Inland Water Transport Digitalisation Vision[1]

I. Introduction

Policy context

The Sustainable and Smart Mobility Strategy underlines the need to increase the use of more sustainable transport modes and indicated that the modal share of inland waterway transport and shortsea shipping should increase by 25% by 2030 and by 50% by 2050. To do so, the NAIADES III Communication indicates that digitalisation and automation are essential to reach these goals and to improve the sustainability, resilience, and competitiveness of inland waterway transport (IWT).

The Sustainable and Smart Mobility Strategy requires that the transport sector's emissions are reduced by 90% by 2050. To support achievement of these goals digitalisation is thereby seen as an indispensable driver for the modernisation of the entire transport system, making it seamless and more efficient, increasing the levels of safety, security, reliability, resilience and comfort, whilst improving Europe's global competitiveness through efficient logistics chains.

One of the objectives set out in the NAIADES III Communication is to make inland waterway transport smarter, i.e., by further advancing the digitalization of the IWT public and private sector. It is imperative for the IWT sector to keep up with digital developments to improve the sector's governance competitiveness and ensure that it becomes an active part of broader multimodal and multi-functional chains and be part of the Physical Internet. Further digitalisation can play a significant role in improving the efficiency and reliability of navigation and traffic management, better integrating inland waterway transport in logistics processes and multimodal chains and reducing the administrative burden and costs of complying with and enforcing legislation. The NAIADES III Communication foresees that the Commission will facilitate the elaboration of a holistic vision for the sector's digitalisation and automation, also identifying necessary adjustments to existing regulations, with the contribution of the Digital Inland Navigation Area, NAIADES and Digital Transport and Logistics Forum Expert Groups. This vision addresses the public role of supporting the sector's digitalisation by creating the adequate policy framework.

The digitalisation vision for inland waterway transport must be seen against the background of the Green Deal, the Sustainable and Smart Mobility Strategy, the European Strategy for Data, the Commission Staff Working Document on Common European Data Spaces, the Digital Synergies Study, the DIWA Masterplan, …

Digitalisations challenges for IWT

The DINA study from 2017 states that it is imperative for the IWT sector to keep up with digital developments (both horizontal developments and developments in other modes of transport) to improve the sector's competitiveness and ensure that it becomes an active part of a broader multimodal chain.

Based on the results of the DINA study and the input of the members of the DINA Expert Group four main challenges have been identified that pose a threat to the competitiveness of the IWT sector

<u>Inefficient navigation and traffic management:</u>

[1] Any statement, considerations or question in this paper neither expresses a view of the Commission nor should any view of the Commission be inferred from any statement, consideration or question mentioned in this paper. This paper only expresses the view of the members of DINA Expert Group and the members of the NAIADES Expert Group.

Limited availability of near to real-time information, as well as not harmonised standards of data on traffic conditions is a problem for barge operators because it makes it difficult for them to adapt their voyage plans based on real-time conditions (e.g., available depth and vertical clearance, delays at a certain bridge or lock, berth allocations in ports, updates to terminal calls in a large port with multiple terminals). This leads to unnecessary delays, reduced quality of service (in terms of punctuality/reliability) and unnecessarily high fuel burn (e.g., to compensate for delays). These problems affect all barge operators.

Fairway authorities experience similar problems. They need to manage their infrastructure and traffic, which involves operating bridges and locks and handling traffic flows in a safe and efficient manner. This leads to high costs both in traffic management and in investments in infrastructure to ease congestion. Some bottlenecks could be relieved by better planning procedures and planning tools, which would save more money for investments (e.g., investing in an additional lock chamber).

The underlying problem for both sides is the reluctance to share the required detailed voyage plans with the fairway authorities, making it difficult to execute smart navigation schemes in waterway corridors.

Integration of IWT in logistics processes under development

Today's supply chains are not yet adapted for the seamless integration of IWT. It is not only about physical but also about contractual adaptations to utilize the benefits of IWT. In order to support the EU Green Deal objective of modal shift, sharing of data and other information is key in a seamless process of moving the cargo from consignor to consignee. At this moment, capacity is mainly lost due to lack of (actual) data or information at critical events in the logistical chain. This results for example in logistical inefficiencies at ports and terminals, but it also represents a potential loss of revenue for IWT entrepreneurs as shippers choose other modes of transport for their operations.

Sharing of data between parties is at present limited due to the following reasons:

- absence of standards for once-only reporting of traffic and transport data;
- absence of a data sharing infrastructure (such as the EU mobility data space);
- no harmonisation of transport documents/datasets and semantics;
- no agreed standards on identification, authorisation and authentication.

