developed which are able to interface with voyage planning software, so that the skipper can enter the requested time at the destination and the timeslots for each lock operation during the sailing is assigned. This is especially important for areas with many locks, such as the upper Danube or the RMD channel. In addition procedures were developed that may be used in traffic mix of RIS and non-RIS vessels.

5.2.2.7 Calamity Abatement

A calamity abatement system has to be able to: manage the input of the incident report (description, localisation); build a request sent to a GIS to define the starting point/area (if unknown), the possible evolution if nothing is done and who has to be contacted; Contact the emergency services and authorities, i.e. send them the relevant information and integrate their data/inputs/actions; and inform the users (notice to skippers).

5.2.2.8 Invoicing

The invoicing function was only demonstrated in Romania and was linked to the planning and statistics with respect to generating automatic invoicing.

5.2.2.9 Statistics

The statistics function involved the suitable generation and presentation of statistics reports by the RIS centres to the statistics offices (suitable format) including the generation of statistics reports out of available ERI CB messages (ERINOT, CUSCAR) and traffic information (cp. “Trigger mechanism”).

5.2.2.10 Learning

An E-Learning tool was developed within WP7 (Human Factors). Various scenarios were incorporated in order to demonstrate the capability of the E-Learning tool to assist in the implementation of the various functions of RIS from the viewpoint of different users, i.e. skippers, authorities etc. The appropriateness of such a tool was the subject of the questionnaire for this element.

5.2.2.3 Demonstrators

The Acceptance Assessment was performed for eight demonstrators, each having its own unique combination of elements.

Below is an overview of the demonstrators attended and the elements demonstrated and assessed:

- Hungary
  - Navigation;
  - Cross Border;
  - Calamity Abatement;
COMPRIS – Socio-economic assessment of RIS

- E-Learning.

- Bel/France
  - Navigation;
  - Logistical Data Platform;
  - Cross Border;
  - Lock Management and Planning;
  - E-Learning.

- Ukraine
  - Navigation;
  - Logistical Data Platform;
  - Cross Border;
  - Vessel Traffic Services.

- Romania
  - Lock Management and Planning;
  - Invoicing;
  - Statistics;
  - E-Learning.

- Netherlands
  - Navigation;
  - Logistical Data Platform;
  - Cross Border;
  - Vessel Traffic Services;
  - Lock Management and Planning;
  - E-Learning.

- Germany
  - Navigation;
  - Vessel Traffic Services;
  - Lock Management and Planning.

- Austria
  - Navigation;
  - Logistical Data Platform;
  - Cross Border;
  - Lock Management and Planning.

- Slovakia
  - Navigation;
  - Logistical Data Platform;
  - Cross Border.

The full questionnaires for each of the demonstrations are included in the Annexes.
5.2.2.4 Population

The Acceptance Assessment applied only to the population of invitees that attended the relevant demonstration.

The following target groups were identified:

<table>
<thead>
<tr>
<th>Skipper</th>
<th>Skippers / Ship Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure</td>
<td>Bridge Operators</td>
</tr>
<tr>
<td>Authority</td>
<td>Lock Operators</td>
</tr>
<tr>
<td>Hydrographic offices</td>
<td>Fairway Authorities</td>
</tr>
<tr>
<td>Customs</td>
<td>Statistical offices</td>
</tr>
<tr>
<td>VTS Authorities</td>
<td>Fort &amp; Terminal authorities</td>
</tr>
<tr>
<td>Fire Brigades</td>
<td>Police</td>
</tr>
<tr>
<td>Local authorities</td>
<td>Search and Rescue organisations</td>
</tr>
<tr>
<td>Health Authorities</td>
<td></td>
</tr>
<tr>
<td>Service orientated (traffic)</td>
<td>Pilots</td>
</tr>
<tr>
<td>VTS operators</td>
<td></td>
</tr>
<tr>
<td>Service orientated (transport)</td>
<td>Charterers</td>
</tr>
<tr>
<td>Shippers, Freight forwarders, Brokers</td>
<td></td>
</tr>
<tr>
<td>Terminal operators</td>
<td></td>
</tr>
<tr>
<td>Short Sea operators</td>
<td></td>
</tr>
<tr>
<td>River barge operators</td>
<td></td>
</tr>
</tbody>
</table>

Table 15: Target groups for acceptance assessment

5.2.2.5 Distribution

The demonstrator responsible or members of SWP12.4 distributed the questionnaires at the beginning of each demonstration. Respondents were invited to complete and return them during the demonstration session.

The preparation steps of this activity were as follows:

\(\Rightarrow\) Each demonstrator, having its own geographical area and requirements/potential therewith, provided an overview of the to-be-demonstrated elements of RIS. From this the relevant clusters were selected for inclusion in the questionnaire for that demonstrator;

\(\Rightarrow\) Where appropriate translations were made of the questionnaire into the local language(s). Each question had a unique code indicating type and number in order to facilitate the analysis of the responses;

\(\Rightarrow\) The questionnaires contained, for each type of information demonstrated and where appropriate, the performance of the "RIS way", and the performance of the "habitual (no RIS) way". Specific attention was paid to the clarity and length of the questionnaires and translations into the local language were made where appropriate. Questionnaires were distributed in-situ before commencement and respondents were invited to complete them during the session.
5.2.2.6 Analysis Methodology

The questionnaires invited the participants to rate the RIS method(s) for providing or presenting data/information compared to the actual method(s) in practice today. The rating used indicated whether the participant found the RIS method as presented to be “much better”, “better”, equal” or “worse”. In addition the participants were asked what the main reasons were for their rating, i.e. ease of use”, accuracy” and/or “response time”.

For each demonstrator an analysis was made of the responses on a per question basis. Following this the results were grouped into the categories as provided and a result given indicating the percentage of answers falling under each rating level/type.

In order to gain an overall rating, and thereby comparison of all demonstrators, during the analysis of the results the responses were weighted. This provided the overall improvement, or worsening, in percentage terms and thereby provided a relative scaling for the overall improvement. The weighting was as follows:

- “Much better” = 2;
- “Better” = 1;
- “Equal” = 0;
- “Worse” = -1.

In Section 3 charts are provided showing how the categories (e.g. Navigation) were received and assessed in the different demonstrators, in so far as they were actually demonstrated. Thereby a comparison is provided of the “acceptance” in the different regions and waterways.

The small response sample meant that analysing the data on a “per target group” basis would produce statistically invalid results. The evaluation was conducted, therefore, on a global basis on the proviso that the spread could be accounted to unqualified responses. The results as given can be seen as providing an indicative reading.
5.3 ANALYSES & RESULTS

In this section the overall results for each demonstrator are presented, indicating overall acceptance and determining parameter by category (where available) and by function demonstrated.

5.3.1 Completed Questionnaires

The following number of Acceptance Assessment Questionnaires was received for each of the demonstrators held:

- Hungary: 10;
- Bel/France: 10;
- Ukraine: 7;
- Romania: 10;
- Netherlands: 42;
- Germany: 9;
- Austria: 16;

5.3.2 Demonstrator Results

The results from each demonstrator were analysed and for comparison purposes, both within each individual demonstrator as well as between demonstrators, the results were consolidated. Following is an overview of the results per demonstrator and per functionality. These results are a summary of the full results as provided in the Annexes.
5.3.2.1 Hungary

The following table provides a summary of the results from the Hungarian demonstrator in Budapest.

<table>
<thead>
<tr>
<th>Budapest</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>42%</td>
<td>43%</td>
<td>12%</td>
<td>3%</td>
<td>41%</td>
<td>36%</td>
<td>24%</td>
</tr>
<tr>
<td>Cross Border</td>
<td>33%</td>
<td>60%</td>
<td>7%</td>
<td>0%</td>
<td>44%</td>
<td>35%</td>
<td>21%</td>
</tr>
<tr>
<td>Calamity Abatement</td>
<td>30%</td>
<td>54%</td>
<td>15%</td>
<td>2%</td>
<td>31%</td>
<td>47%</td>
<td>22%</td>
</tr>
<tr>
<td>E-Learning</td>
<td>45%</td>
<td>35%</td>
<td>20%</td>
<td>0%</td>
<td>76%</td>
<td>22%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Table 16: Hungary Results*

*Figure 20: Budapest overall results*
Figure 21: Budapest influencing factors

5.3.2.2 Belgium/France

The following table provides a summary of the results from the Belgian/French demonstrator in Gent.

<table>
<thead>
<tr>
<th>Gent</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Border</td>
<td>31%</td>
<td>48%</td>
<td>21%</td>
<td>0%</td>
<td>35%</td>
<td>50%</td>
<td>14%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>22%</td>
<td>56%</td>
<td>18%</td>
<td>4%</td>
<td>32%</td>
<td>42%</td>
<td>26%</td>
</tr>
<tr>
<td>Lock Management &amp; Planning</td>
<td>12%</td>
<td>80%</td>
<td>7%</td>
<td>0%</td>
<td>28%</td>
<td>56%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Table 17: Belgium / France Results
Figure 22: Gent Overall Results

Figure 23: Gent influencing factors
5.3.2.3 Ukraine

The following table provides a summary of the results from the Ukrainian demonstrator in Vilkovo.

<table>
<thead>
<tr>
<th>Ukraine</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Border</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>27%</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>28%</td>
<td>35%</td>
<td>37%</td>
</tr>
<tr>
<td>Navigation</td>
<td>73%</td>
<td>27%</td>
<td>0%</td>
<td>0%</td>
<td>16%</td>
<td>57%</td>
<td>27%</td>
</tr>
<tr>
<td>VTS</td>
<td>89%</td>
<td>11%</td>
<td>0%</td>
<td>0%</td>
<td>21%</td>
<td>43%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Table 18: Ukraine Results

Figure 24: Ukraine overall results
5.3.2.4 Romania

The following table provides a summary of the results from the Romanian demonstrator in Agigea/Constantza.

<table>
<thead>
<tr>
<th>Romania</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lock Management &amp; Planning</td>
<td>46%</td>
<td>44%</td>
<td>10%</td>
<td>0%</td>
<td>15%</td>
<td>56%</td>
<td>29%</td>
</tr>
<tr>
<td>Invoicing</td>
<td>48%</td>
<td>50%</td>
<td>3%</td>
<td>0%</td>
<td>14%</td>
<td>48%</td>
<td>38%</td>
</tr>
<tr>
<td>Statistics</td>
<td>50%</td>
<td>48%</td>
<td>3%</td>
<td>0%</td>
<td>30%</td>
<td>63%</td>
<td>8%</td>
</tr>
<tr>
<td>E-Learning</td>
<td>88%</td>
<td>10%</td>
<td>3%</td>
<td>0%</td>
<td>57%</td>
<td>38%</td>
<td>5%</td>
</tr>
</tbody>
</table>

*Table 19: Romania Results*
Figure 26: Romania overall results

Figure 27: Romania influencing factors
5.3.2.5 Netherlands

The following table provides a summary of the results from the Dutch demonstrator in Nijmegen.

<table>
<thead>
<tr>
<th>Nijmegen</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Border</td>
<td>17%</td>
<td>57%</td>
<td>26%</td>
<td>1%</td>
<td>54%</td>
<td>34%</td>
<td>12%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>23%</td>
<td>56%</td>
<td>19%</td>
<td>2%</td>
<td>53%</td>
<td>31%</td>
<td>16%</td>
</tr>
<tr>
<td>Navigation</td>
<td>26%</td>
<td>62%</td>
<td>11%</td>
<td>0%</td>
<td>45%</td>
<td>33%</td>
<td>23%</td>
</tr>
<tr>
<td>VTS</td>
<td>20%</td>
<td>65%</td>
<td>14%</td>
<td>1%</td>
<td>44%</td>
<td>35%</td>
<td>21%</td>
</tr>
<tr>
<td>Lock Management &amp; Planning</td>
<td>12%</td>
<td>61%</td>
<td>23%</td>
<td>4%</td>
<td>41%</td>
<td>42%</td>
<td>17%</td>
</tr>
<tr>
<td>E-Learning</td>
<td>23%</td>
<td>68%</td>
<td>9%</td>
<td>0%</td>
<td>72%</td>
<td>17%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 20: Netherlands Results

Figure 28: Nijmegen overall results
Figure 29: Nijmegen influencing factors

5.3.2.6 Germany

The following table provides a summary of the results from the German demonstrator in Oberwesel.

<table>
<thead>
<tr>
<th>Oberwesel</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>37%</td>
<td>57%</td>
<td>5%</td>
<td>0%</td>
<td>31%</td>
<td>39%</td>
<td>30%</td>
</tr>
<tr>
<td>VTS</td>
<td>41%</td>
<td>57%</td>
<td>2%</td>
<td>0%</td>
<td>52%</td>
<td>37%</td>
<td>10%</td>
</tr>
<tr>
<td>Lock Management &amp; Planning</td>
<td>33%</td>
<td>45%</td>
<td>22%</td>
<td>0%</td>
<td>54%</td>
<td>25%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Table 21: Germany Results
**Figure 30: Oberwesel overall results**

**Figure 31: Oberwesel influencing factors**
5.3.2.7 Austria

The following table provides a summary of the results from the Austrian demonstrator in Grein.

<table>
<thead>
<tr>
<th>Austria</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Border</td>
<td>29%</td>
<td>64%</td>
<td>7%</td>
<td>0%</td>
<td>31%</td>
<td>40%</td>
<td>28%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>27%</td>
<td>58%</td>
<td>14%</td>
<td>1%</td>
<td>38%</td>
<td>33%</td>
<td>30%</td>
</tr>
<tr>
<td>Navigation</td>
<td>36%</td>
<td>51%</td>
<td>12%</td>
<td>0%</td>
<td>31%</td>
<td>44%</td>
<td>26%</td>
</tr>
<tr>
<td>Lock Management &amp; Planning</td>
<td>33%</td>
<td>51%</td>
<td>16%</td>
<td>0%</td>
<td>30%</td>
<td>42%</td>
<td>28%</td>
</tr>
</tbody>
</table>

*Table 22: Austria Results*

*Figure 32: Austria overall results*
Figure 33: Austria influencing factors

5.3.2.8 Slovakia

The following table provides a summary of the results from the Slovakian demonstrator.

<table>
<thead>
<tr>
<th>Slovakia</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Border</td>
<td>33%</td>
<td>62%</td>
<td>5%</td>
<td>0%</td>
<td>29%</td>
<td>55%</td>
<td>16%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>34%</td>
<td>65%</td>
<td>2%</td>
<td>0%</td>
<td>33%</td>
<td>38%</td>
<td>29%</td>
</tr>
<tr>
<td>Navigation</td>
<td>62%</td>
<td>38%</td>
<td>0%</td>
<td>0%</td>
<td>9%</td>
<td>59%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Table 23: Slovakia Results
**Figure 34: Slovakia overall results**

**Figure 35: Slovakia influencing factors**
5.3.3 Comparative Results

In order to draw a comparison of the acceptance of the same functionality at different demonstrators the “improvement” of the RIS way was quantified according the method described earlier.

