Memo

Deltares

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Subject
On the use of the EuRIS network in the Digital Twin Waterways

Voorliggend memo is een product van het project TRANS2 ("TRANSitie naar een klimaatbestendig en duurzaam Rotterdams achterlandTRANSport"), een project met 15 partners onder coördinatie van Deltares. TRANS2 gaat primair over klimaatadaptatie: hoe kan de binnenvaart zich aanpassen aan, meer grip krijgen op een veranderend klimaat? Project TRANS2 is mede gefinancierd door TKI Deltatechnologie uit de PPS-innovatie programmasubsidie van het Ministerie van Economische Zaken.

1 Digital Twin Waterways: EuRIS network

We looked at the (potential) use of the EuRIS network instead of the FIS network in the Digital Twin Waterways (DTW). The application of the EuRIS network in a single test simulation can be found here:
https://github.com/Deltares-research/digitaltwin-waterway/blob/poetry-lock-en-toml-toevoegen/notebooks/ivs/simulation_euris.ipynb

1.1 The current network (FIS network)

The current graph used for the digital twin is based on the Fairway Information Services (FIS). This network contains all waterways in the Netherlands, some in Belgium, Germany, France and Luxembourg. The network has a high resolution for the Netherlands, but a lower resolution for the other countries.

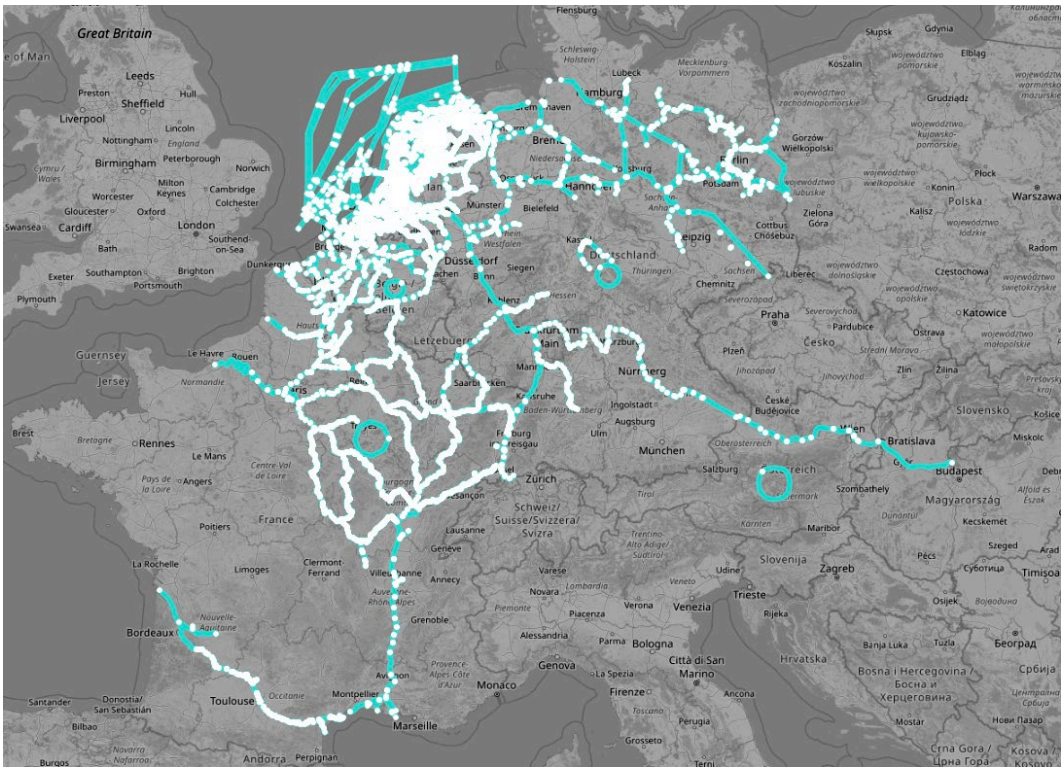

Figure 1 The entire FIS network.

1.2 The EuRIS network

The EuRIS network is a network from EuRIS https://www.eurisportal.eu/. EuRIS is a collaboration project between 13 different countries in Europe. The developed system mainly used for route planning. Since it is a collaboration between 13 countries, it has quite an extensive reach, which allows skippers to easily have the navigable waterways in one place.

