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Navigation Data Transmission in the RIS System

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ABSTRACT: The paper presents processing and transmission navigation data in inland navigation. Data transmission of messages by ship electronic reporting in the RIS (River Information Services) system is analyzed. The principles of reporting data navigation in the RIS Management Centre are defined. Furthermore, the RIS communication architecture is analyzed. Finally, the author presented new standard – BICS 2.0 for the processing and navigation data transmission in inland navigation.

1 INLAND NAVIGATIONAL DATA TRANSMISSION BY THE SHIP ELECTRONIC REPORTING IN THE RIVER INFORMATION SERVICES

Data transmission of messages by ship reporting in the RIS system Management Centre has following tasks [2.4]:

1 Facilitation of data structure transfer with EDI (Electronic Data Interchange) standards.
2 Exchange of information between inland navigation partners.
3 Sending dynamic information on a voyage at the same time to many participants.
4 Consistent use of the EDIFAC standard (Electronic Data Interchange for Administration)
5 Inland traffic management.
6 Transfer of complete information on locks and bridges and calamity situation.
7 Loading / unloading management and container terminal operation monitoring.
8 Border crossing control.
9 Services to passengers of inland ships.

1.1 *The principles of co-operation between the RIS System Management Centre and an inland VTS stations [2.7].*

General purpose of VTS center is to improve the safety and efficiency of sea and inland navigation, safety of life and the protection of the environment from possible adverse effects of vessel traffic.

A part of these objectives of a Vessel Traffic Service include promoting efficient transport and the collection of data that may be required in order to evaluate the Vessel Traffic Service.

The benefits of implementing a VTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assistance.

It can also assist in reducing the risk of pollution and coordinating pollution response. The efficiency of a VTS will depend on the reliability and continuity of communications and on the ability to provide concise, accurate and unambiguous information.

The quality of accident prevention measures will depend on the capability of the system to detect developing dangerous situations and on the ability to give timely warning of such dangers.

For inland navigation vessels cooperating with the RIS Management Centre, there is a need to harmonize inland VTS through international application on all inland waterways in a waterway system.

2 COMMUNICATION AND REPORTING

Communication between inland VTS centre and participating vessels or between participating vessels should be limited to information essential to achieve the objectives of the VTS [1.5].

Communication should be clear, easily understood by of all participants. Standard reports and phrases should be used when necessary. Where language difficulties exist, use should be made of a common language as determined by the VTS authority.

In any VTS message directed to a vessel or vessels it should be made clear whether the message contains information, advice, warning, or an instruction.

2.1 *The RIS Communication Architecture[1.3];*

The RIS Architecture consists of seven components:

- **Reference Model**, in which inland shipping and River Information Services is defined and the RIS architecture s build;
- **Organization Architecture**, in which the roles responsible for the use and operation of River Information Services are defined. For the roles that actually use RIS to strengthen the execution of their task in inland shipping the intended cooperation is drawn. This cooperation is the basis for the information and functional architecture.
- **Information Architecture**, in which the information exchange coming with the cooperation as drawn in the organization architecture.
- **Function Architecture**, in which the functions are derived which have to be performed to actually make the cooperation work. At this stage these functions can be performed by the responsible roles, by those roles supported by an application or autonomous by a system.
- **Data Architecture**, in which the data is defined from which the information in the information architecture can be build.
- **Physical Architecture**, in which an first example is given of the way the functions from the functional architecture can be allocated to a system.
- **Communication Architecture**, in which the link is out between the data and information on the one hand and the standardised message on the other hand.

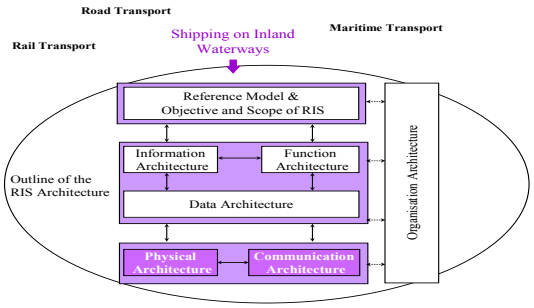

Figure 1. Structure of the data architecture in the RIS [3.6]

3 DATA TRANSMISSION IN THE RIS SYSTEM.

Technical specifications of the message structure for data processing and transmission of ship reporting in the RIS system are composed of segments shows on figure 2. The structure of a message is described in a branching diagram indicating the position and the relationship of the segments and segment groups.

For each segment the data elements are defined which are to be used in a message [3.6].