Administrative burden and costs involved in complying with and enforcing legislation:

Barge operators need to comply with relevant legislation – both safety-related and non-safety-related (e.g., provision of statistics) in a complex governance structure. In many cases, this includes filing certain declarations to the authorities, e.g., on voyages with dangerous cargo and containerised freight.

Barge operators indicate that they must file the same data multiple times, either to comply with different aspects of legislation or because they are dealing with multiple jurisdictions in cross-border operations, or both.

Compliance with legislation therefore represents a high administrative burden for barge operators, as well as high costs for the authorities that must verify their compliance. The underlying problems are the existing 'declaration-based' reporting system and the limited re-use of data by authorities. Ensuring a straightforward governance structure, further harmonisation and the complementarity between eFTI and RIS is not yet sufficiently addressed and exploited.

Shortage of qualified personnel

In the meantime, significant developments in automation took place. Automation will be helpful with fourth challenge of "shortage of qualified personnel". Automation can help to make the sector more attractive, by giving remote control vessel operators the possibility to work from their place of living in a normal office environment, by the digital upskilling of workforce and creating attractive jobs for old and young in the logistics sector.

II. Vision

To meet the digitalisation challenges, the following vision for a digital inland waterway area in 2035 is put forward:

By 2035, with the aim of achieving safe, seamless and sustainable inland navigation, inland waterway transport in the European Union is a competitive, resilient, attractive, innovative connected, cyber secure and digital by default mode of transport for freight and passengers which is fully harnessing the potential of digital technologies and emerging solutions, thereby allowing effective data-sharing between all parties of the chain, thus enabling seamless integration with other modes of transport as well as automation, by embracing the latest digital achievements and contributing to a better functioning of the Inland waterway single market. IWT will be part of the concept of Physical Internet. It will help overall time efficient, sustainable transport flows and support other modes to decongest.

By 2035 the concept of smart shipping is expected to be fully fledged

Smart shipping is a widely used term, with several definitions available. Smart shipping is broader than just an autonomous vessel. Smart shipping is understood as a comprehensive approach consisting of the following four components:

- **Smart administration** – This is the policy framework of legislation and the governance at the core that enables and facilitates smart data and its exchange, infrastructure and vessels, as well as their deployment and the reduction of administrative burden in order to create a smooth interaction between the physical and digital worlds. The administration itself is smart and provides a single window environment. Freight transport has become paperless covering the financial, technical and operational level thanks to a smart administration which acts as a no-stop-shop. Passenger transport is facilitated by integrated, electronic, multimodal ticketing. Authorities facilitates IWT to become a reliable transport mode in logistics with smart traffic management at network level. Authorities facilitate and support innovations and forward-looking initiatives in smart shipping taking a solution-oriented and a holistic approach advancing the public good such as safety, resilience, sustainability and security.
    - By 2035
        - The RIS Directive aims to improve data quality, to increase the availability of real-time and near-term information, to ensure once-only reporting and to foster harmonisation. It will ensure seamless data sharing and traffic management taking into consideration new requirements arising from emerging challenges and take into account the digital transformation (e.g., the emerging and interacting automated inland vessels, corridor and network management, synchro-modal supply chains, port information systems…).
        - The Directive on technical requirements for inland waterway vessels will have taken into account the new requirements and harmonised rules related to automated navigation, in order to facilitate the use of automated vessels on the European waterway network.
        - All the communication between the different IWT actors is expected to be digitalised.
            - The concept of e-tools (for digital certificates for crew and vessels) is expected to be fully implemented/deployed.

                - The use of digital tools will have alleviated the administrative burden and ensured a level playing field through the simplification and improved enforcement of those rules on navigation time, work and rest periods.
            - The crewing requirements are today regulated only at national and Rhine level, and not at the EU level. By 2035 the crewing requirements are expected to be regulated at EU level. A forward-looking and flexible legal framework is expected to be established. Digital tools should facilitate the proper implementation and enforcement of that framework.
            - Digital documents/data storage and exchange as the digitalisation is a horizontal task (covering all segments of the sector) – the crucial part of it will be acceptance of digital certificates. The intention is to have in the future IWT business which will use e-docs (e.g., cargo related documents, professional qualification certificates, vessels' certificates) with tamper-proof systems for automated recording of information in real time and make them available for remote access, allowing exchange such information/data between authorities, enforcement bodies. Recording of and access to such information will be done in line with the core principles as agreed by the social partners in IWT and laid down in attached document.
              This activity will also tackle cargo documents – it is to ensure alignment with the work of eFTI.
            - The EU legislation related to digitalisation such as the RIS directive and the eFTI regulation is consistent and interoperable. It is implemented EU wide.