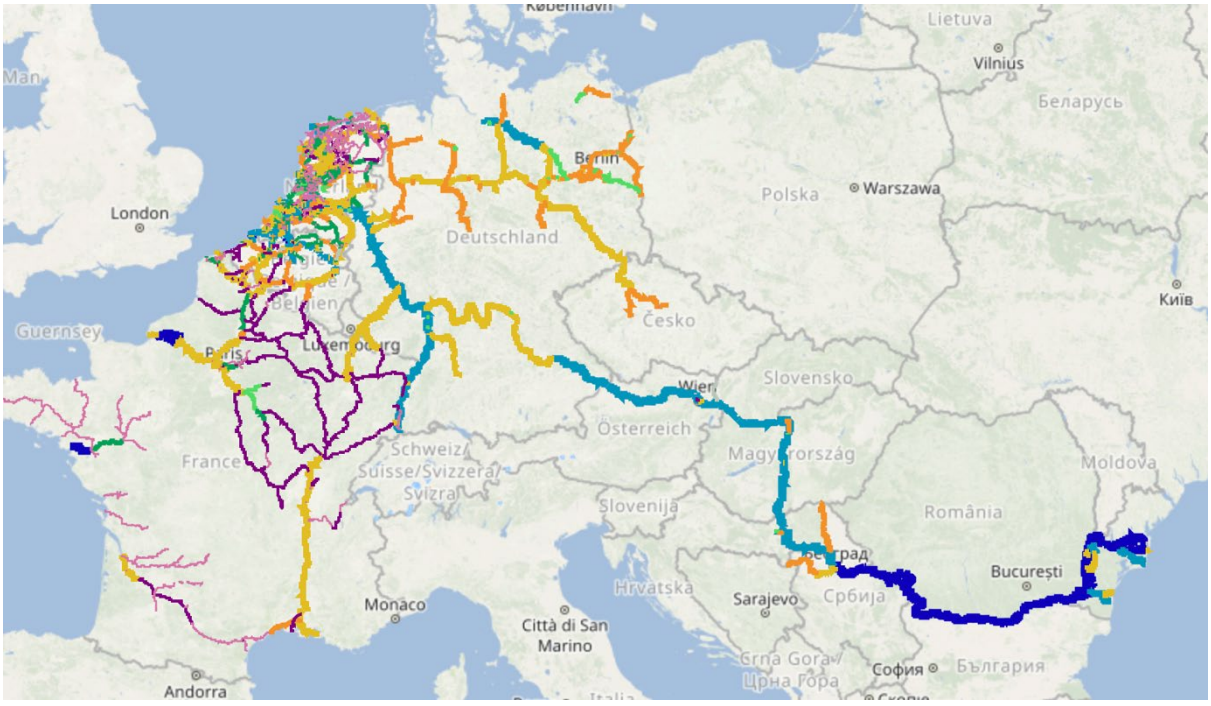

Figure 2 The entire EuRIS network.

1.3 Considerations

The use of the EuRIS network instead of the FIS network for the Digital Twin Waterways has some advantages, namely:

- Wider coverage. The EuRIS network covers more waterways across more countries than the FIS network does.
- Higher resolution. While FIS has a high resolution in the Netherlands, outside of that it is lacking. EuRIS has the same resolution in the Netherlands as FIS, while also having a higher resolution in other countries such as Germany or France.
- More accurate. FIS has some parts where a connection between two waterways is not connected in the network, or the edges are slightly off. EuRIS improves this overall.
- The FIS network has circles for a closed path within each country. These circles are not present in the EuRIS network.

There are however also few shortcomings in the EuRIS network. The connections between two edges at the borders between two countries are not always visually connected. The edges are topologically connected, so this does not form issues in a simulation, only in its visualization.

Hydraulic structures are registered in the EuRIS database, but are not directly linked to the EuRIS network. Adding the structures (locks, bridges) to the DTW requires attention when switching to the EuRIS network.