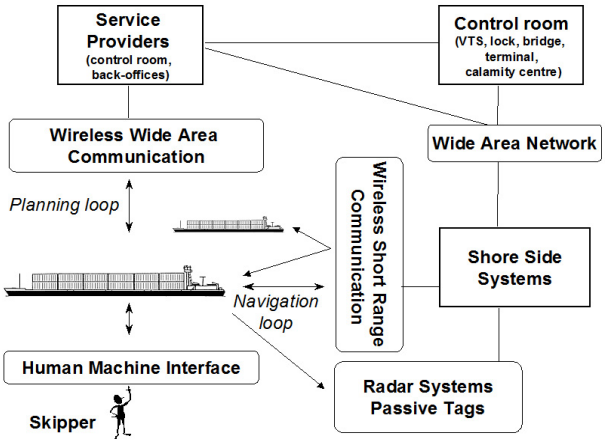

Figure 2. Processing and transmission navigation data in the RIS system [3]

3.1 *New standard – BICS for the processing and navigation data transmission in inland navigation.*

In conformity with the EDIFACT (Electronic Data Interchange for Administration), data processing in the RIS system makes use BICS standard [2.4].

BICS ((BICS-Binnenvaart Informatie en Communicatie System-inland shipping information and communication system)) used to transmit navigation data about transported voyages and cargos of ships.

The port authorities and all inland shipping waterway management centers need adequate information for security and safety handling of inland shipping. In the distress and emergency situations all vessels must also be able to protect people and environment.

Standard BICS transfer navigation data information faster and confidential.

BICS usually transmitted electronic declaration of ship and data cargo to the inland waterways management system.

When BICS standard is installed, all details of the ship (official of the ships number, name of the ship, dimensions and other) are defined in BICS software.

BICS contains the names of all loading and unloading points, all cargo types and the precise names of, and indications of the risks associated with, each dangerous substance that is allowed to be transported over water. It is therefore only necessary to enter the variable information for each voyage, e.g. port of departure and destination, type and amount of cargo, draught and number of persons on board.

New standard –BICS is responsible for the generation, maintenance, use and delivery processing of data. All information should be clear, understandable and logical for public authorities.

Figure 3 shows architecture of the BICS standard using on the board of the vessel.

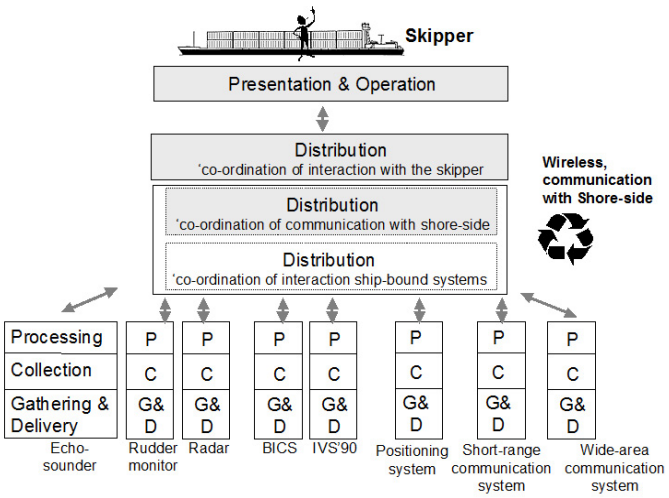

Figure 3.The data communication and information system onboard of a vessel in the BICS standard [4,8].

In line of these layers there should be a distribution layer for the co-ordination of the communication between the vessel-bound systems (e.g. echo sounder, rudder monitor, radar).

An analogous topology is drawn for the RIS-system in back-offices and control rooms cooperating with VTS-centres, locks and bridges in figure 4. For back-offices and control rooms an extra distribution layer can be of interest.

The competent authorities are allowed to distribute information based on vessels' reports to bridge and lock operators in order to optimise the traffic movements.

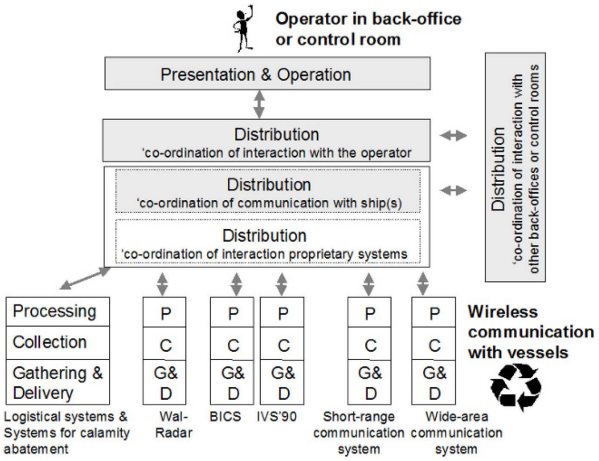

Figure 4. The processing communication and navigation information system in back-offices and the RIS control rooms management centres in the BICS standard [4.8].

4 CONCLUSION

The RIS management centres are responsibility for the storage of the all navigation data and for processing of the distribution in the BICS standard.

This standard of electronic data transmission provides rules for the interchange of electronic messages between partners in the field of inland navigation: ship owners, skippers and ports authority. For the different services and functions of River Information Services processing of the data transmission contains the most important regulations for electronic ship reporting. Standard BICS describes the messages, data items and codes to be used in the navigation data transmission.

LITERATURE

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