

Newsletter Shallow Water

Knowledge Centre Manoeuvring in
Shallow and Confined Water



January 2026

This is the 62nd newsletter of the Knowledge Centre Manoeuvring in Shallow and Confined Water, which is a collaboration between Flanders Hydraulics and the Ships and Marine Technology Division at Ghent University. In this newsletter, we have items on research on open water swimming in inland waterways, on research to support sustainable fishing and operational parameters by AIS-analysis for overtaking manoeuvres. We would like to wish you an interesting 2026 with positive impact for the maritime world and global society.

Research on open water swimming and shipping in inland waterways



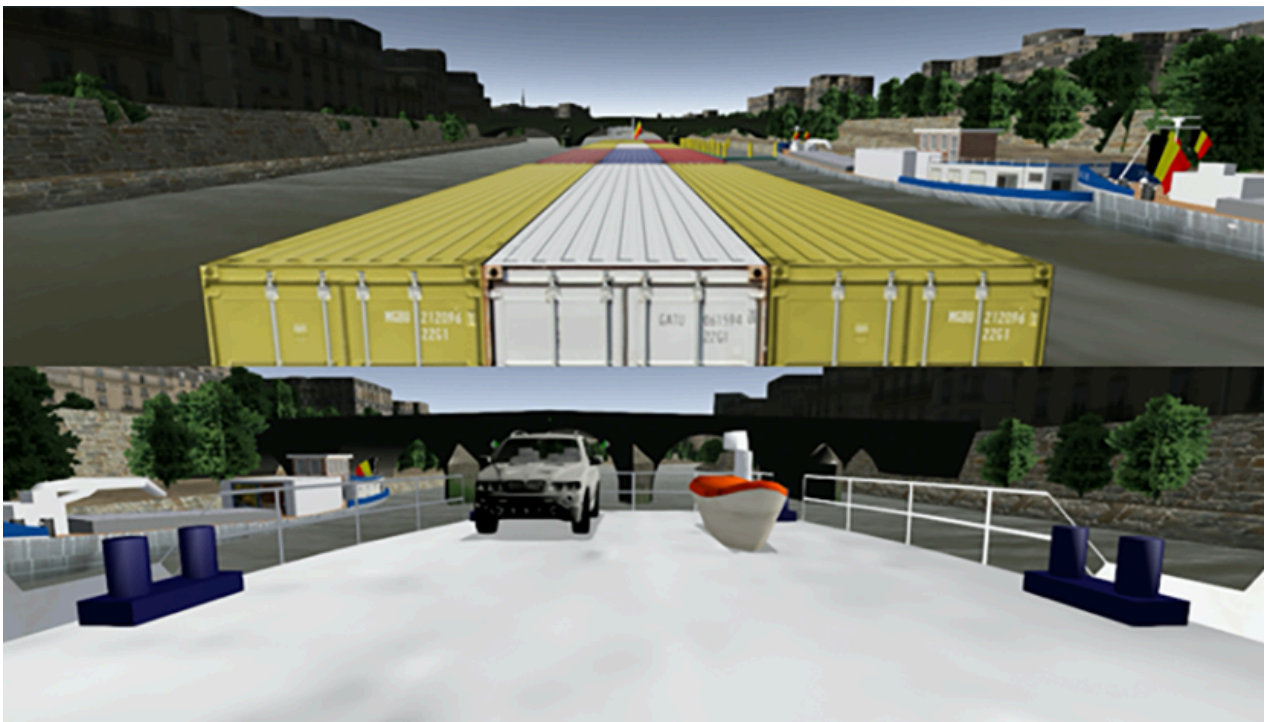
Last summer, the Belgian press published a series of articles on open water swimming in Europe. With more people living in cities around the world and rising temperatures, the question arises: can we make swimming accessible and affordable for everyone in cities with open water, such as rivers and canals? In Belgium, the current regulation states that you may only swim in open waters that are officially designated for swimming. However, there is a shift in thinking towards the idea that open water swimming should be allowed everywhere, except where it is specifically prohibited. While this is not yet the case, France—benefiting from the legacy of the 2024 Olympic Games—has opted for dedicated swimming areas in the Seine and other rivers, such as the Marne.

On 5 July, three swimming areas opened in Paris along the Seine. For the Bras Marie location, commercial shipping was prohibited during swimming hours, but at the sites in Parc de Bercy and in front of the Eiffel Tower, both shipping and leisure activities for locals and tourists were allowed to coexist. As the number of designated swimming areas along the river is set to increase, Flanders Hydraulics conducted real-time simulations with a French captain using the inland navigation simulator to determine the most suitable of two possible locations, taking into account trajectories and potential emergencies. The French government has chosen to establish a permanent swimming area at Bras Marie, meaning after installation in spring 2026, commercial shipping and swimming in the Seine can take place side by side.

If you want to share how your government is facilitating swimming in open water, please e-mail to info@shallowwater.be.



Enjoying the nice temperatured Seine water in Bras Marie.