Mean values were ascertained per functionality per demonstrator whereby the foreseen improvement of the introduction of the proposed RIS applications was quantified in terms of a percentage improvement. The following table and chart provide an overview of the comparison between the different demonstrators.
### Mean Values

<table>
<thead>
<tr>
<th>Service</th>
<th>Hungary</th>
<th>Netherlands</th>
<th>Germany</th>
<th>Belgium/France</th>
<th>Austria</th>
<th>Ukraine</th>
<th>Slovakia</th>
<th>Romania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Border</td>
<td>63%</td>
<td>45%</td>
<td></td>
<td>55%</td>
<td>61%</td>
<td>90%</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td>62%</td>
<td>57%</td>
<td>66%</td>
<td>61%</td>
<td>86%</td>
<td>81%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VTS</td>
<td></td>
<td></td>
<td>52%</td>
<td>70%</td>
<td>95%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lock Management &amp; Planning</td>
<td></td>
<td></td>
<td></td>
<td>41%</td>
<td>56%</td>
<td>53%</td>
<td></td>
<td>68%</td>
</tr>
<tr>
<td>E-Learning</td>
<td>63%</td>
<td>57%</td>
<td></td>
<td>53%</td>
<td>58%</td>
<td></td>
<td></td>
<td>93%</td>
</tr>
<tr>
<td>Calamity Abatement</td>
<td>56%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invoicing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Statistics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>74%</td>
<td></td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>61%</td>
<td>50%</td>
<td>64%</td>
<td>52%</td>
<td>59%</td>
<td>91%</td>
<td>70%</td>
<td>77%</td>
</tr>
</tbody>
</table>

*Table 24: Comparative Mean Results*
Figure 36: Comparison of mean values. All demonstrators
5.3.4 Comments on Demonstrator Results

5.3.4.1 General

For each demonstrator approximately 15% of the audience completed the Acceptance Assessment questionnaire. In this respect there were, in general, too few responses in order to gain statistically sound results and as such all comments hereafter are based on the indicative results as reported here above and in the Annexes. From the results it is noticeable that there was a certain consistency between the demonstrators as to the participant opinions, and only reinforce the validity of the indicative status.

5.3.4.2 Per Demonstrator

5.3.4.2.1 Hungary

The Hungarian demonstrator took place on 7th June 2005 in Budapest. The elements Navigation, Cross Border, Calamity Abatement and E-learning were presented to the audience.

The most improvement was considered in the E-Learning, Cross Border and Navigation elements whilst Calamity Abatement, although scoring highly and thereby still showing a remarkable improvement, was considered to demonstrate the least. The main reason for the improvements was the Ease of Use, and then Accuracy followed by Response Time.

With respect Navigation, the position and identification of other traffic were considered the major improvements, Accuracy being the main influencing factor. Further all information was seen as an improvement however other vessel dimensions and draught, as well as present and future water levels, were undecided.

Cross Border registered a consistent improvement for all the services provided. Ease of Use and Accuracy were clearly the main influencing factors for the improvement.

For Incident and Calamity Abatement the most improvement was found in the overall operational traffic image including the location of patrol and other assistance vessels. Accuracy of information was considered key for this.

E-Learning proved popular through its Multilanguage approach and very clearly through its Ease of Use.

5.3.4.2.2 Belgium/France

A joint Belgian and French demonstrator was organised and held in Gent Belgium. The demonstrator was split into two sessions, one focussing on the Authorities and the other on end-users, such as Skippers. The dates of the demonstration were 23rd and 24th June 2005.

The first demonstrator day focussed on the Logistical Data Platform, Cross Border and Lock Management & Planning. The second day focussed on the Navigation, Logistical Data Platform, Cross Border, Lock Management & Planning and E-Learning. Unfortunately there were insufficient responses on the second day to warrant even an indicative analysis of the results. The results from the first day are reported here above.

From the results the E-Learning scored highly whilst the Logistical Data Platform and Cross Border elements were also positively received. With respect the reasoning, there was a fairly even spread although Accuracy appeared to be the most important influencing factor.
Cross Border received a mixed reaction however the overall trend was for an improvement through the RIS standard compared to the current practice. Ease of Use and Accuracy were the main reasons for this.

The Logistical Data Platform was equally well received and whilst service providers stated that they would be willing to provide LDP services there was some resistance to the idea of these services being commercialised and users would be reluctant to pay for the information.

Lock Management & Planning registered a slight improvement. The benefits were attributed to the Accuracy of the information.

5.3.4.2.3 Ukraine

The Ukrainian demonstrator took place on 30th June 2005 in Vilkovo. The elements Navigation, Cross Border, Logistical Data Platform and VTS were presented to the audience.

The respondents rated the improvement in the presented elements through the “RIS way” of providing the necessary information very highly. For all elements the consensus was that the RIS way was Much Better. The key influencing factors were Accuracy and Response Time.

Information relating to the position, identification and type of vessel and/or cargo were consistently rated the highest. For this information the key-influencing factor was Accuracy.

5.3.4.2.4 Romania

The Romanian demonstrator took place on 7th July 2005 in Agigea/Constantza. The elements Lock Management & Planning, Invoicing, Statistics and E-Learning were presented to the audience.

The Romanian demonstrator was unique in that it was the only one to present the dedicated elements referring to Invoicing and Statistics. These were received positively, mainly for the Accuracy. Whilst the Lock Management & Planning was received equally well, and also for Accuracy, the perceived improvement through E-Learning was the perceived the best. The key-influencing factor was Ease of Use.

Lock Management & Planning noted the most improvements with respect to the position data of approaching vessels and vessel dimensions as well as information relating to the booking requirements.

5.3.4.2.5 Netherlands

The Dutch demonstrator took place over three days in the period 12th to 14th September 2005 in Nijmegen. This demonstrator was the most comprehensive of all the demonstrators with the elements Cross Border, Logistical Data Platform, Navigation, VTS, Lock Management & Planning and E-Learning were presented to the audience. Working demonstrations/prototypes for most of the elements were available for the participants.

In general all elements were perceived as better in the provision of the information. Ease of Use was deemed the key-influencing factor, closely followed by Accuracy.

Cross Border registered an overall improvement and primarily for the perceived Ease of Use.

With respect the Logistical Data Platform the audience was undecided as to whether they would be willing to pay for the information however clearly indicated that the services would be desired. It was not felt that these services should be commercialised.
Navigation and VTS both noted the best responses with respect the identification of other vessels, and all other information related herewith. Present and Current water levels scored well however was perceived to provide the least improvement.

Lock Management & Planning whilst showing an improvement was often considered to be equal to the current situation. This could be explained through much of the functionality being implemented already during the course of the project and therefore seen as standard practice already.

5.3.4.2.6 Germany

The German demonstrator took place on 23rd September in Oberwesel. The elements Lock Management & Planning, Navigation and VTS were presented to the audience.

The most improvement was considered in the Navigation and VTS elements. For Navigation, Accuracy was the main influencing factor, whilst for VTS and Lock Management & Planning the main influencing factor was Ease of Use.

Identification of other vessels, the state of rivers, canals, locks and bridges, and other ECDIS information were considered the main improvements under Navigation as well as VTS. There was a trend towards Accuracy with respect the information available through the RIS standards.

Lock Management & Planning again showed the most improvement with respect vessel dimensions, position information and Estimated Time of Arrival (ETA). Ease of Use was the overwhelming influencing factor here.

5.3.4.2.7 Austria

The Austrian demonstrator took place on 29th September in Vienna. The elements Cross Border, Logistical Data Platform, Navigation and Lock Management & Planning were presented to the audience.

The results were consistent across the four demonstrated elements, all indicating a majority score of Better. The influencing factors were also evenly spread although a slight preference for Accuracy was indicated.

Cross Border received a consistent response for all elements. The Dangerous Goods reporting service and the statistics service showed slightly more improvement than the others. The influencing parameters were evenly spread.

5.3.4.2.8 Slovakia

The Slovakian demonstrator took place on 30th September in Bratislava. The elements Cross Border, Logistical Data Platform and Navigation were presented to the audience.

The elements Cross Border and Logistical Data Platform scored mostly as Better whilst Navigation was considered Much Better. Accuracy was given as the main influencing factor in all cases.

Once again the identification of other vessels, the state of rivers, canals, locks and bridges, and other ECDIS information were considered the main improvements under Navigation. Again there was a trend towards Accuracy with respect the information available through the RIS standards.
5.3.4.2.9 Overall per Demonstrator

Following is an overview of the overall rating (mean value) for all functionalities demonstrated per demonstrator:

<table>
<thead>
<tr>
<th>Demonstrator</th>
<th>Overall Rating (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukraine</td>
<td>91%</td>
</tr>
<tr>
<td>Romania</td>
<td>77%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>70%</td>
</tr>
<tr>
<td>Germany</td>
<td>64%</td>
</tr>
<tr>
<td>Hungary</td>
<td>61%</td>
</tr>
<tr>
<td>Austria</td>
<td>59%</td>
</tr>
<tr>
<td>Belgium / France</td>
<td>52%</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>50%</td>
</tr>
</tbody>
</table>

*Table 25: Rating per Demonstrator*

5.3.4.2.10 Overall per Functionality

Following is an overview of the overall rating (mean value) for all demonstrators per functionality:

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Overall Rating (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>74%</td>
</tr>
<tr>
<td>Invoicing</td>
<td>73%</td>
</tr>
<tr>
<td>VTS</td>
<td>72%</td>
</tr>
<tr>
<td>E-Learning</td>
<td>71%</td>
</tr>
<tr>
<td>Navigation</td>
<td>69%</td>
</tr>
<tr>
<td>Cross Border</td>
<td>63%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>62%</td>
</tr>
<tr>
<td>Calamity Abatement</td>
<td>56%</td>
</tr>
<tr>
<td>Lock Management &amp; Planning</td>
<td>55%</td>
</tr>
</tbody>
</table>

*Table 26: Rating per Functionality*
5.4 CONCLUSIONS

Due to the relatively low response it was only possible to provide indicative results for the Acceptance Assessment. Nevertheless there proved to be a consistent opinion of improvement in relation to the introduction of the different solutions and standards for RIS.

The demonstrators showed a variety of functionalities, each country selecting what they felt to be the most appropriate/required. These “tailor-made” demonstrators proved the validity of the selection of functionalities through the overwhelming positive response. In very few cases were the elements rated as being equal or worse than the present situation.

The demonstrators also varied in the way that the functionalities were presented. Comments received from the participants indicated that where a prototype was available for “own testing” the understanding and thereby perception was easier to gauge. Where presentations were made without working models the overall understanding and perception of the benefits were more difficult to reflect. This added to the argument for only being able to present indicative results.

It is noticeable that in general the Eastern European countries scored higher than their Western neighbours. This could also be interpreted as a Rhine/Danube split.

The function of Tracking and Tracing the movements of vessels is a crucial part of River Information Services. The position information is a pre-requisite for many services and the basic data used for important functionalities like e.g. collision avoidance or calculation of the Estimated Time of Arrival. The results only confirmed this statement through the identification and position of vessels consistently scoring the highest.

Identification of other vessels, the state of rivers, canals, locks and bridges, and other ECDIS information were considered the main improvements under Navigation as well as VTS. There was a trend towards Accuracy with respect the information available through the RIS standards.

Lock Management & Planning whilst showing an improvement was often considered to be equal to the current situation. This could be explained through much of the functionality being implemented already during the course of the project and therefore seen as standard practice already. Accuracy and Ease of Use were the key-influencing factors. Lock Management & Planning noted the most improvements with respect to the position data of approaching vessels and vessel dimensions as well as information relating to the booking requirements.

Cross Border received a mixed reaction however the overall trend was for an improvement through the RIS standard compared to the current practice. Ease of Use and Accuracy were the main reasons for this.

The Logistical Data Platform was equally well received and whilst service providers stated that they would be willing to provide LDP services there was certainly resistance to the idea of these services being commercialised and users would be reluctant to pay for the information.

For Incident and Calamity Abatement the most improvement was found in the overall operational traffic image including the location of patrol and other assistance vessels. Accuracy of information was considered key for this.

Wherever E-Learning was presented it proved to be very popular, mainly due to its Multilanguage approach and very clearly through its Ease of Use.
**Invoicing and Statistics** were only presented as stand-alone functionalities at one demonstrator. These were received positively, mainly for the Accuracy.

The overall results indicate a definite improvement, this varying from 50% up to 91%, in the RIS services as demonstrated compared to the current situation without RIS.
PART 6

SOCIO-ECONOMIC ANALYSIS
6 PART 6: SOCIO-ECONOMIC ANALYSIS

6.1 General words on external costs of transport

Transportation is presently unsustainable on three counts: first it constitutes the major use of non-renewable resource, oil, for which renewable substitutes are not being developed at a corresponded rate, second it is responsible for 25% of global CO₂ emission from fossil fuel use. Tremendous growth of these emissions has contributed to a significant rise in atmospheric CO₂ concentration from their pre-industrial levels. In several respect passengers and goods transport result in emissions that exceed the assimilative capacity of the environment. Third, many of the local and regional impacts of transport activity damage the health of humans and other organisms and affect the integrity of ecosystems. On local level transport activity might be the most contributor to health risk associated with toxic air pollutants (e.g. carbon monoxide, benzene and other volatile organic compounds, fine particulate matter and lead). Concerning regional impacts, the combustion of fossil fuels produces pollutants, which can travel over large distances and damage human health, plants, animals and ecosystem. These pollutants and their derivatives such as tropospheric ozone and acidifying compounds lead to rise in respiratory problems, and diseases among humans and impair the growth of crops and forests.

It is to be added that today’s noise pollution constitutes a threat to health (high blood pressure and cardiovascular diseases), and must be brought down to permissible levels. Reductions are necessary to prevent adverse effects (interference with communication and sleep disturbance). Some 130 million people in the EU are affected by noise emissions from road, rail and air traffic which exceed permissible levels, with 90% of this being attributable to road noise alone.

Concerning nature conservation, preservation of landscapes and improvement of residential areas, the stresses to which nature and landscapes are exposed today through the continuous expansion of transport infrastructure, and the traffic-related changes in urban living conditions as well as the present-day mobility is incompatible with sustainable living in general and sustainable urban living in particular. Important urban spaces are occupied by cars, children can hardly play or otherwise spend their time on or near the streets, elderly people feel insecure and confined when walking on the streets, and inner-city streets have virtually lost their function as a place to spend time and communicate with other.

Looking at the "business as usual" – scenario of the project on environmentally friendly sustainable transport (OECD Environment Directorate 1999), the trends until 2030 are unsustainable too. Even if all present, planned and reasonably foreseeable legislative, technological and societal changes and measures are to come out, the trends will be directed in an unsustainable future of the transport system.

Car ownership and total distance travelled will be at a substantially higher level than in 1990 while vehicles will be more fuel-efficient and less polluting. Gasoline and diesel will continue to be most widespread source of transport energy, with some increase in the use of gas, hybrid, fuel cells and electric vehicles.