- **Smart Vessels** - Smart vessels are vessels that are highly automated and/or remotely operated and are therefore equipped with automated systems using (external) data to optimise the key functions of the vessel.
    - By 2035
        - A significant part of the European inland vessels fleet is expected to consist of highly automated vessels, safely operating in coexistence with "conventional inland vessels".

- **Smart Infrastructure** - Smart infrastructure is available 24/7 on the whole inland waterway network and - where necessary - highly automated and operated remotely. Interaction between infrastructure and vessels takes place digitally, to guide traffic in the safest and most efficient way possible.
    - By 2035
        - The European waterway network infrastructure and corresponding moveable infrastructure (moveable bridges, locks, …) are expected to be highly equipped with remote control operation and automation. Smart management of infrastructure (sensors, digital twins, prediction tools, etc.)
        - The European waterway network infrastructure is expected be adapted where necessary to allow the safe coexistence of automated vessels and "conventional" vessels.

- **Smart data** - This is a data exchange/sharing process that aims to be a smart, smooth, and flexible system in which all the communication between the waterway authorities, transport operators, terminal operators and waterway users is digitized and conducted according to internationally standardized procedures.
    - By 2035

- All the communication between the different IWT actors is expected to be digitized.
    - The concept of e-tools (for digital certificates for crew and vessels) is expected to be fully implemented/deployed.
    - The use of digital tools will have alleviated the administrative burden and ensured a level playing field through the simplification and improved enforcement of those rules on navigation time-, work- and rest periods.
- IWT is expected to be fully integrated through the EU Mobility Data Space into a European single market for data (crew, vessels, cargo, infrastructure)
    - In the EU single data market
        - data flows within the EU and across sectors, for the benefit off all
        - European rules, in particular privacy and data protection, are fully respected.
        - the rules for access and use of data are fair, practical, and clear.

By 2035 an IWT data space fully integrated into the EU Mobility Data Space has become reality

In the inland waterway transport sector, there is no EU wide single window for vessels and voyage reporting yet. Moreover, inland waterway operators are required to declare a range of information to national authorities and there is limited re-use of such data by these authorities. Developing and deploying and EU wide EuRIS including the current European IWT repositories (e.g., EHDB) would help solving this issue and facilitate the implementation of a real cross-border, once-only reporting environment for IWT.

- By 2035
    - The emerging European IWT single window environment is expected to be integrated in the EU Mobility Data Space to connect with other transport modes so that any participant can use one single data integration for B2B and B2A purposes. The European IWT single window environment should be interoperable and interfacing with the European Maritime Single Window Environment as well as with similar platforms for other modes/nodes/sectors to evolve to synchro-modal connected information services for data sharing and traffic management as part of the EU Mobility Data Space.

By 2035 the RIS Network Management concept has been implemented

IWT stakeholder like vessel operators, terminal operators, fairway, traffic and other related authorities as well as the concerned logistics sector heavily depend on reliable and easily accessible information about the conditions/parameters of fairway, infrastructure, traffic, and transports within their daily business. This information is provided by River Information Services which have been realised over the last decades in a fragmented, decentralised approach. With the realisation of the RIS Corridor Management concept major step forward was achieved concerning availability and accessibility of the required important information services as well as harmonisation of standards and requirements in this area**.** This will further evolve into network management.

By 2035

- A legal basis for the implementation of a permanent European wide RIS Network Management platform is expected to be incorporated into the EU IWT legal framework.
- The RIS Network Management concept will be further advanced, taking into consideration new requirements arising from emerging challenges and developments.
- New and harmonised of standards for efficient implementation of digitalisation in the sector (CESNI) are expected to be set.

Optimizing traffic and transport management and the development of a resilient and reliable information infrastructure will help the integration of automated inland shipping into synchromodal transport chains.

III. Next steps

In line with the NAIADES III Roadmap for digitalisation and automation of IWT (Flagship 6), the Commission will launch a CEF technical assistance project to develop closer public-private cooperation in IWT and facilitate the implementation of the IWT Digitalisation vision. Based on the present vision, the terms of reference for the call for tenders for the CEF technical assistance (NAIADES III – Action 26) will be drafted by the Commission.

The DINA Expert Group will not only discuss the implementation of this vision document but also update, when necessary, the vision to reflect new essential developments.

Finally, to ensure this vision turns into reality, an active role by all relevant public and private stakeholders is required.