# The Fairway to Corridor Management

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**Abstract.** This document is a description on the path we're working on in Flanders to implement corridor management. At this moment we're already providing services on European lever, but in other to be futureproof inland waterway transport has to take a next step to evolve to a reliable, modern, efficient and innovative transport mode. A brief description is given on the status today and the next phases in the program. Both the waterway authorities and the sector will have to do some efforts to realize the next phases. The document doesn't consists all the details because this is a work in process with all involved parties.

**Keywords:** Corridor management · ETA · RIS · Planning

## 1 Introduction

Since 2017 De Vlaamse Waterweg nv offers a certain amount of RIS services towards skippers and logistic parties by means of the VisuRIS portal. The provided services are meant to provide fairway information to the user or to share information with logistic partners on ETA's (estimated times of arrival) of certain vessels. The information is always a reflection on the status of the waterway network or the result of calculations made using collected voyage information and the status of the network, but it's always a snapshot of the situation at that moment.

In 2022 De Vlaamse Waterweg nv and 12 other European waterway authorities will launch these services on a larger scale towards the inland waterway users in Europe, as a result of the European RIS COMEX project. This will be done via the EuRIS platform where RIS services will be offered to facilitate corridor management. With this new portal users can already use the services on a European level and have one location for all information. Voyage information will also be available for cross border voyages.

This is a first, but indispensable, step towards green and efficient corridor management and planning in the future. But, to be able to facilitate a full-blown corridor planning some building blocks are missing in the current scope of EuRIS.

To get to the next level waterway authorities need to deliver an higher service level at locks and bridges. Therefore De Vlaamse Waterweg nv keeps building on the necessary features to facilitate full-blown corridor management.

## 2   Traffic Management Today

Today inland vessel operators or captains have to estimate themselves at what time they have to leave their berth to be at the destination at the requested time. And for some vessels (for example container vessel going to a terminal in a seaport) it's not that easy because they only have a limited time window when they can more at this location.

The operator has to estimate, based on the information that's available on traffic density, possible blockages and operating hours at locks when they have to start their voyage.

During their voyage they have to take in account possible waiting times at locks. At the moment vessels are planned based on their arrival at the lock and first come first served. This means that they're not certain when they will be served at the moment they're making their voyage plan. This resolves in vessels racing each other in order the be first in line at the locks, waiting times at terminals because they're to early and last but not least in extra containers on a truck because the vessel had already left at the terminal to ensure his timeslot in the Harbour.

A first step to facilitate operational improvements in this use case DVW has already done some extra developments to support lock and bridge operators to plan traffic at their objects, but they can still only do this following the current, and outdated, rules.

## 3   Automated Voyage Plans and Traffic Image for Each Vessel

A first building block that's developed is the generation of the voyage plan. Combining information gathered through AIS and the voyage and cargo information of all vessels on our network, we're able to calculate detailed ETA's at all locks and bridges. These ETA's are constantly monitored and optimized, based on the AIS position, the voyage information and lock scheduling. This data is shared with the traffic planners on shore and the skippers.

Having the voyage plan on time is a major factor for success. To ensure this, skippers have to announce their voyage electronically. Based on this information, ETA's for locks and bridges are calculated automatically by the European routing software of EuRIS, taking in account the dimensions of the vessel, the network and the route points given by the skipper.

To avoid extra administrative burdens for the vessel operators we ask them to send us this info using reporting software, which can be integrated in the current software packages they currently use in the wheelhouse (iENC viewer, container planner, …).

Also the process for collecting waterway charges is incorporated in this service by using the same information. Making use of the calculated voyage we will be able to automate and optimize the process both for waterway users and authorities.

When the voyage information is processed by VisuRIS it will constantly be monitored and recalculated when needed based on AIS and registrations in the lock planning software. But since planning is still only done within a certain perimeter from the lock the ETA at the end of the voyage is not certain.

At the moment the quality of the ETA-calculator is suboptimal due to different reasons:

- Missing information on interruptions of the voyage (staying overnight, delays at a berth…)
- ETD (Estimated Time of Departure) is not always correct or voyages are announced to late.
- Missing lock schedules at all locks
- Missing interaction with other transport modes (trains on movable bridges)
- Missing variables like, flood, weather conditions, traffic density, …

Filling these gaps and improve data quality is one of the challenges in the future.