The same trends will likely hold for truck and lorry use whose total volume of travel will be underpinned by significant higher levels of both light and heavy-duty road freight transport. Increases in road freight activity will be generally higher than those for car use. Rails and water-borne freight will also grow, but at a much lower rate.
Concerning specific emissions of nitrogen oxides, carbon monoxide, volatile organic compounds and fine particulate per vehicle-kilometre will decrease substantially from their 1990 levels. The growth in volume of travel might inverse this positive trend, but overall the above-mentioned pollutants from transport will decrease until 2030 in OECD countries.

Despite for all foreseeable policy, carbon dioxide emissions from the transport sector will be doubled by 2030 contributing to dangerously high concentrations of atmospheric CO₂ (OECD Environment Directorate 2000).

6.2 Savings due to the modal split

6.2.1 Introduction

It is expected that the introduction of RIS in the inland navigation will be benefit for the society as a whole. This benefit is the result of the shift of goods from road to the inland navigation. It is then very important to take the necessary measures to make sure that with RIS, this shift will become a reality in the future. For the moment, as we have no means to measure the potential shift from road to inland navigation, we are going to base our reasoning on acceptable assumptions on the level of this shift and on its impact on the external costs of the transports: reduction of accidents, road congestion, pollution, costs of infrastructure, etc.

6.2.2 Methodological approach

In order to have an estimation of the costs and benefits of RIS for the society as a whole, we will consider that the implementation of RIS leads to a transfer from road to inland navigation. RIS will be introduced gradually in European inland navigation so that each RIS user will have time to get the necessary equipment and take all the necessary measures to obtain the best results from the use of RIS. However, the present socio-economic assessment compares the situation without RIS; that is to say with 0% of RIS and the situation with 100% of implementation of RIS.

Since RIS is not yet implemented globally in Europe, it is difficult to conduct experiments allowing the assessment of its impacts on the society. Besides, the demonstrations made in the framework of this project are not enough to make final statements about all the societal effects of RIS in Europe. This is why 3 acceptable scenarios have been developed regarding the socio-economic impacts of RIS.

Scenarios are based on the percentages of improvement for the society deriving from the shift of goods from road to inland navigation. In the first scenario it is supposed that the shift from road to inland navigation is equal to 1%, in the shift is equal to 5% and in the third scenario the shift is equal to 10%.

6.2.3 RIS and the energy consumption

The following figures summarise the logistic performances of the European inland navigation for the year 2002.
Production in million of tkm of the transport sector:

<table>
<thead>
<tr>
<th></th>
<th>Global</th>
<th>IWW</th>
<th>Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU 25</td>
<td>2158000</td>
<td>129000</td>
<td>1554000</td>
</tr>
<tr>
<td>EU 15</td>
<td>1821000</td>
<td>125000</td>
<td>1376000</td>
</tr>
</tbody>
</table>

(Source: Eurostat pocketbook 2004)

In the same time, the fuel consumption associated to this production is the following:

<table>
<thead>
<tr>
<th></th>
<th>Global</th>
<th>IWW</th>
<th>Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU 25</td>
<td>338</td>
<td>5</td>
<td>281</td>
</tr>
<tr>
<td>EU 15</td>
<td>313</td>
<td>5</td>
<td>259</td>
</tr>
</tbody>
</table>

(Fuel consumption, in million tonnes of oil equivalent (MTOE)

(Source: Eurostat pocketbook 2004)

These figures show that 281 MTOE were necessary to produce 1554000 Mtkm by road and 5 MTOE were necessary to produce 129000 Mtkm by IWW. By dividing the fuel consumed by the production, we obtain the average quantity of fuel consumed to produce 1 tkm by the two modes.

6.2.3.1 Savings on energy consumption by scenario

6.2.3.1.1 Scenario 1: Shift 1%

<table>
<thead>
<tr>
<th>Area</th>
<th>Production in millions of tkm</th>
<th>Fuel consumption (MTOE)</th>
<th>Fuel consumption (Global Rd+IWW)</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without RIS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>EU 25</td>
<td>1554000</td>
<td>281.00</td>
<td>286.00</td>
</tr>
<tr>
<td></td>
<td>EU 15</td>
<td>1376000</td>
<td>259.00</td>
<td>264.00</td>
</tr>
</tbody>
</table>

5 EU 25: The 25 countries composing the European Union now

6 EU 15: The 15 countries of the European Union before may 2004
### Table 27: Fuel consumption "without" vs "with" RIS scenario 1

#### 6.2.3.1.2 Scenario 2: 5% of shift

<table>
<thead>
<tr>
<th>Area</th>
<th>Production in millions of tkm</th>
<th>Fuel consumption (MTOE)</th>
<th>Fuel consumption (Global Rd+IWW)</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Without RIS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>EU 25</td>
<td>1554000</td>
<td>281,00</td>
<td>286,00</td>
</tr>
<tr>
<td></td>
<td>EU 15</td>
<td>1376000</td>
<td>259,00</td>
<td>264,00</td>
</tr>
<tr>
<td>IWW</td>
<td>EU 25</td>
<td>129000</td>
<td>5,00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EU 15</td>
<td>125000</td>
<td>5,00</td>
<td></td>
</tr>
<tr>
<td><strong>Shift : 5%</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>EU 25</td>
<td>1476300</td>
<td>266,95</td>
<td>274,96</td>
</tr>
<tr>
<td></td>
<td>EU 15</td>
<td>1307200</td>
<td>246,05</td>
<td>253,80</td>
</tr>
<tr>
<td>IWW</td>
<td>EU 25</td>
<td>206700</td>
<td>8,01</td>
<td>11,04</td>
</tr>
<tr>
<td></td>
<td>EU 15</td>
<td>193800</td>
<td>7,75</td>
<td>10,20</td>
</tr>
</tbody>
</table>

### Table 28: Fuel consumption "without" vs "with" RIS scenario 2

#### 6.2.3.1.3 Scenario 3: Shift 10%

COMPRIS/Assessment report/ WP 12/ULG-ANAST /30-03-2006/version 1.0/P Page 127 of 205
Table 29: Fuel consumption "without" vs "with" RIS scenario 3

These tables show that the global fuel consumption without RIS is higher than the global fuel consumption with RIS for the three scenarios.

Saving fuel is an interesting result as for the moment fuel costs too much and the forecasts for the coming years are not encouraging.

Figure 37: Impact of RIS on fuel consumption in the European Union
6.3 RIS and external costs of transport

This chapter aims at calculating the external costs of transport and assess the impact of RIS on them. If we know the external costs of transport by type of externality and by tkm transported, then the external costs for a given production expressed in tkm can be calculated. The calculation can be done for each country but in the continuation of this report we choose to calculate the costs for the European Union considered as one country.

The INE\(^7\) gives these figures for the external costs of road and IWW transports by tkm and by externality. The costs are expressed in €/1000 tkm.

<table>
<thead>
<tr>
<th>External impact</th>
<th>Cost (€/1000 tkm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Road</td>
</tr>
<tr>
<td>Accident</td>
<td>5.1</td>
</tr>
<tr>
<td>Noise</td>
<td>2.4</td>
</tr>
<tr>
<td>Pollutants</td>
<td>7.5</td>
</tr>
<tr>
<td>Climate change</td>
<td>0.3</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3</td>
</tr>
<tr>
<td>Congestion</td>
<td>5.8</td>
</tr>
</tbody>
</table>

Table 30: Marginal external costs of transport by mode in €/1000 tkm

These values are derived from the picture hereafter.

![Figure 38: Marginal external costs of transport by mode in €/1000 tkm](image)

Source: Inland navigation in Europe

6.3.1 Impacts of RIS on external costs of transport by scenario

Using data provided by the INE on the costs of transport, the effects of RIS on the environment in Europe are calculated.

---

\(^7\) Inland Navigation Europe
### 6.3.1.1 External costs of transport: Scenario 1

<table>
<thead>
<tr>
<th>Shift</th>
<th>Cost (€/1000 tkm)</th>
<th>Road Costs (€)</th>
<th>IWW Costs (€)</th>
<th>Increase of IWW costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Road</td>
<td>IWW Without RIS</td>
<td>With RIS</td>
<td>Benefit</td>
</tr>
<tr>
<td>Production (x1000 tkm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accident costs</td>
<td>5.1</td>
<td>7.91E+09</td>
<td>7.83E+09</td>
<td>7.91E+07</td>
</tr>
<tr>
<td>Noise costs</td>
<td>2.4</td>
<td>3.72E+09</td>
<td>3.68E+09</td>
<td>3.72E+07</td>
</tr>
<tr>
<td>Pollution costs</td>
<td>7.5</td>
<td>1.16E+10</td>
<td>1.15E+10</td>
<td>1.16E+08</td>
</tr>
<tr>
<td>Climate change</td>
<td>0.3</td>
<td>4.65E+08</td>
<td>4.60E+08</td>
<td>4.65E+06</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3</td>
<td>4.65E+09</td>
<td>4.60E+09</td>
<td>4.65E+07</td>
</tr>
<tr>
<td>Congestion</td>
<td>5.8</td>
<td>8.99E+09</td>
<td>8.90E+09</td>
<td>8.99E+07</td>
</tr>
<tr>
<td><strong>Global effect (€)</strong></td>
<td></td>
<td><strong>37.4E+09</strong></td>
<td><strong>37E+09</strong></td>
<td><strong>0.374E+09</strong></td>
</tr>
</tbody>
</table>

*Table 31: External costs of transport: Scenario 1*
Impacts of RIS on external costs of transports scenario 1

Figure 39: Pollution costs for road and IWW transport scenario 1

Figure 40: Infrastructure costs for road & IWW transport scenario 1

Figure 41: Accident and noise costs for road transport
Figure 42: Climate change and congestion costs for road transport scenario 1

Figure 43: Comparison of external costs road vs IWW scenario 1
6.3.1.2  *External costs of transport: Scenario 2*

<table>
<thead>
<tr>
<th>Shift</th>
<th>Cost (€/1000 tkm)</th>
<th>Road Costs (€)</th>
<th>IWW Costs (€)</th>
<th>Increase of IWW costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Without RIS</td>
<td>With RIS</td>
<td>Benefit</td>
</tr>
<tr>
<td>Production (x1000 tkm)</td>
<td></td>
<td>1.55E+09</td>
<td>1.47E+09</td>
<td>7.75E+07</td>
</tr>
<tr>
<td>Accident costs</td>
<td>5.1</td>
<td>7.91E+09</td>
<td>7.51E+09</td>
<td>3.95E+08</td>
</tr>
<tr>
<td>Noise costs</td>
<td>2.4</td>
<td>3.72E+09</td>
<td>3.53E+09</td>
<td>1.86E+08</td>
</tr>
<tr>
<td>Pollution costs</td>
<td>7.5</td>
<td>1.16E+10</td>
<td>1.10E+10</td>
<td>5.81E+08</td>
</tr>
<tr>
<td>Climate change</td>
<td>0.3</td>
<td>4.65E+08</td>
<td>4.42E+08</td>
<td>2.33E+07</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3</td>
<td>4.65E+09</td>
<td>4.42E+09</td>
<td>2.33E+08</td>
</tr>
<tr>
<td>Congestion</td>
<td>5.8</td>
<td>8.99E+09</td>
<td>8.54E+09</td>
<td>4.50E+08</td>
</tr>
<tr>
<td>Global effect</td>
<td></td>
<td>37.4E+09</td>
<td>35.5E+09</td>
<td>1.87E+09</td>
</tr>
</tbody>
</table>

*Table 32: External costs of transport: Scenario 2*
External costs of transport

**Pollution costs (Rd)**

- Without RIS: 1,18E+10
- With RIS: 1,15E+10

**Pollution costs (IWW)**

- Without RIS: 6,00E+08
- With RIS: 4,00E+08

Figure 44: Pollution costs for road & IWW transport. Scenario 2

**Infrastructure costs (Rd)**

- Without RIS: 4,70E+09
- With RIS: 4,40E+09

**Infrastructure costs (IWW)**

- Without RIS: 2,50E+08
- With RIS: 2,00E+08

Figure 45: Infrastructure costs for road & IWW transports scenario 2

**Accident costs (€)**

- Without RIS: 8,00E+09
- With RIS: 7,80E+09

**Noise costs**

- Without RIS: 3,60E+09
- With RIS: 3,40E+09

Figure 46: Accident & noise costs for road transport. Scenario 2
Figure 47: Climate change & congestion costs for road transport scenario 2

Figure 48: Comparison of external costs road vs IWW scenario 2
## 6.3.1.3 External costs of transport: Scenario 3

<table>
<thead>
<tr>
<th>Shift</th>
<th>Cost (€/1000 tkm)</th>
<th>Road Costs (€)</th>
<th>IWW Costs (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Road Without RIS</td>
<td>Road With RIS</td>
<td>IWW Without RIS</td>
</tr>
<tr>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production (x1000 tkm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accident costs</td>
<td>5.1</td>
<td>0</td>
<td>7.91E+09</td>
</tr>
<tr>
<td>Noise costs</td>
<td>2.4</td>
<td>0</td>
<td>3.72E+09</td>
</tr>
<tr>
<td>Pollution costs</td>
<td>7.5</td>
<td>3</td>
<td>1.16E+10</td>
</tr>
<tr>
<td>Climate change</td>
<td>0.3</td>
<td>0</td>
<td>4.65E+08</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3</td>
<td>1</td>
<td>4.65E+09</td>
</tr>
<tr>
<td>Congestion</td>
<td>5.8</td>
<td>0</td>
<td>8.99E+09</td>
</tr>
<tr>
<td>Global effect</td>
<td></td>
<td></td>
<td>3.74E+10</td>
</tr>
</tbody>
</table>

*Table 33: External costs of transport: Scenario 3*
External costs of transport

Figure 49: Pollution costs for road & IWW transports. Scenario 3

Figure 50: Infrastructure costs for road & IWW transports. Scenario 3

Figure 51: Accident & noise costs for road transport. Scenario 3
6.3.2 Global impacts of RIS on external costs of transport

The implementation of RIS will result in a reduction of external costs for road, which is a positive impact, and in the increase of IWW external costs, which is a negative impact. The global impact is the sum of these two effects. The figure below shows that the global impacts of RIS on the external costs are positive (reduction of global costs).
It is important to highlight here that, as shown on the pictures on different costs for road and inland navigation, the IWW doesn’t support accident, noise, climate change and noise costs. This explains why the reduction of road costs is very important when cargo is shifted to inland navigation.

![Bar chart showing billions of euros for different shifts of cargo from road to inland navigation.]

*Figure 54: Global impacts of RIS on external costs of transport*
6.4  RIS and the pollution

6.4.1  Introduction

This paragraph is devoted to the calculation of savings in emission exhausts assuming that RIS is fully implemented and a transfer of 1% from road to inland navigation. These calculations are based on emissions factors for the trucks and vessels provided by the Creating study (Creating, WP 6.1.).