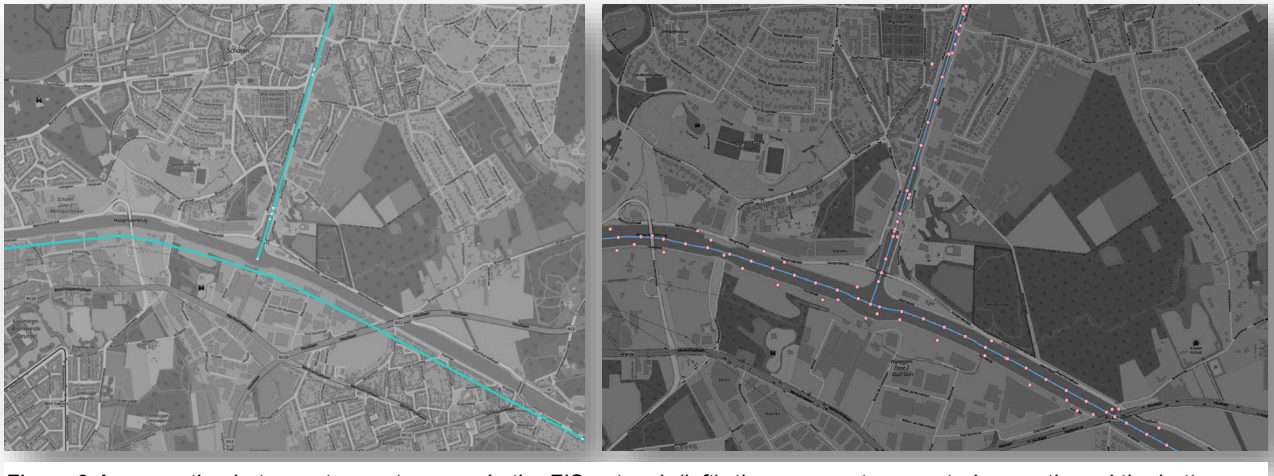

Figure 3 A connection between two waterways. In the FIS network (left), these are not connected correctly and the bottom edge is not properly aligned with the waterway. The connection in EuRIS does not have this issue.

Figure 4 Part of a waterway in Germany showing the difference between the resolution in the FIS network (left) and the EuRIS network (right).

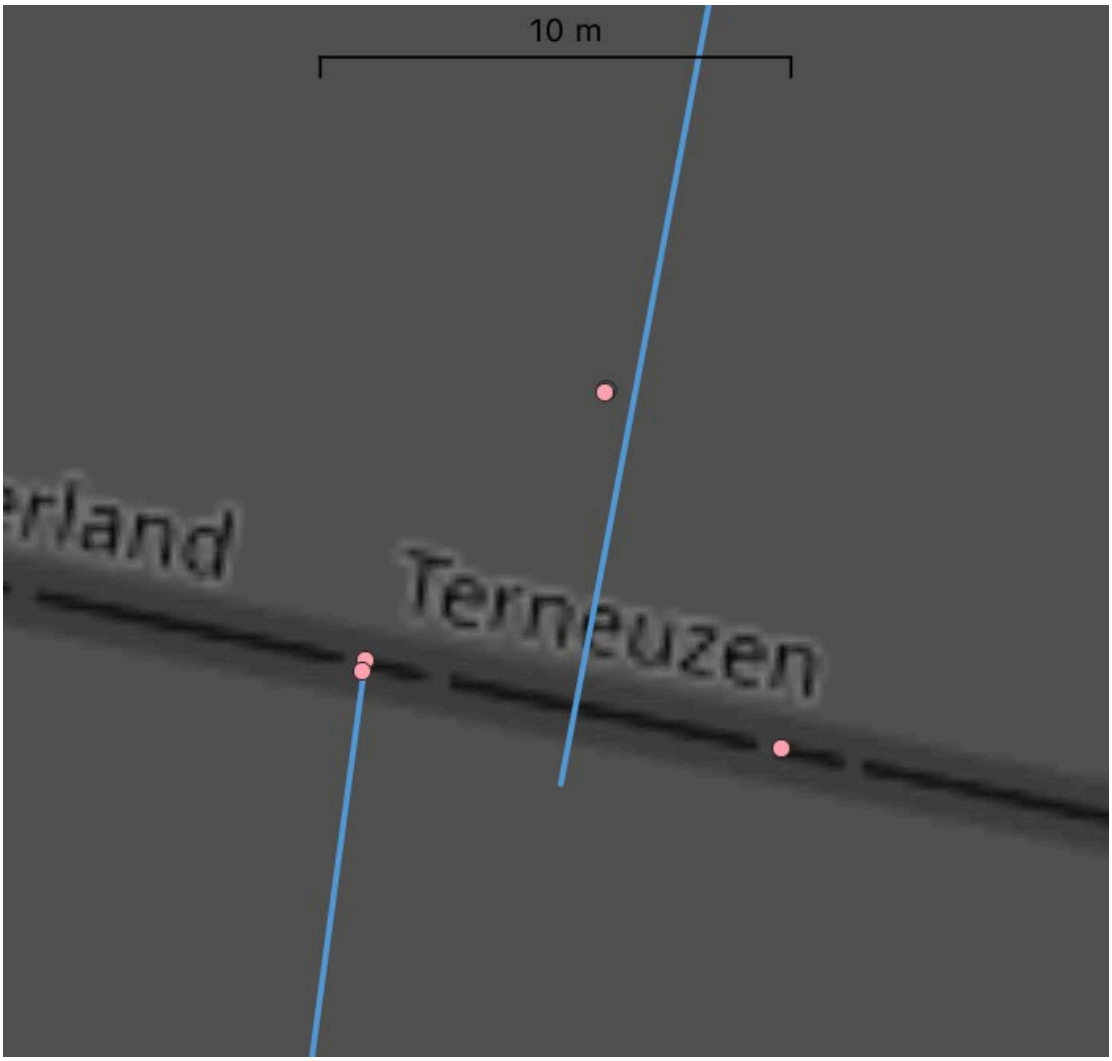

Figure 5 The connection of two edges between the Netherlands and Belgium border in EuRIS.