## 4  Lock and Bridge Management

Locks are, most of the time, a time-consuming factor during the voyage of a vessel, certainly in a country like Belgium where there are a lot of locks on the main waterways. Optimizing planning and considering RTA's (Requested Time of Arrival) of the skipper can have a huge impact on the reliability and carbon footprint of inland shipping.

Therefore we've provided our operators a lock planning software. Based on calculated ETA's, vessels are planned at the different locks and bridges. At this moment, each object (i.e. a lock or bridge) makes his own planning. This can be done based on an automated proposal that's made by the software or the operator can make it manually. When a vessel is planned at a certain lock the Estimated Time of Departure (ETD) will be added to the voyage plan.

Our lock operators have a good overview on the ETA of the vessels and plan traffic in both directions optimizing water usage. Today the planning is communicated through VHF but in the near future we'll also do this via an API (Application Programming Interface). Based on a validated schedule a digital message will be send to the each vessel. Through this message he can see where he must take position in the lock basin, the order that they have to follow to enter the lock and the dimension of the other vessel.

Thanks to the EuRIS system we're able to offer this information through a centralized European API towards the vessel operator, certainly in case of automated vessels this service will become indispensable.

To improve data quality and increase the usability, our scheduling software receives directly data from OPC and VHF systems. Some of these data like the position of a bridge, lock door, traffic light, … will be offered via AIS and API's to the skippers on board or in the vessel control centers (in case of a remote operated vessel) to increase safety around the lock in all conditions.

Colleting all these data will enable us in the coming years to optimize our ETA calculation and predicted passage times in different situations (number of vessels in the lock, type of vessels, …). This data is indispensable to reach automated corridor planning in the future.

## 5   Digital Handshake

To be able to move towards corridor planning, where we agree on passing times on all objects with the skipper not only legislation will have to change, but skippers will have to be convinced of this approach. We will have to convince them this will make inland shipping more efficient, reliable and green.

In the upcoming years we hope to evolve from a human traffic planner that operates one lock, to a traffic planner that agrees on planning with the users for the entire network.

This means that software on board of the vessel will have to communicate with lock planning software to agree on the time that the vessel has to be on each lock. This has to take in account the possible time windows at the lock, resting times of the vessel, speed of the vessel,….

A correct planning can only be made in collaboration between the vessel operator and the traffic planner. Based on a digital communication a timeslot has to be agreed upon for the different obstacles on their route. The vessel can optimize his time of departure and speed to be at the lock's at the foreseen time and the lock operator will be able to prepare his lock.

The most optimal scenario is that a all planning's are made before the voyage starts, but in a first phase it would be good to be able to offer these services on smaller corridors or within certain time windows and with locks that are managed by one traffic manager. But it's important to standardize communications and to foresee a single point of contact like is done in the EuRIS system. This will make it easier for suppliers of on board software to use these services.

## 6   Challenges

To provide a good corridor management service some challenges will have to be overtaken:

- Receiving voyage information of high quality & on time
- Reliable ETA calculation and lock passing times (cfr. supra)
- Convince waterway users of corridor planning and change legislation
- Connect software in the wheelhouse with lock planning software
- Modernize legislation focused on modern service levels

To achieve our goal both the waterway users and the authorities will have to some efforts. Therefore it's important to collect enough data to optimize the calculation and to do a GAP analysis to indicate and eliminate the blank spots.

Authorities also have to try to minimize the administrative burden for operators. This means that we first have to try the fill the gaps with automated processes and try not to ask more actions at the operator side.

But it will also be important to start with a realistic scope. Our dream is to offer a reliable planning and to strengthen the position of IWT. But it's not realistic to get there with a big bang. These services will have to grow starting with a smaller scope, for

example a stretch with a manageable number of locks and within a certain time window, and evolving towards larger corridors and maybe in the future an entire voyage.

## 7  Opportunities

All services provided today are focusing on inland water transport but when corridor management is fully operational this can also bring opportunities for other transport modes. Sharing information when bridges will be open or closed with route planners will avoid certain traffic jams on certain roads. Communication with rescue services can be elaborated.