6.4.2  Truck and vessels emissions

To get an idea of how inland navigation vessels perform compared to trucks, an estimation of emissions per ton kilometre was made based on average values. The emission calculation for trucks is based on emission factors for truck-trailer/tractor-trailers with a weight of 34-40 t. Those emission factors have been taken out of the handbook emission factors from 2005. In this handbook the emission factors are printed in g/km for a truck with an average load, which is figured as 72% of the full capacity that is assumed in this calculation as 25 t. The calculation leads to emissions in g/km for EURO I, EURO II, EURO III, EURO IV and EURO V trucks shown in the table hereafter.

<table>
<thead>
<tr>
<th>Norme</th>
<th>EURO I</th>
<th>EURO II</th>
<th>EURO III</th>
<th>EURO IV</th>
<th>EURO V</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC</td>
<td>0.05</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>CO</td>
<td>0.14</td>
<td>0.1</td>
<td>0.12</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Nox</td>
<td>0.61</td>
<td>0.67</td>
<td>0.5</td>
<td>0.37</td>
<td>0.2</td>
</tr>
<tr>
<td>PM</td>
<td>0.028</td>
<td>0.011</td>
<td>0.013</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>17.95</td>
<td>17.1</td>
<td>17.77</td>
<td>17.79</td>
<td>18.35</td>
</tr>
<tr>
<td>CO2</td>
<td>56.56</td>
<td>53.85</td>
<td>55.98</td>
<td>56.04</td>
<td>57.81</td>
</tr>
</tbody>
</table>

*Table 34: Truck emission (g/km)*

*Source: Creating WP6.1.*

The vessel emissions are based on average emission values (in g/kWh) of new engines that have been estimated in a study by German Lloyd for HC and CO. The values for PM and NOx have been taken from the emission limits set by the EU because they are equal to those average values (PM) or lower. For this reason the calculations are only valid for vessels that are equipped with new engines. The energy consumption (kWh/km) is calculated out of the average fuel consumption (g/km) of a typical Rhine vessel and the average fuel consumption of vessel engines (g/kWh). A combination of emissions in g/kWh and the energy consumption in kWh/km leads to the emissions per tkm that are shown in the table 9.
<table>
<thead>
<tr>
<th></th>
<th>Emissions of inland vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g/kwh</td>
</tr>
<tr>
<td>Assumed fuel consumption</td>
<td>215</td>
</tr>
<tr>
<td>HC</td>
<td>0,24</td>
</tr>
<tr>
<td>CO</td>
<td>0,1</td>
</tr>
<tr>
<td>Nox</td>
<td>7</td>
</tr>
<tr>
<td>PM</td>
<td>0,2</td>
</tr>
<tr>
<td>CO2</td>
<td>688</td>
</tr>
</tbody>
</table>

Table 35: Emission of vessels (g/kwh – g/ton-km)

Source Creating WP 6.1

Although those values are not too accurate and can be assumed to have a range of approx. 30% a trend can be seen in those figures. Trucks cannot compete in any emission class with the vessels up to EURO III. With the by stricter EURO IV limits, the particle mass emitted by trucks is reduced to approx. the half of vessel emissions. Even when inaccuracies are considered, this means that EURO IV trucks performs better regarding particle emissions than new vessels. Older vessels will definitely perform worse in this competition.

With the launch of EURO V limits in 2008, trucks will also perform at least a bit better than inland vessels regarding NOx emissions.

6.4.3  Environmental impacts of RIS

6.4.3.1  Hypotheses of calculation:

Logistic performances\(^8\) without RIS in million of ton-km for the EU 15:

- Road: 1376000;
- IWW: 125000.

Production with RIS:

The results of the calculations show benefit effects for the environment for the three scenariios: reduction of all the emission gases in the atmosphere. The results show an increase of emissions of the particle matters but this increase is of less importance compared to the benefit made besides.

\(^8\) Source: European pocketbook on transport, 2004
6.4.3.2  *Environmental impacts of RIS Scenario 1*

<table>
<thead>
<tr>
<th>Shift: 1%</th>
<th>Road</th>
<th>IWW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without RIS</td>
<td>With RIS</td>
</tr>
<tr>
<td>Production (mio. tonnes)</td>
<td>1376000</td>
<td>1362240</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Road emissions</th>
<th>IWW emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission factor (g/km)</td>
<td>Without RIS</td>
</tr>
<tr>
<td>Emission of HC</td>
<td>0,03</td>
</tr>
<tr>
<td>CO</td>
<td>0,08</td>
</tr>
<tr>
<td>Nox</td>
<td>0,37</td>
</tr>
<tr>
<td>CO2</td>
<td>56,04</td>
</tr>
<tr>
<td>PM</td>
<td>0,003</td>
</tr>
</tbody>
</table>

*Table 36: Emission of pollutants scenario 1*
COMPRIS – Socio-economic assessment of RIS

Figure 55: Road & IWW and impact of RIS on HC emissions. Scenario 1

Figure 56: Road & IWW and impact of RIS on CO emissions. Scenario 1
COMPRIS – Socio-economic assessment of RIS

**Figure 57: Road & IWW and impact of RIS on NOx emissions. Scenario 1**

**Figure 58: Road & IWW and impact of RIS on CO2 emissions. Scenario 1**
**COMPRIS – Socio-economic assessment of RIS**

Figure 59: Road & IWW and impact of RIS on PM emissions. Scenario 1
6.4.3.3 Environmental impacts of RIS scenario 2

<table>
<thead>
<tr>
<th>Shift: 5%</th>
<th>Road</th>
<th>IWW</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without RIS</td>
<td>With RIS</td>
<td>Without RIS</td>
</tr>
<tr>
<td>Production (mio. tonnes)</td>
<td>1376000</td>
<td>1307200</td>
<td>125000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emission of</th>
<th>Emission factor (g/km)</th>
<th>Without RIS</th>
<th>With RIS</th>
<th>Reduction of road emission</th>
<th>Emission factor (g/km)</th>
<th>Without RIS</th>
<th>With RIS</th>
<th>Increase of IWW emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC</td>
<td>0,03</td>
<td>41280</td>
<td>39216</td>
<td>2064</td>
<td>0,009</td>
<td>1125</td>
<td>1744,2</td>
<td>619,2</td>
</tr>
<tr>
<td>CO</td>
<td>0,08</td>
<td>110080</td>
<td>104576</td>
<td>5504</td>
<td>0,004</td>
<td>500</td>
<td>775,2</td>
<td>275,2</td>
</tr>
<tr>
<td>Nox</td>
<td>0,37</td>
<td>509120</td>
<td>483664</td>
<td>25456</td>
<td>0,26</td>
<td>32500</td>
<td>50388</td>
<td>17888</td>
</tr>
<tr>
<td>CO2</td>
<td>56,04</td>
<td>77111040</td>
<td>73255488</td>
<td>4E+06</td>
<td>25,6</td>
<td>3E+06</td>
<td>4961280</td>
<td>1761280</td>
</tr>
<tr>
<td>PM</td>
<td>0,003</td>
<td>4128</td>
<td>3921,6</td>
<td>206,4</td>
<td>0,007</td>
<td>875</td>
<td>1356,6</td>
<td>481,6</td>
</tr>
</tbody>
</table>

*Table 37: Emission of pollutants scenario 2*
Figure 60: Road & IWW and impact of RIS on HC emissions. Scenario 2

Figure 61: Road & IWW and impact of RIS on CO emissions. Scenario 2
COMPRIS – Socio-economic assessment of RIS

Figure 62: Road & IWW and impact of RIS on NOx emissions. Scenario 2

Figure 63: Road & IWW and impact of RIS on CO2 emissions. Scenario 2
Figure 64: Road & IWW and impact of RIS on PM emissions. Scenario 2
### 6.4.3.4 Environmental impacts of RIS scenario 3

<table>
<thead>
<tr>
<th>Shift: 10%</th>
<th>Road</th>
<th>IWW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without RIS</td>
<td>With RIS</td>
</tr>
<tr>
<td>Production (mio. tonnes)</td>
<td>1376000</td>
<td>1238400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emission of</th>
<th>Emission factor (g/tkm)</th>
<th>Without RIS</th>
<th>With RIS</th>
<th>Reduction of road emission</th>
<th>Emission factor (g/tkm)</th>
<th>Without RIS</th>
<th>With RIS</th>
<th>Increase of IWW emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC</td>
<td>0.03</td>
<td>4128</td>
<td>37152</td>
<td>4128</td>
<td>0.009</td>
<td>1125</td>
<td>2363.4</td>
<td>1238.4</td>
</tr>
<tr>
<td>CO</td>
<td>0.08</td>
<td>110080</td>
<td>99072</td>
<td>11008</td>
<td>0.004</td>
<td>500</td>
<td>1050.4</td>
<td>550.4</td>
</tr>
<tr>
<td>Nox</td>
<td>0.37</td>
<td>509120</td>
<td>458208</td>
<td>50912</td>
<td>0.26</td>
<td>32500</td>
<td>68276</td>
<td>35776</td>
</tr>
<tr>
<td>CO2</td>
<td>56.04</td>
<td>77111040</td>
<td>69399936</td>
<td>8E+06</td>
<td>25.6</td>
<td>3E+06</td>
<td>6722560</td>
<td>3522560</td>
</tr>
<tr>
<td>PM</td>
<td>0.003</td>
<td>4128</td>
<td>3715.2</td>
<td>412.8</td>
<td>0.007</td>
<td>875</td>
<td>1838.2</td>
<td>963.2</td>
</tr>
</tbody>
</table>

*Table 38: Emission of pollutants scenario 3*
Figure 65: Road & IWW and impact of RIS on HC emissions. Scenario 3

Figure 66: Road & IWW and impact of RIS on CO emissions. Scenario 3
Figure 67: Road & IWW and impact of RIS on NOx emissions. Scenario 3

Figure 68: Road & IWW and impact of RIS on CO2 emissions. Scenario 3
Figure 69: Road & IWW and impact of RIS on PM emissions. Scenario 3
6.4.4 Benefit of RIS on emissions of air pollutants

Benefits of shifting cargo on the emission exhausts are summarised in the following tables and figures.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Shift 1%</th>
<th>Shift 5%</th>
<th>Shift10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC</td>
<td>288.96</td>
<td>1444.8</td>
<td>2889.6</td>
</tr>
<tr>
<td>CO</td>
<td>1045.76</td>
<td>5228.8</td>
<td>10457.6</td>
</tr>
<tr>
<td>NOx</td>
<td>1513.6</td>
<td>7568</td>
<td>15136</td>
</tr>
<tr>
<td>PM</td>
<td>-55.04</td>
<td>-275.2</td>
<td>-550.4</td>
</tr>
<tr>
<td>CO2</td>
<td>418854.4</td>
<td>2094272</td>
<td>4188544</td>
</tr>
</tbody>
</table>

*Table 39: Benefit of RIS on emissions of air pollutants*

*Figure 70: Benefit of RIS on emissions of air pollutants*
Figure 71: Benefit of RIS on emissions of HC, CO and NOx

Figure 72: Impact of RIS on emissions of PM
6.5 Impacts of RIS on the employment

This chapter aims at assessing the impact of RIS on the employment in Europe. For the moment, (situation without RIS), the number of employment for the road freight transport for the EU 25 is equal to 2182096 persons.

Shifting a given goods from road to the IWW will result in a lost of employment for the road transport sector: Less heavy good trucks on the roads, less drivers, etc. So, for the three scenarios we have these figures:
- Scenario 1: lost of 21821 employments;
- Scenario 2: lost of 109108 employments;
- Scenario 3: lost of 218210 employments.

The worse scenario is the third because of the important lost in employment.

On the contrary, the transfer to tkm to the IWW will result in the creation of employment. For the EU 25, the production of the IWW transport is of 129000 millions of tkm and the number of employment is 30045. With these two values we calculate the ratio R giving the number of employment by tkm for the inland navigation. R = 0.23 E-09

So, for the three scenarios we have these figures:
- Scenario 1: Shift=1554\textsuperscript{E}+08 Creation of employments: 36;
- Scenario 2: Shift=7770\textsuperscript{E}+08 Creation of employments: 180;
- Scenario 3: Shift=1554\textsuperscript{E}+09 Creation of employments: 360.

![Impacts of RIS on the employment](image)

*Figure 73: Impacts of RIS on employments*

The picture shows that the implementation of RIS will result in a lost of employments in the EU 25. This is normal since the shift of goods to inland navigation will reduce the number of trucks, reducing in the same time the number of drivers and entreprises of road transport.
On the contrary, the increase of inland production resulting from that shift can be absorbed either by the existing transport capacity or by the addition of few vessels in the inland navigation in Europe.

The negative impacts of RIS on the employement can be attenuated by the fact that it is possible that Europe needs more new vessels. This need will result in the relaunch of the European shipbuilding industry, which can be seen as a positive impact on employment.

### 6.6 Summary of impacts and conclusion

#### 6.6.1 Summary of impacts of RIS

The table hereafter summarises the impact of RIS for the three scenarios studied and for the EU 15.

Firstly, two negative impacts are highlighted but globally, we can say that RIS should be implemented. Besides, the impact of RIS on the reduction of CO$_2$ is one of the most important arguments in favour of RIS.

The best scenario to achieve is the third. Indeed, if governments have to invest in RIS, they have to target the best results in terms of emissions of pollutants. All measures must be taken on the European level in order to realise the scenario 3 or to achieve more than 10% of shift between road and inland navigation.

If the negative impact on the PM is negligible compared to the positive impacts of other parameters, the lost of employments should be monitored and measures of accompaniment should be taken in order to soften this negative impact.

<table>
<thead>
<tr>
<th>EU 15</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel consumption (MTOE)</td>
<td>12.3</td>
<td>11.04</td>
<td>22.08</td>
<td>Positive</td>
</tr>
<tr>
<td>Costs (global effects) billions of euros</td>
<td>0.312</td>
<td>1.56</td>
<td>3.12</td>
<td>Positive</td>
</tr>
<tr>
<td>HC (Tonnes)</td>
<td>289</td>
<td>1445</td>
<td>2890</td>
<td>Positive</td>
</tr>
<tr>
<td>CO (Tonnes)</td>
<td>1046</td>
<td>5229</td>
<td>10457</td>
<td>Positive</td>
</tr>
<tr>
<td>NOx (Tonnes)</td>
<td>1514</td>
<td>7568</td>
<td>15136</td>
<td>Positive</td>
</tr>
<tr>
<td>CO2 (Tonnes)</td>
<td>418854</td>
<td>2094272</td>
<td>4188544</td>
<td>Positive</td>
</tr>
<tr>
<td>PM (Tonnes)</td>
<td>-55</td>
<td>-275</td>
<td>-550</td>
<td>Negative</td>
</tr>
<tr>
<td>Employment</td>
<td>-21785</td>
<td>-108928</td>
<td>-217850</td>
<td>Negative</td>
</tr>
</tbody>
</table>

*Table 40: Summary of impacts of RIS*

#### 6.6.2 Conclusion

All the calculations presented in this report show that the implementation of RIS results in positive impacts for the community as a whole.

The reduction of fuel consumption in the transport of goods in Europe is the first useful benefit we can highlight. Indeed, with the increase of fuel costs, it is necessary to find ways to make some savings on this post. This impact of RIS is of utmost importance since the forecast for the coming years for the fuel production in the world is not very good. Experts say that the oil reserves are declining. So, the oil must be wisely used. RIS contribute to this wise use of oil.
The reduction of external costs of transport is the second useful effect of the implementation of RIS.

The other important benefit of RIS is the reduction of emissions of pollutants in the air. The impact of RIS on CO₂ emissions is very high. Indeed, according to the European Union experts, carbon dioxide emissions from the transport sector will be doubled by 2030 contributing to dangerously high concentrations of atmospheric CO₂ (OECD Environment Directorate 2000).

Besides, specific emissions of nitrogen oxides, carbon monoxide, and fine particulate will decrease substantially from their 2004 levels. The only one negative impact to highlight is the increase of particle matters but this increase is so small that it can be neglected.
PART 7

REFERENCES, BIBLIOGRAPHY AND ANNEXES
7 REFERENCES, BIBLIOGRAPHY AND ANNEXES


L. Orban, office pour la promotion des voies navigables. Enquête auprès des chargeurs, synthèse statistique, mai 2003

L. Orban, office pour la promotion des voies navigables. Etude du potentiel de transport fluvial de conteneurs le long de la dorsale wallonne, novembre 2005

Romeo Danielis & Lucia Rotaris: Shippers’ preferences for freight transport services : a conjoint analysis experiment for an Italian region, in Transporti Europei of December the 22, 2002.


Shifting cargo to Inland Waterways First interim report. December 1996.


Web sites:

http://www.liege.port-autonome.be

http://voies-hydrauliques.wallonie.be

http://www.opvn.be
ANNEXES

Individual Results - Hungary
COMPRIS Demonstration: Budapest, Hungary

7th June 2005

RESULTS

Acceptance Assessment Questionnaire

Elements
(Tracking and Tracing integral)

Navigation
Cross-Border
Calamity Abatement
E-Learning
## CATEGORY: Navigation

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
<td>Equal</td>
</tr>
<tr>
<td>I1 Navigation (for short-term voyage planning and monitoring on board)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1a Position of traffic in time and space with respect to own vessel</td>
<td></td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIP</td>
<td>71%</td>
<td>14%</td>
<td>0%</td>
</tr>
<tr>
<td>I1b Identification of other vessels (name, sign, etc…)</td>
<td></td>
<td>Visual/ VHF</td>
<td>AIS/ AIP</td>
<td>71%</td>
<td>29%</td>
<td>0%</td>
</tr>
<tr>
<td>I1c Type of vessels and cargo type</td>
<td></td>
<td>Visual/ VHF</td>
<td>AIS/ AIP</td>
<td>29%</td>
<td>57%</td>
<td>0%</td>
</tr>
<tr>
<td>I1d History plot of other to indicate intentions</td>
<td></td>
<td>Visual/ VHF</td>
<td>AIS/ AIP</td>
<td>20%</td>
<td>60%</td>
<td>20%</td>
</tr>
<tr>
<td>I1e Other vessels’ dimensions</td>
<td></td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIP</td>
<td>43%</td>
<td>29%</td>
<td>29%</td>
</tr>
<tr>
<td>I1f Other vessels’ draught</td>
<td></td>
<td>Visual</td>
<td>AIS/ AIP</td>
<td>43%</td>
<td>29%</td>
<td>14%</td>
</tr>
<tr>
<td>I1g Vessels in the lock being approached</td>
<td></td>
<td>Visual/ VHF</td>
<td>AIS/ AIP</td>
<td>17%</td>
<td>67%</td>
<td>17%</td>
</tr>
<tr>
<td>I1h Vessels waiting on both sides of the lock</td>
<td></td>
<td>Visual/ VHF</td>
<td>AIS/ AIP</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
</tr>
<tr>
<td>J1 Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1a State of rivers, canals, locks and bridges</td>
<td></td>
<td>Written and aural reports</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>J1b Lock and bridge opening times</td>
<td></td>
<td>Written info</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>40%</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>J1c Digital update information for ENC</td>
<td></td>
<td>n/a</td>
<td>RIS</td>
<td>50%</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>J1d Present and future water levels</td>
<td></td>
<td>Written info/ online info/ teletext</td>
<td>Notices to Skipper Receive Application</td>
<td>25%</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>J1e Obstacles in fairway, such as dredging activities</td>
<td></td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
</tr>
<tr>
<td>J1f Malfunctions of aids to navigation</td>
<td></td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>30%</td>
<td>70%</td>
<td>0%</td>
</tr>
<tr>
<td>J1g Any other restriction or obstacle to navigation</td>
<td></td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>57%</td>
<td>43%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
## CATEGORY: Cross Border

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross Border</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1a</td>
<td></td>
<td>Dangerous cargo reporting service</td>
<td>63%</td>
<td>38%</td>
<td>0%</td>
<td>0%</td>
<td>42%</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>N1ai</td>
<td></td>
<td>Notification to competent authority</td>
<td>50%</td>
<td>38%</td>
<td>13%</td>
<td>0%</td>
<td>40%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>N1aii</td>
<td></td>
<td>Notification to other authorities, e.g. in case of emergency</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
<td>0%</td>
<td>43%</td>
<td>14%</td>
<td>43%</td>
</tr>
<tr>
<td>N1b</td>
<td></td>
<td>Voyage reporting service</td>
<td>17%</td>
<td>83%</td>
<td>0%</td>
<td>0%</td>
<td>80%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>N1bii</td>
<td></td>
<td>Providing pre-arrival voyage information</td>
<td>25%</td>
<td>63%</td>
<td>13%</td>
<td>0%</td>
<td>50%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>N1c</td>
<td></td>
<td>Immigration inspection service</td>
<td>17%</td>
<td>83%</td>
<td>0%</td>
<td>0%</td>
<td>57%</td>
<td>14%</td>
<td>29%</td>
</tr>
<tr>
<td>N1cii</td>
<td></td>
<td>Supervision of persons and compliance with immigration</td>
<td>25%</td>
<td>63%</td>
<td>13%</td>
<td>0%</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
</tr>
<tr>
<td>N1d</td>
<td></td>
<td>Customs service</td>
<td>29%</td>
<td>71%</td>
<td>0%</td>
<td>0%</td>
<td>57%</td>
<td>14%</td>
<td>29%</td>
</tr>
<tr>
<td>N1di</td>
<td></td>
<td>Control of persons crossing borders</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
<td>0%</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
</tr>
<tr>
<td>N1dii</td>
<td></td>
<td>Clearance of imported/exported goods</td>
<td>38%</td>
<td>38%</td>
<td>25%</td>
<td>0%</td>
<td>29%</td>
<td>57%</td>
<td>14%</td>
</tr>
<tr>
<td>N1e</td>
<td></td>
<td>Statistics service</td>
<td>13%</td>
<td>75%</td>
<td>13%</td>
<td>0%</td>
<td>29%</td>
<td>57%</td>
<td>14%</td>
</tr>
<tr>
<td>N1eii</td>
<td></td>
<td>Supervision of goods and compliance with customs regulations</td>
<td>38%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
</tr>
<tr>
<td>N1eiii</td>
<td></td>
<td>Cargo/trade statistics</td>
<td>38%</td>
<td>63%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
</tr>
<tr>
<td>N1eiv</td>
<td></td>
<td>Information on vessel traffic and intensity of flow</td>
<td>38%</td>
<td>63%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
</tr>
</tbody>
</table>
COMPRIS – Socio-economic assessment of RIS

**CATEGORY: Calamity Abatement**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J3a</td>
<td>J3a</td>
<td>General alert of incident</td>
<td>VHF/ telephone</td>
<td>VHF/ telephone AIS/ AIP</td>
<td>50%</td>
<td>25%</td>
<td>25%</td>
<td>0%</td>
<td>29%</td>
<td>29%</td>
<td>43%</td>
</tr>
<tr>
<td>J3b</td>
<td>J3b</td>
<td>Hazard limit boundary</td>
<td>VHF/ telephone</td>
<td>VHF/ telephone AIS/ AIP/ RIS/ ECDIS updates</td>
<td>0%</td>
<td>88%</td>
<td>13%</td>
<td>0%</td>
<td>29%</td>
<td>57%</td>
<td>14%</td>
</tr>
<tr>
<td>J3c</td>
<td>J3c</td>
<td>Vessel(s) characteristics</td>
<td>VHF</td>
<td>VHF/ AIS/ AIP</td>
<td>25%</td>
<td>63%</td>
<td>13%</td>
<td>0%</td>
<td>31%</td>
<td>46%</td>
<td>23%</td>
</tr>
<tr>
<td>J3d</td>
<td>J3d</td>
<td>Target and status of target (Skip)</td>
<td>VHF</td>
<td>VHF/ AIS/ AIP</td>
<td>0%</td>
<td>86%</td>
<td>14%</td>
<td>0%</td>
<td>40%</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>J3e</td>
<td>J3e</td>
<td>Instructions where assistance is influenced by the presence of dangerous goods (Skip)</td>
<td>VHF</td>
<td>VHF/ AIS/ AIP</td>
<td>17%</td>
<td>50%</td>
<td>33%</td>
<td>0%</td>
<td>14%</td>
<td>43%</td>
<td>43%</td>
</tr>
<tr>
<td>J3f</td>
<td>J3f</td>
<td>Personnel and passengers on board (Skip)</td>
<td>VHF</td>
<td>AIS/ AIP</td>
<td>25%</td>
<td>25%</td>
<td>38%</td>
<td>13%</td>
<td>29%</td>
<td>43%</td>
<td>29%</td>
</tr>
<tr>
<td>J3g</td>
<td>J3g</td>
<td>Operational traffic image (RIS op)</td>
<td>Radar</td>
<td>Radar/ AIS/ AIP</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>44%</td>
<td>22%</td>
</tr>
<tr>
<td>J3h</td>
<td>J3h</td>
<td>Location of patrol vessel (RIS op)</td>
<td>VHF/ mobile</td>
<td>AIS/ AIP</td>
<td>50%</td>
<td>38%</td>
<td>13%</td>
<td>0%</td>
<td>20%</td>
<td>60%</td>
<td>20%</td>
</tr>
<tr>
<td>J3i</td>
<td>J3i</td>
<td>Location of fire boat and crew (RIS op)</td>
<td>AIS/ AIP</td>
<td>AIS/ AIP</td>
<td>0%</td>
<td>63%</td>
<td>25%</td>
<td>13%</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
</tr>
<tr>
<td>J3j</td>
<td>J3j</td>
<td>Knowledge of dangerous goods on board (RIS op)</td>
<td>VHF</td>
<td>AIS/ AIP</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
<td>0%</td>
<td>33%</td>
<td>44%</td>
<td>22%</td>
</tr>
<tr>
<td>J3k</td>
<td>J3k</td>
<td>Knowledge of number of crew and passengers on board (RIS op)</td>
<td>VHF</td>
<td>AIS/ AIP</td>
<td>0%</td>
<td>63%</td>
<td>25%</td>
<td>13%</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
</tr>
<tr>
<td>J3m</td>
<td>J3m</td>
<td>Operational traffic image (On-scene com.)</td>
<td>Radar</td>
<td>Radar/ AIS/ AIP</td>
<td>63%</td>
<td>38%</td>
<td>0%</td>
<td>0%</td>
<td>27%</td>
<td>45%</td>
<td>27%</td>
</tr>
<tr>
<td>J3o</td>
<td>J3o</td>
<td>Dedicated id labels for calamity abatement vessels (On-scene com.)</td>
<td>No</td>
<td>AIS/ AIP</td>
<td>25%</td>
<td>75%</td>
<td>0%</td>
<td>0%</td>
<td>40%</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>J3p</td>
<td>J3p</td>
<td>Support of maritime expert (On-scene com.)</td>
<td>Yes</td>
<td>yes</td>
<td>0%</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>60%</td>
<td>40%</td>
<td>0%</td>
</tr>
</tbody>
</table>
### CATEGORY: E-Learning

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>01</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O1</td>
<td><strong>01a</strong></td>
<td>Thematic multilanguage scenarios related to important subjects from the skippers world</td>
<td><strong>60%</strong></td>
<td><strong>20%</strong></td>
<td><strong>20%</strong></td>
<td><strong>0%</strong></td>
<td><strong>82%</strong></td>
<td><strong>18%</strong></td>
<td><strong>0%</strong></td>
</tr>
<tr>
<td></td>
<td><strong>01b</strong></td>
<td>Multilanguage lexicon with nautical terms including audio (example of pronunciation)</td>
<td><strong>60%</strong></td>
<td><strong>30%</strong></td>
<td><strong>10%</strong></td>
<td><strong>0%</strong></td>
<td><strong>82%</strong></td>
<td><strong>18%</strong></td>
<td><strong>0%</strong></td>
</tr>
<tr>
<td></td>
<td><strong>01c</strong></td>
<td>Video explanatory resources</td>
<td><strong>30%</strong></td>
<td><strong>40%</strong></td>
<td><strong>30%</strong></td>
<td><strong>0%</strong></td>
<td><strong>73%</strong></td>
<td><strong>27%</strong></td>
<td><strong>0%</strong></td>
</tr>
<tr>
<td></td>
<td><strong>01d</strong></td>
<td>Photographic explanatory resources</td>
<td><strong>30%</strong></td>
<td><strong>50%</strong></td>
<td><strong>20%</strong></td>
<td><strong>0%</strong></td>
<td><strong>69%</strong></td>
<td><strong>23%</strong></td>
<td><strong>8%</strong></td>
</tr>
</tbody>
</table>
Individual Results – Belgium / France
COMPRIS Demonstration: Gent, Belgium

Thursday, 23rd June 2005

RESULTS

Acceptance Assessment Questionnaire

Elements

(Tracking and Tracing integral)
Logistical Data Platform
Cross-Border
Lock Management & Planning
**CATEGORY: Cross Border**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1 Cross Border</td>
<td>N1a</td>
<td>Dangerous cargo reporting service</td>
<td>43%</td>
<td>14%</td>
<td>43%</td>
<td>0%</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>N1ai</td>
<td>Notification to competent authority</td>
<td>43%</td>
<td>29%</td>
<td>29%</td>
<td>0%</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>N1a ii</td>
<td>Notification to other authorities, e.g. in case of emergency</td>
<td>43%</td>
<td>29%</td>
<td>29%</td>
<td>0%</td>
<td>10%</td>
<td>60%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>N1b</td>
<td>Voyage reporting service</td>
<td>20%</td>
<td>80%</td>
<td>0%</td>
<td>0%</td>
<td>50%</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>N1bi</td>
<td>Providing pre-arrival voyage information</td>
<td>38%</td>
<td>38%</td>
<td>25%</td>
<td>0%</td>
<td>45%</td>
<td>36%</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>N1bii</td>
<td>Providing actual voyage information</td>
<td>25%</td>
<td>38%</td>
<td>38%</td>
<td>0%</td>
<td>44%</td>
<td>33%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>N1c</td>
<td>Immigration inspection service</td>
<td>0%</td>
<td>60%</td>
<td>40%</td>
<td>0%</td>
<td>29%</td>
<td>57%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>N1ci</td>
<td>Control of persons crossing borders</td>
<td>29%</td>
<td>43%</td>
<td>29%</td>
<td>0%</td>
<td>38%</td>
<td>63%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>N1c ii</td>
<td>Supervision of persons and compliance with immigration</td>
<td>17%</td>
<td>50%</td>
<td>33%</td>
<td>0%</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>N1d</td>
<td>Customs service</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>N1di</td>
<td>Clearance of imported/exported goods</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
<td>0%</td>
<td>42%</td>
<td>42%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>N1d ii</td>
<td>Supervision of goods and compliance with customs regulations</td>
<td>38%</td>
<td>38%</td>
<td>25%</td>
<td>0%</td>
<td>44%</td>
<td>44%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>N1e</td>
<td>Statistics service</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>N1e i</td>
<td>Cargo/trade statistics</td>
<td>29%</td>
<td>57%</td>
<td>14%</td>
<td>0%</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>N1e ii</td>
<td>Information on vessel traffic and intensity of flow</td>
<td>43%</td>
<td>57%</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
<td>70%</td>
<td>10%</td>
</tr>
</tbody>
</table>
### CATEGORY: Logistical Data Platform (LDP)

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td><strong>P1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1a</td>
<td></td>
<td>BoRIS – Voyage Planning Application for barge operators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1ai</td>
<td></td>
<td>Selection of optimal vessel required to transport specific cargo</td>
<td>38%</td>
<td>50%</td>
</tr>
<tr>
<td>P1a1i</td>
<td></td>
<td>Selection of route based on type and amount of cargo</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td>P1b</td>
<td></td>
<td>Hull Database</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td>P1bi</td>
<td></td>
<td>Database to search for available/suitable vessels Free access</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td>P1bii</td>
<td></td>
<td>Bargelink – vessel database with added ability to offer cargo Paid access</td>
<td>25%</td>
<td>38%</td>
</tr>
<tr>
<td>P1c</td>
<td></td>
<td>Voyage and Cargo Information</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>P1ci</td>
<td></td>
<td>Access to vessel, route, cargo and ETA information for transport organisers</td>
<td>13%</td>
<td>88%</td>
</tr>
<tr>
<td>P1d</td>
<td></td>
<td>Tracking and Tracing Position information supporting the monitoring of transport (cargo/vessel)</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>P1d1i</td>
<td></td>
<td>Request position of vessel</td>
<td>29%</td>
<td>43%</td>
</tr>
<tr>
<td>P1d1ii</td>
<td></td>
<td>Request position of cargo</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td>P1e</td>
<td></td>
<td>COAARI EDI message – Conversion of (pre-) loading list from different formats to support RIS, Voyage Planning and Terminal Management</td>
<td>25%</td>
<td>75%</td>
</tr>
</tbody>
</table>

#### Logistical Data Platform (LDP)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would be willing to pay for this kind of information.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As a service provider I would be willing to offer LDP services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDP is a tool, which is able to change the modal shift, making inland shipping more accessible for new transports?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDP is a tool helping to solve mobility problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDP offers comparable services with the other transport modes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The services on this platform should be commercialised and not offered by the government</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CATEGORY: Lock Management & Planning

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>J4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J4a Operating times</td>
<td>J4a</td>
<td>Operating times</td>
<td>Written info</td>
<td>ECDIS / Lock Planning Software (LPS)</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>J4b Booking requirements</td>
<td>J4b</td>
<td>Booking requirements</td>
<td>Written info</td>
<td>LPS</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>J4c Vessel dimensions</td>
<td>J4c</td>
<td>Vessel dimensions</td>
<td>Various</td>
<td>RIS/ LPS</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>J4d Position details of approaching vessels</td>
<td>J4d</td>
<td>Position details of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>J4e ETA of approaching vessels</td>
<td>J4e</td>
<td>ETA of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>J4f Presence of dangerous goods</td>
<td>J4f</td>
<td>Presence of dangerous goods</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>33%</td>
<td>50%</td>
</tr>
<tr>
<td>J4g Waiting times</td>
<td>J4g</td>
<td>Waiting times</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>0%</td>
<td>67%</td>
</tr>
</tbody>
</table>
Individual Results - Ukraine
COMPRIS Demonstration: VILKOVO, UKRAINE

29th-30th June 2005

RESULTS

Acceptance Assessment Questionnaire

Elements

(Tracking and Tracing integral)

Navigation

Cross-Border

Logistical Data Platform

VTS
# CATEGORY: Navigation

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td><strong>I1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(for short-term voyage planning and monitoring on board)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1a</td>
<td>I</td>
<td>Position of traffic in time and space with respect to own vessel</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>I1b</td>
<td>I</td>
<td>Identification of other vessels (name, sign, etc...)</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>I1c</td>
<td>I</td>
<td>Type of vessels and cargo type</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>I1d</td>
<td>I</td>
<td>History plot of other to indicate intentions</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>I1e</td>
<td>I</td>
<td>Other vessels' dimensions</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>I1f</td>
<td>I</td>
<td>Other vessels' draught</td>
<td>Visual</td>
<td>AIS/ AIIP</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>I1g</td>
<td>I</td>
<td>Vessels in the lock being approached</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vessels waiting on both sides of the lock</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td><strong>J1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1a</td>
<td>J</td>
<td>State of rivers, canals, locks and bridges</td>
<td>Written and aural reports</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>J1b</td>
<td>J</td>
<td>Lock and bridge opening times</td>
<td>Written info</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>J1c</td>
<td>J</td>
<td>Digital update information for ENC</td>
<td>n/a</td>
<td>RIS</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>J1d</td>
<td>J</td>
<td>Present and future water levels</td>
<td>Written info/ online info/ teletext</td>
<td>Notices to Skipper Receive Application</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>J1e</td>
<td>J</td>
<td>Obstacles in fairway, such as dredging activities</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>J1f</td>
<td>J</td>
<td>Malfunctions of aids to navigation</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>J1g</td>
<td>J</td>
<td>Any other restriction or obstacle to navigation</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>
### CATEGORY: Cross Border

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1a</td>
<td></td>
<td>Dangerous cargo reporting service</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>N1ai</td>
<td></td>
<td>Notification to competent authority</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>25%</td>
<td>33%</td>
<td>42%</td>
</tr>
<tr>
<td>N1aui</td>
<td></td>
<td>Notification to other authorities, e.g. in case of emergency</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>25%</td>
<td>33%</td>
<td>42%</td>
</tr>
<tr>
<td>N1b</td>
<td></td>
<td>Voyage reporting service</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>36%</td>
<td>36%</td>
<td>27%</td>
</tr>
<tr>
<td>N1b1</td>
<td></td>
<td>Providing pre-arrival voyage information</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>27%</td>
<td>27%</td>
<td>45%</td>
</tr>
<tr>
<td>N1b1i</td>
<td></td>
<td>Providing actual voyage information</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>25%</td>
<td>33%</td>
<td>42%</td>
</tr>
<tr>
<td>N1c</td>
<td></td>
<td>Immigration inspection service</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>25%</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>N1ci</td>
<td></td>
<td>Control of persons crossing borders</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>30%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>N1cii</td>
<td></td>
<td>Supervision of persons and compliance with immigration</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>30%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>N1d</td>
<td></td>
<td>Customs service</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>N1d1</td>
<td></td>
<td>Clearance of imported/exported goods</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>29%</td>
<td>29%</td>
<td>43%</td>
</tr>
<tr>
<td>N1d1i</td>
<td></td>
<td>Supervision of goods and compliance with customs regulations</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
<td>29%</td>
<td>29%</td>
<td>43%</td>
</tr>
<tr>
<td>N1e</td>
<td></td>
<td>Statistics service</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>27%</td>
<td>36%</td>
<td>36%</td>
</tr>
<tr>
<td>N1ei</td>
<td></td>
<td>Cargo/Trade statistics</td>
<td>75%</td>
<td>25%</td>
<td>0%</td>
<td>0%</td>
<td>30%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>N1eii</td>
<td></td>
<td>Information on vessel traffic and intensity of flow</td>
<td>83%</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>31%</td>
<td>31%</td>
<td>38%</td>
</tr>
</tbody>
</table>
### CATEGORY: Logistical Data Platform (LDP)

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td><strong>P1</strong></td>
<td></td>
<td>BoRIS – Voyage Planning Application for barge operators</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Plai</td>
<td>Selection of optimal vessel required to transport specific cargo</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>PlaII</td>
<td>Selection of route based on type and amount of cargo</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Plb</td>
<td>Hull Database</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Plbi</td>
<td>Database to search for available/suitable vessels</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Plbii</td>
<td>Paid access</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Plc</td>
<td>Voyage and Cargo Information</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Plci</td>
<td>Access to vessel, route, cargo and ETA information for transport organisers</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Pld</td>
<td>Tracking and Tracing</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Pldi</td>
<td>Position information supporting the monitoring of transport (cargo/vessel)</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Pldii</td>
<td>Request position of vessel</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Ple</td>
<td>COARRI EDI message – Conversion of (pre-) loading list from different formats to support RIS, Voyage Planning and Terminal Management</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>
### CATEGORY: Vessel Traffic Services

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H1a</td>
<td>Geographic related information</td>
<td>Simplified flat map</td>
<td>ECDIS</td>
<td><strong>83%</strong></td>
<td><strong>17%</strong></td>
</tr>
<tr>
<td></td>
<td>H1b</td>
<td>Position of traffic in time and space</td>
<td>Radar/ VHF/ camera's</td>
<td>Radar/ VHF/ AIP/ TTI</td>
<td><strong>100%</strong></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>H1c</td>
<td>Fairway boundaries, beacons, km signs, conspicuous points, bridges, locks, buoyage depth contours</td>
<td>VHF</td>
<td>TTI (ECDIS)</td>
<td><strong>100%</strong></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>H1d</td>
<td>Identification of vessels (name, sign, etc…)</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>100%</strong></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>H1e</td>
<td>Type of ships and cargo type</td>
<td>VHF/ BICS</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>100%</strong></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>H1f</td>
<td>Dangerous goods</td>
<td>Radar/ VHF</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>83%</strong></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>H1g</td>
<td>Course and speed of vessels</td>
<td>VHF</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>100%</strong></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>H1h</td>
<td>Final destination of vessels</td>
<td>VHF</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>83%</strong></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>H1i</td>
<td>Intention of vessels</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>83%</strong></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>H1j</td>
<td>Vessels dimensions</td>
<td>Radar</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>100%</strong></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>H1k</td>
<td>Vessels draught</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>83%</strong></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>H1l</td>
<td>Vessels in the lock</td>
<td>VHF</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>83%</strong></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>H1m</td>
<td>Vessels waiting on both sides of the lock</td>
<td>VHF</td>
<td>AIS/ AIP/ IVS90/TTI</td>
<td><strong>83%</strong></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>H1n</td>
<td>Current direction of lock process</td>
<td>VHF/ IVS90</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Individual Results - Romania
COMPRIS Demonstration: Agigea/Constantza, Romania

Thursday, 7th July 2005

RESULTS

Acceptance Assessment Questionnaire

Elements

Lock Management & Planning

Invoicing

Statistics

E-Learning
**COMPRIS – Socio-economic assessment of RIS**

### CATEGORY: Lock Management & Planning

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>J4</td>
<td>J4a</td>
<td>Operating times</td>
<td>Written info</td>
<td>ECDIS / Lock Planning Software (LPS)</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>J4b</td>
<td>Booking requirements</td>
<td>Written info</td>
<td>LPS</td>
<td>70%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>J4c</td>
<td>Vessel dimensions</td>
<td>Various</td>
<td>RIS / LPS</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>Lock Management and Planning</td>
<td>J4d</td>
<td>Position details of approaching vessels</td>
<td>Telephone / GSM</td>
<td>LPS</td>
<td>70%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>J4e</td>
<td>ETA of approaching vessels</td>
<td>Telephone / GSM</td>
<td>LPS</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>J4f</td>
<td>Presence of dangerous goods</td>
<td>Telephone / GSM</td>
<td>LPS</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>J4g</td>
<td>Waiting times</td>
<td>Telephone / GSM</td>
<td>LPS</td>
<td>30%</td>
<td>60%</td>
</tr>
</tbody>
</table>

### CATEGORY: Invoicing

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>Q1</td>
<td>Q1a</td>
<td>User friendly human-machine interface</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Invoicing</td>
<td>Q1b</td>
<td>Data accuracy in invoices</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Q1c</td>
<td>Time for issuing invoices</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Q1d</td>
<td>Availability of service cost information</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

COMPRIS/Assessment report/ WP 12/ULG-ANAST /30-03-2006/version 1.0/P  
Page 181 of 205
**CATEGORY: Statistics**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 Statistics</td>
<td>R1a</td>
<td>Statistics building method</td>
<td>70%</td>
<td>30%</td>
<td>0%</td>
<td>0%</td>
<td>53%</td>
<td>40%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>R1b</td>
<td>Statistics quantity (more records)</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
<td>75%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>R1c</td>
<td>Statistics quality (more fields)</td>
<td>50%</td>
<td>40%</td>
<td>10%</td>
<td>0%</td>
<td>25%</td>
<td>67%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>R1d</td>
<td>Statistics accuracy</td>
<td>30%</td>
<td>70%</td>
<td>0%</td>
<td>0%</td>
<td>23%</td>
<td>69%</td>
<td>8%</td>
</tr>
</tbody>
</table>

**CATEGORY: E-Learning**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1 E-Learning</td>
<td>O1a</td>
<td>Thematic multilanguage scenarios related to important subjects from the skippers world</td>
<td>90%</td>
<td>0%</td>
<td>10%</td>
<td>0%</td>
<td>56%</td>
<td>38%</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>O1b</td>
<td>Multilanguage lexicon with nautical terms including audio (example of pronunciation)</td>
<td>60%</td>
<td>40%</td>
<td>0%</td>
<td>0%</td>
<td>60%</td>
<td>40%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>O1c</td>
<td>Video explanatory resources</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>57%</td>
<td>36%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>O1d</td>
<td>Photographic explanatory resources</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>53%</td>
<td>40%</td>
<td>7%</td>
</tr>
</tbody>
</table>
Individual Results – The Netherlands
COMPRIS Demonstration: Nijmegen, The Netherlands

12th – 14th September 2005

RESULTS

Acceptance Assessment Questionnaire

Elements

(Tracking and Tracing integral)

Cross-Border

Logistical Data Platform

Navigation

VTS

Lock Management & Planning

E-Learning
### CATEGORY: Cross Border

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>Cross Border</td>
<td>N1a</td>
<td>Dangerous cargo reporting service</td>
<td>19%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>N1ai</td>
<td>Notification to competent authority</td>
<td>15%</td>
<td>74%</td>
</tr>
<tr>
<td></td>
<td>N1aii</td>
<td>Notification to other authorities, e.g. in case of emergency</td>
<td>24%</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>N1b</td>
<td>Voyage reporting service</td>
<td>6%</td>
<td>89%</td>
</tr>
<tr>
<td></td>
<td>N1bi</td>
<td>Providing pre-arrival voyage information</td>
<td>23%</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>N1bii</td>
<td>Providing actual voyage information</td>
<td>27%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>N1c</td>
<td>Immigration inspection service</td>
<td>6%</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>N1ci</td>
<td>Control of persons crossing borders</td>
<td>8%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>N1cii</td>
<td>Supervision of persons and compliance with immigration</td>
<td>5%</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>N1d</td>
<td>Customs service</td>
<td>6%</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>N1di</td>
<td>Clearance of imported/exported goods</td>
<td>5%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>N1dii</td>
<td>Supervision of goods and compliance with customs regulations</td>
<td>0%</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>N1e</td>
<td>Statistics service</td>
<td>21%</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>N1ei</td>
<td>Cargo/trade statistics</td>
<td>35%</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>N1eii</td>
<td>Information on vessel traffic and intensity of flow</td>
<td>43%</td>
<td>39%</td>
</tr>
</tbody>
</table>
### CATEGORY: Logistical Data Platform (LDP)

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>P1</td>
<td>P1a</td>
<td>BoRIS – Voyage Planning Application for barge operators</td>
<td>5%</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td>P1ai</td>
<td>Selection of optimal vessel required to transport specific cargo</td>
<td>12%</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>P1aii</td>
<td>Selection of route based on type and amount of cargo</td>
<td>16%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>P1b</td>
<td>Hull Database</td>
<td>24%</td>
<td>53%</td>
</tr>
<tr>
<td></td>
<td>P1bi</td>
<td>Database to search for available/suitable vessels Free access</td>
<td>22%</td>
<td>44%</td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td>P1bii</td>
<td>Bargelink – vessel database with added ability to offer cargo Paid access</td>
<td>12%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>P1c</td>
<td>Voyage and Cargo Information</td>
<td>35%</td>
<td>53%</td>
</tr>
<tr>
<td></td>
<td>P1ci</td>
<td>Access to vessel, route, cargo and ETA information for transport organisers</td>
<td>28%</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>P1d</td>
<td>Tracking and Tracing Position information supporting the monitoring of transport (cargo/vessel)</td>
<td>44%</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>P1di</td>
<td>Request position of vessel</td>
<td>32%</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>P1dii</td>
<td>Request position of cargo</td>
<td>30%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>P1e</td>
<td>COARRI EDI message – Conversion of (pre-) loading list from different formats to support RIS, Voyage Planning and Terminal Management</td>
<td>11%</td>
<td>67%</td>
</tr>
</tbody>
</table>

### Logistical Data Platform (LDP)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would be willing to pay for this kind of information.</td>
<td>31%</td>
<td>23%</td>
<td>46%</td>
</tr>
<tr>
<td>As a service provider I would be willing to offer LDP services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDP is a tool, which is able to change the modal shift, making inland shipping more accessible for new transports?</td>
<td>76%</td>
<td>10%</td>
<td>14%</td>
</tr>
<tr>
<td>LDP is a tool helping to solve mobility problems</td>
<td>69%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>LDP offers comparable services with the other transport modes</td>
<td>36%</td>
<td>21%</td>
<td>43%</td>
</tr>
<tr>
<td>The services on this platform should be commercialised and not offered by the government</td>
<td>23%</td>
<td>50%</td>
<td>27%</td>
</tr>
</tbody>
</table>
## CATEGORY: Navigation

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>II</strong> Navigation (for short-term voyage planning and monitoring on board)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIa</td>
<td></td>
<td>Position of traffic in time and space with respect to own vessel</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>16%</td>
<td>66%</td>
<td>13%</td>
<td>6%</td>
<td>39%</td>
<td>36%</td>
<td>24%</td>
</tr>
<tr>
<td>IIb</td>
<td></td>
<td>Identification of other vessels (name, sign, etc…)</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>34%</td>
<td>66%</td>
<td>0%</td>
<td>0%</td>
<td>29%</td>
<td>48%</td>
<td>23%</td>
</tr>
<tr>
<td>IIc</td>
<td></td>
<td>Type of vessels and cargo type</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>16%</td>
<td>78%</td>
<td>6%</td>
<td>0%</td>
<td>50%</td>
<td>31%</td>
<td>19%</td>
</tr>
<tr>
<td>IIc</td>
<td></td>
<td>Type of vessels and cargo type</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>16%</td>
<td>68%</td>
<td>16%</td>
<td>0%</td>
<td>38%</td>
<td>42%</td>
<td>19%</td>
</tr>
<tr>
<td>IIe</td>
<td></td>
<td>Other vessels’ dimensions</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>22%</td>
<td>66%</td>
<td>13%</td>
<td>0%</td>
<td>48%</td>
<td>28%</td>
<td>24%</td>
</tr>
<tr>
<td>IIe</td>
<td></td>
<td>Other vessels’ dimensions</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>22%</td>
<td>66%</td>
<td>13%</td>
<td>0%</td>
<td>48%</td>
<td>28%</td>
<td>24%</td>
</tr>
<tr>
<td>IIe</td>
<td></td>
<td>Other vessels’ draught</td>
<td>Visual</td>
<td>AIS/ AIIP</td>
<td>19%</td>
<td>61%</td>
<td>19%</td>
<td>0%</td>
<td>50%</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>IIh</td>
<td></td>
<td>Vessels in the lock being approached</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>23%</td>
<td>68%</td>
<td>10%</td>
<td>0%</td>
<td>46%</td>
<td>35%</td>
<td>19%</td>
</tr>
<tr>
<td>IIi</td>
<td></td>
<td>Vessels waiting on both sides of the lock</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>19%</td>
<td>71%</td>
<td>10%</td>
<td>0%</td>
<td>54%</td>
<td>23%</td>
<td>23%</td>
</tr>
<tr>
<td><strong>J1</strong> Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1a</td>
<td></td>
<td>State of rivers, canals, locks and bridges</td>
<td>Written and aural reports</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
<td>0%</td>
<td>43%</td>
<td>30%</td>
<td>27%</td>
</tr>
<tr>
<td>J1b</td>
<td></td>
<td>Lock and bridge opening times</td>
<td>Written info</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>38%</td>
<td>50%</td>
<td>13%</td>
<td>0%</td>
<td>47%</td>
<td>31%</td>
<td>22%</td>
</tr>
<tr>
<td>J1c</td>
<td></td>
<td>Digital update info for ENC</td>
<td>N/A</td>
<td>RIS</td>
<td>27%</td>
<td>62%</td>
<td>12%</td>
<td>0%</td>
<td>46%</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>J1d</td>
<td></td>
<td>Present and future water levels</td>
<td>Written info/ online info/</td>
<td>Notices to Skipper Receive Application</td>
<td>30%</td>
<td>50%</td>
<td>20%</td>
<td>0%</td>
<td>39%</td>
<td>39%</td>
<td>21%</td>
</tr>
<tr>
<td>J1e</td>
<td></td>
<td>Obstacles in fairway, such as dredging activities</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>37%</td>
<td>57%</td>
<td>7%</td>
<td>0%</td>
<td>50%</td>
<td>27%</td>
<td>23%</td>
</tr>
<tr>
<td>J1f</td>
<td></td>
<td>Malfunctions of aids to navigation</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>30%</td>
<td>60%</td>
<td>10%</td>
<td>0%</td>
<td>45%</td>
<td>32%</td>
<td>23%</td>
</tr>
<tr>
<td>J1g</td>
<td></td>
<td>Any other restriction or obstacle to navigation</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td></td>
<td>31%</td>
<td>62%</td>
<td>7%</td>
<td>0%</td>
<td>46%</td>
<td>29%</td>
<td>25%</td>
</tr>
</tbody>
</table>
### CATEGORY: Vessel Traffic Services

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>H1</td>
<td>H1a</td>
<td>Geographic related information</td>
<td>Simplified flat map</td>
<td>ECDIS</td>
<td>33% 60% 7% 0%</td>
<td>53% 32% 15%</td>
</tr>
<tr>
<td></td>
<td>H1b</td>
<td>Position of traffic in time and space</td>
<td>Radar/ VHF/ camera’s</td>
<td>Radar/ VHF/ camera’s / AIS/ AIP/ TTI</td>
<td>32% 52% 13% 3%</td>
<td>41% 38% 21%</td>
</tr>
<tr>
<td>H1</td>
<td>H1c</td>
<td>Fairway boundaries, beacons, km signs, conspicuous points, bridges, locks, buoyage depth contours</td>
<td>VHF</td>
<td>TTI (ECDIS)</td>
<td>19% 74% 6% 0%</td>
<td>48% 35% 16%</td>
</tr>
<tr>
<td>VTS</td>
<td></td>
<td>Identification of vessels (name, sign, etc…)</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>42% 52% 6% 0%</td>
<td>32% 38% 29%</td>
</tr>
<tr>
<td>H1</td>
<td>H1d</td>
<td>Type of ships and cargo type</td>
<td>VHF/ BCS</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>10% 63% 23% 3%</td>
<td>43% 37% 20%</td>
</tr>
<tr>
<td></td>
<td>H1e</td>
<td>Dangerous goods</td>
<td>Radar/ VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>19% 74% 3% 3%</td>
<td>48% 28% 24%</td>
</tr>
<tr>
<td></td>
<td>H1f</td>
<td>Course and speed of vessels</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>26% 61% 13% 0%</td>
<td>37% 37% 27%</td>
</tr>
<tr>
<td></td>
<td>H1g</td>
<td>Final destination of vessels</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>10% 71% 16% 3%</td>
<td>50% 32% 18%</td>
</tr>
<tr>
<td></td>
<td>H1h</td>
<td>Intention of vessels</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>6% 71% 19% 3%</td>
<td>46% 29% 25%</td>
</tr>
<tr>
<td></td>
<td>H1i</td>
<td>Vessels dimensions</td>
<td>Radar</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>19% 65% 16% 0%</td>
<td>37% 48% 15%</td>
</tr>
<tr>
<td></td>
<td>H1j</td>
<td>Vessels draught</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>6% 71% 19% 3%</td>
<td>46% 35% 19%</td>
</tr>
<tr>
<td></td>
<td>H1j</td>
<td>Vessels in the lock</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>19% 65% 16% 0%</td>
<td>48% 31% 21%</td>
</tr>
<tr>
<td></td>
<td>H1n</td>
<td>Vessels waiting on both sides of the lock</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>16% 71% 13% 0%</td>
<td>41% 38% 21%</td>
</tr>
<tr>
<td></td>
<td>H1n</td>
<td>Current direction of lock process</td>
<td>VHF/ IVS90</td>
<td></td>
<td>21% 54% 25% 0%</td>
<td>42% 38% 21%</td>
</tr>
</tbody>
</table>
**COMPRIS** – Socio-economic assessment of RIS

### CATEGORY: Lock Management & Planning

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>Lock Management and Planning</td>
<td>J4a</td>
<td>Operating times</td>
<td>Written info</td>
<td>ECDIS / Lock Planning Software (LPS)</td>
<td>14%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>J4b</td>
<td>Booking requirements</td>
<td>Written info</td>
<td>LPS</td>
<td>11%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>J4d</td>
<td>Vessel dimensions</td>
<td>Various</td>
<td>RIS/ LPS</td>
<td>12%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>J4e</td>
<td>Position details of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>18%</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>J4f</td>
<td>ETA of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>15%</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>J4h</td>
<td>Presence of dangerous goods</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>7%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>J4i</td>
<td>Waiting times</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>7%</td>
<td>61%</td>
</tr>
</tbody>
</table>

### CATEGORY: E-Learning

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>E-Learning</td>
<td>O1a</td>
<td>Thematic multilanguage scenarios related to important subjects from the skippers world</td>
<td>21%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>O1b</td>
<td>Multilanguage lexicon with nautical terms including audio (example of pronunciation)</td>
<td>21%</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td>O1c</td>
<td>Video explanatory resources</td>
<td>21%</td>
<td>71%</td>
</tr>
<tr>
<td></td>
<td>O1d</td>
<td>Photographic explanatory resources</td>
<td>29%</td>
<td>64%</td>
</tr>
</tbody>
</table>
Individual Results – Germany
COMPRIS Demonstration: Oberwesel, Germany

23rd September 2005

RESULTS

Acceptance Assessment Questionnaire

Elements

(Tracking and Tracing integral)

Navigation

VTS

Lock Management & Planning
**CATEGORY: Navigation**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td><strong>I1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>Navigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11%</td>
<td>89%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38%</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td><strong>J1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11%</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11%</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25%</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25%</td>
<td>63%</td>
</tr>
</tbody>
</table>

**COMPRIS – Socio-economic assessment of RIS**
**CATEGORY: Vessel Traffic Services**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>H1a</td>
<td></td>
<td>Geographic related information</td>
<td>Simplified flat map</td>
<td>ECDIS</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>H1b</td>
<td></td>
<td>Position of traffic in time and space</td>
<td>Radar/ VHF/ camera's</td>
<td>Radar/ VHF/ camera/ AIS/ AIP/ TTI</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>H1c</td>
<td></td>
<td>Farway boundaries, beacons, km signs, conspicuous points, bridges, locks, buoyage depth contours</td>
<td>VHF</td>
<td>TTI (ECDIS)</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>H1d</td>
<td></td>
<td>Identification of vessels (name, sign, etc…)</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>H1e</td>
<td></td>
<td>Type of ships and cargo type</td>
<td>VHF/ BICS</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>44%</td>
<td>56%</td>
</tr>
<tr>
<td>H1f</td>
<td></td>
<td>Dangerous goods</td>
<td>Radar/ VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>H1g</td>
<td></td>
<td>Course and speed of vessels</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>H1h</td>
<td></td>
<td>Final destination of vessels</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>25%</td>
<td>63%</td>
</tr>
<tr>
<td>H1i</td>
<td></td>
<td>Intention of vessels</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>H1j</td>
<td></td>
<td>Vessels dimensions</td>
<td>Radar</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>H1k</td>
<td></td>
<td>Vessels draught</td>
<td>VHF/ IVS90</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>H1l</td>
<td></td>
<td>Vessels in the lock</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td>H1m</td>
<td></td>
<td>Vessels waiting on both sides of the lock</td>
<td>VHF</td>
<td>AIS/ AIP/IVS90/TTI</td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td>H1n</td>
<td></td>
<td>Current direction of lock process</td>
<td>VHF/ IVS90</td>
<td></td>
<td>11%</td>
<td>78%</td>
</tr>
</tbody>
</table>

**CATEGORY: Lock Management & Planning**

<table>
<thead>
<tr>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
</table>

**COMPRIS – Socio-economic assessment of RIS**

COMPRIS/Assessment report/ WP 12/ULG-ANAST /30-03-2006/version 1.0/P  
Page 193 of 205
**COMPRIS – Socio-economic assessment of RIS**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>J4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lock Management</td>
<td>J4a</td>
<td>Operating times</td>
<td>Written info</td>
<td>ECDIS / Lock Planning Software</td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
<td>0%</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>and Planning</td>
<td>J4b</td>
<td>Booking requirements</td>
<td>Written info</td>
<td>LPS</td>
<td>25%</td>
<td>63%</td>
<td>13%</td>
<td>0%</td>
<td>80%</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>J4d</td>
<td>Vessel dimensions</td>
<td>Various</td>
<td>RIS/ LPS</td>
<td>38%</td>
<td>38%</td>
<td>25%</td>
<td>0%</td>
<td>60%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>J4e</td>
<td>Position details of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>44%</td>
<td>33%</td>
<td>22%</td>
<td>0%</td>
<td>40%</td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>J4f</td>
<td>ETA of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>33%</td>
<td>33%</td>
<td>33%</td>
<td>0%</td>
<td>40%</td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>J4h</td>
<td>Presence of dangerous goods</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>33%</td>
<td>44%</td>
<td>22%</td>
<td>0%</td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>J4i</td>
<td>Waiting times</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>33%</td>
<td>56%</td>
<td>11%</td>
<td>0%</td>
<td>50%</td>
<td>25%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Individual Results – Austria
COMPRIS Demonstration: Vienna, Austria

Thursday, 29th September 2005

RESULTS

Acceptance Assessment Questionnaire

Elements
(Tracking and Tracing integral)
Cross-Border
Logistical Data Platform
Navigation
Lock Management & Planning
**CATEGORY: Cross Border**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>Cross Border</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1</td>
<td>N1a</td>
<td>Dangerous cargo reporting service</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>N1ai</td>
<td>Notification to competent authority</td>
<td>15%</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td>N1aii</td>
<td>Notification to other authorities, e.g. in case of emergency</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>N1b</td>
<td>Voyage reporting service</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>N1bi</td>
<td>Providing pre-arrival voyage information</td>
<td>8%</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td>N1bii</td>
<td>Providing actual voyage information</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td></td>
<td>N1c</td>
<td>Immigration inspection service</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>N1ci</td>
<td>Control of persons crossing borders</td>
<td>31%</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>N1cii</td>
<td>Supervision of persons and compliance with immigration</td>
<td>31%</td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td>N1d</td>
<td>Customs service</td>
<td>33%</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>N1di</td>
<td>Clearance of imported/exported goods</td>
<td>8%</td>
<td>69%</td>
</tr>
<tr>
<td></td>
<td>N1dii</td>
<td>Supervision of goods and compliance with customs regulations</td>
<td>21%</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>N1c</td>
<td>Statistics service</td>
<td>42%</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>N1cii</td>
<td>Cargo/trade statistics</td>
<td>23%</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td>N1ciii</td>
<td>Information on vessel traffic and intensity of flow</td>
<td>42%</td>
<td>58%</td>
</tr>
</tbody>
</table>
**COMPRIS – Socio-economic assessment of RIS**

**CATEGORY: Logistical Data Platform (LDP)**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Much better</th>
<th>Better</th>
<th>Equal</th>
<th>Worse</th>
<th>Ease of Use</th>
<th>Accuracy</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>P1a</td>
<td>BoRIS – Voyage Planning Application for barge operators</td>
<td>25%</td>
<td>58%</td>
<td>17%</td>
<td>0%</td>
<td>50%</td>
<td>17%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>P1ai</td>
<td>Selection of optimal vessel required to transport specific cargo</td>
<td>31%</td>
<td>46%</td>
<td>23%</td>
<td>0%</td>
<td>47%</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>P1aii</td>
<td>Selection of route based on type and amount of cargo</td>
<td>31%</td>
<td>54%</td>
<td>15%</td>
<td>0%</td>
<td>40%</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>P1b</td>
<td>Hull Database</td>
<td>11%</td>
<td>78%</td>
<td>11%</td>
<td>0%</td>
<td>56%</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>P1bi</td>
<td>Database to search for available/suitable vessels Free access</td>
<td>23%</td>
<td>62%</td>
<td>15%</td>
<td>0%</td>
<td>40%</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>P1bii</td>
<td>Bargelink – vessel database with added ability to offer cargo Paid access</td>
<td>15%</td>
<td>62%</td>
<td>15%</td>
<td>8%</td>
<td>45%</td>
<td>36%</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>P1c</td>
<td>Voyage and Cargo Information</td>
<td>22%</td>
<td>78%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>50%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>P1ci</td>
<td>Access to vessel, route, cargo and ETA information for transport organisers</td>
<td>23%</td>
<td>69%</td>
<td>8%</td>
<td>0%</td>
<td>40%</td>
<td>27%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>P1d</td>
<td>Tracking and Tracing Position information supporting the monitoring of transport (cargo/vessel)</td>
<td>43%</td>
<td>43%</td>
<td>14%</td>
<td>0%</td>
<td>35%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>P1di</td>
<td>Request position of vessel</td>
<td>50%</td>
<td>25%</td>
<td>25%</td>
<td>0%</td>
<td>11%</td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>P1dii</td>
<td>Request position of cargo</td>
<td>42%</td>
<td>33%</td>
<td>25%</td>
<td>0%</td>
<td>19%</td>
<td>50%</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>P1e</td>
<td>COARRI EDI message – Conversion of (pre-) loading list from different formats to support RIS, Voyage Planning and Terminal Management</td>
<td>9%</td>
<td>91%</td>
<td>0%</td>
<td>0%</td>
<td>36%</td>
<td>18%</td>
<td>45%</td>
</tr>
</tbody>
</table>

**Logistical Data Platform (LDP)**

<table>
<thead>
<tr>
<th>I would be willing to pay for this kind of information.</th>
<th>Agree</th>
<th>Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>29%</td>
<td>29%</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>As a service provider I would be willing to offer LDP services</td>
<td>71%</td>
<td>7%</td>
<td>21%</td>
</tr>
<tr>
<td>LDP is a tool, which is able to change the modal shift, making inland shipping more accessible for new transports?</td>
<td>67%</td>
<td>13%</td>
<td>20%</td>
</tr>
<tr>
<td>LDP is a tool helping to solve mobility problems</td>
<td>47%</td>
<td>7%</td>
<td>47%</td>
</tr>
<tr>
<td>LDP offers comparable services with the other transport modes</td>
<td>60%</td>
<td>7%</td>
<td>33%</td>
</tr>
<tr>
<td>The services on this platform should be commercialised and not offered by the government</td>
<td>33%</td>
<td>20%</td>
<td>47%</td>
</tr>
</tbody>
</table>
### CATEGORY: Navigation

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
<td>Equal</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(for short-term voyage planning and monitoring on board)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IIa</strong></td>
<td></td>
<td>Position of traffic in time and space with respect to own vessel</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>56%</td>
<td>19%</td>
</tr>
<tr>
<td><strong>IIb</strong></td>
<td></td>
<td>Identification of other vessels (name, sign, etc…)</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>80%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>IIc</strong></td>
<td></td>
<td>Type of vessels and cargo type</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>53%</td>
<td>33%</td>
</tr>
<tr>
<td><strong>IId</strong></td>
<td></td>
<td>History plot of other to indicate intentions</td>
<td>Visual/ VHF</td>
<td>AIS/ AIIP</td>
<td>13%</td>
<td>67%</td>
</tr>
<tr>
<td><strong>IIe</strong></td>
<td></td>
<td>Other vessels’ dimensions</td>
<td>Visual/ radar/ VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>14%</td>
<td>79%</td>
</tr>
<tr>
<td><strong>III</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
<td>Equal</td>
</tr>
<tr>
<td><strong>J1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>J1a</strong></td>
<td></td>
<td>State of rivers, canals, locks and bridges</td>
<td>Written and aural reports</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>56%</td>
<td>38%</td>
</tr>
<tr>
<td><strong>J1b</strong></td>
<td></td>
<td>Lock and bridge opening times</td>
<td>Written info</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>33%</td>
<td>60%</td>
</tr>
<tr>
<td><strong>J1c</strong></td>
<td></td>
<td>Digital update information for ENC</td>
<td>n/a</td>
<td>RIS</td>
<td>47%</td>
<td>47%</td>
</tr>
<tr>
<td><strong>J1d</strong></td>
<td></td>
<td>Present and future water levels</td>
<td>Written info/ online info</td>
<td>Notices to Skipper Receive Application</td>
<td>13%</td>
<td>53%</td>
</tr>
<tr>
<td><strong>J1e</strong></td>
<td></td>
<td>Obstacles in fairway, such as dredging activities</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>29%</td>
<td>57%</td>
</tr>
<tr>
<td><strong>J1f</strong></td>
<td></td>
<td>Malfunctions of aids to navigation</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>20%</td>
<td>67%</td>
</tr>
<tr>
<td><strong>J1g</strong></td>
<td></td>
<td>Any other restriction or obstacle to navigation</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>29%</td>
<td>64%</td>
<td>7%</td>
</tr>
</tbody>
</table>
### CATEGORY: Lock Management & Planning

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>J4</td>
<td>J4a</td>
<td>Operating times</td>
<td>Written info</td>
<td>ECDES / Lock Planning Software (LPS)</td>
<td>36%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>J4b</td>
<td>Booking requirements</td>
<td>Written info</td>
<td>LPS</td>
<td>33%</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>J4d</td>
<td>Vessel dimensions</td>
<td>Various</td>
<td>RIS/LPS</td>
<td>23%</td>
<td>69%</td>
</tr>
<tr>
<td></td>
<td>J4e</td>
<td>Position details of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>36%</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>J4f</td>
<td>ETA of approaching vessels</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>42%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>J4h</td>
<td>Presence of dangerous goods</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>31%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>J4i</td>
<td>Waiting times</td>
<td>Telephone/ GSM</td>
<td>LPS</td>
<td>31%</td>
<td>38%</td>
</tr>
</tbody>
</table>
Individual Results – Slovakia
COMPRIS Demonstration: Bratislava, Slovakia

Friday, 30th September 2005

RESULTS

Acceptance Assessment Questionnaire

Elements
(Tracking and Tracing integral)
Cross-Border
Logistical Data Platform
Navigation
### CATEGORY: Cross Border

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td>N1</td>
<td>N1a</td>
<td>Dangerous cargo reporting service</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>N1ai</td>
<td>Notification to competent authority</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>N1aii</td>
<td>Notification to other authorities, e.g. in case of emergency</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>N1b</td>
<td>Voyage reporting service</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>N1bi</td>
<td>Providing pre-arrival voyage information</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>N1bii</td>
<td>Providing actual voyage information</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>N1c</td>
<td>Immigration inspection service</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>N1cii</td>
<td>Control of persons crossing borders</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>N1d</td>
<td>Supervision of persons and compliance with immigration</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>N1dii</td>
<td>Customs service</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>N1diii</td>
<td>Clearance of imported/exported goods</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>N1diii</td>
<td>Supervision of goods and compliance with customs regulations</td>
<td>25%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>N1e</td>
<td>Statistics service</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>N1ei</td>
<td>Cargo/trade statistics</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>N1eii</td>
<td>Information on vessel traffic and intensity of flow</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>
**CATEGORY: Logistical Data Platform (LDP)**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of service provided</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td><strong>P1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistical Data Platform</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P1a</strong></td>
<td></td>
<td>BoRIS – Voyage Planning Application for barge operators</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td><strong>P1ai</strong></td>
<td></td>
<td>Selection of optimal vessel required to transport specific cargo</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td><strong>P1ait</strong></td>
<td></td>
<td>Selection of route based on type and amount of cargo</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td><strong>P1b</strong></td>
<td></td>
<td>Hull Database</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td><strong>P1bi</strong></td>
<td></td>
<td>Database to search for available/suitable vessels</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td><strong>P1bii</strong></td>
<td></td>
<td>Bargelink – vessel database with added ability to offer cargo</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>P1c</strong></td>
<td></td>
<td>Voyage and Cargo Information</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td><strong>P1ci</strong></td>
<td></td>
<td>Access to vessel, route, cargo and ETA information for transport organisers</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>P1d</strong></td>
<td></td>
<td>Tracking and Tracing</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>P1di</strong></td>
<td></td>
<td>Position information supporting the monitoring of transport (cargo/vessel)</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>P1dii</strong></td>
<td></td>
<td>Request position of vessel</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>P1e</strong></td>
<td></td>
<td>COARRI EDI message – Conversion of (pre-) loading list from different formats to support RIS, Voyage Planning and Terminal Management</td>
<td>20%</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Logistical Data Platform (LDP)**

<table>
<thead>
<tr>
<th>I would be willing to pay for this kind of information.</th>
<th>Agree</th>
<th>Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>As a service provider I would be willing to offer LDP services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDP is a tool, which is able to change the modal shift, making inland shipping more accessible for new transports?</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>LDP is a tool helping to solve mobility problems</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>LDP offers comparable services with the other transport modes</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>The services on this platform should be commercialised and not offered by the government</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
## CATEGORY: Navigation

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Code</th>
<th>Type of information provided</th>
<th>Actual (no-RIS) way for provision of that info</th>
<th>RIS way for provision of that info</th>
<th>Your opinion about RIS standard in comparison to habitual one</th>
<th>Which parameters influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Much better</td>
<td>Better</td>
</tr>
<tr>
<td><strong>I1</strong> Navigation (for short-term voyage planning and monitoring on board)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1a</td>
<td>Position of traffic in time and space with respect to own vessel</td>
<td>Visual/radar/VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>I1b</td>
<td>Identification of other vessels (name, sign, etc...)</td>
<td>Visual/VHF</td>
<td>AIS/ AIIP</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I1c</td>
<td>Type of vessels and cargo type</td>
<td>Visual/VHF</td>
<td>AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>I1d</td>
<td>History plot of other to indicate intentions</td>
<td>Visual/VHF</td>
<td>AIS/ AIIP</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>I1e</td>
<td>Other vessels’ dimensions</td>
<td>Visual/radar/VHF</td>
<td>Radar/ AIS/ AIIP</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>I1f</td>
<td>Other vessels’ draught</td>
<td>Visual</td>
<td>AIS/ AIIP</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>I1g</td>
<td>Vessels in the lock being approached</td>
<td>Visual/VHF</td>
<td>AIS/ AIIP</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I1h</td>
<td>Vessels waiting on both sides of the lock</td>
<td>Visual/VHF</td>
<td>AIS/ AIIP</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>J1</strong> Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1a</td>
<td>State of rivers, canals, locks and bridges</td>
<td>Written and aural reports</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>J1b</td>
<td>Lock and bridge opening times</td>
<td>Written info</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>J1c</td>
<td>Digital update information for ENC</td>
<td>n/a</td>
<td>RIS</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>J1d</td>
<td>Present and future water levels</td>
<td>Written info/ online info/ teletext</td>
<td>Notices to Skipper Receive Application</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>J1e</td>
<td>Obstacles in fairway, such as dredging activities</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>67%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>J1f</td>
<td>Malfunctions of aids to navigation</td>
<td>Written and aural reports/ teletext</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td>J1g</td>
<td>Any other restriction or obstacle to navigation</td>
<td>ECDIS / Notices to Skipper Receive Application</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>