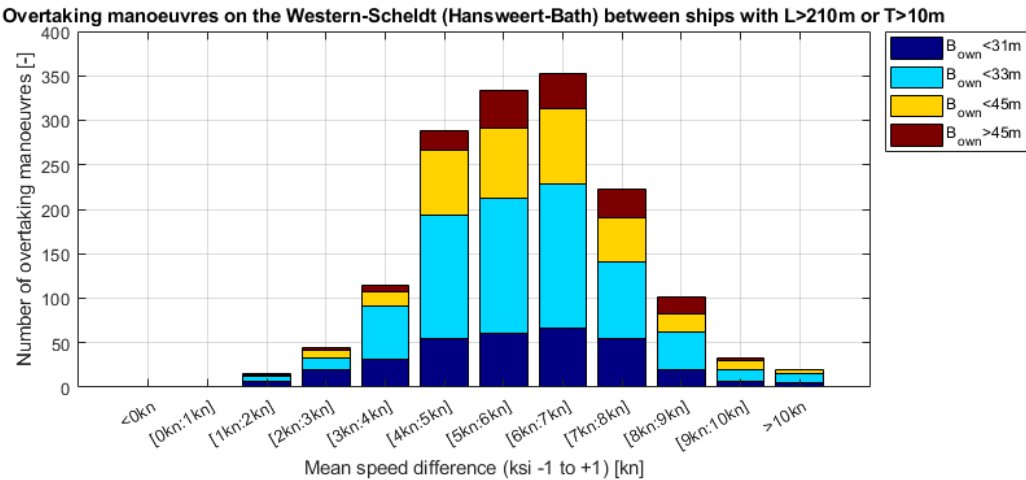
Front and rear view during the simulations in Bras Marie with a container ship passing the moored ships and swimming area.

Operational parameters by AIS-analysis for overtaking manoeuvres

In recent years an increased number of incidents related to overtaking manoeuvres is reported on the Western-Scheldt. In most cases the overtaking-manoeuve was performed between an ultra large container ship and a smaller seagoing ship. The Flemish pilotage requested the Knowledge Centre to investigate the conditions during the incidents and to organize informative workshops on the operational parameters during overtaking manoeuvres.

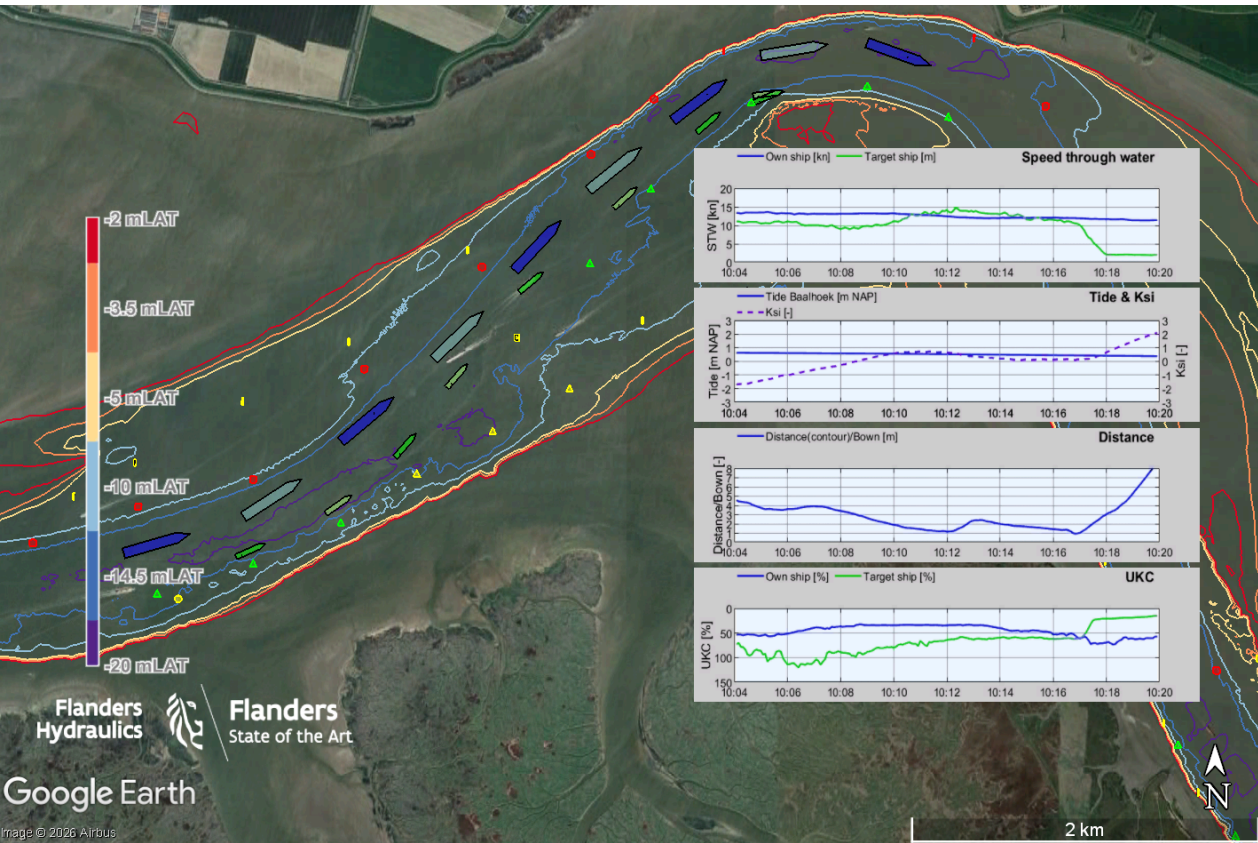
The investigation on the Western-Scheldt was performed based on AIS-data for overtaking manoeuvres executed between the bends of Hansweert and Bath for the period 2012 to 2022. A selection was made with both ships having a length longer than 210 m or a draft of more than 10 m with 1526 unique

overtaking manoeuvres. With evaluated passing distances, ship speeds (over ground and through water) and durations of the overtaking manoeuvres, statistics are derived as illustrated through the relation between number of overtaking manoeuvres and mean speed difference between the vessels (Figure, average of 6 knots).



The assessment revealed that in general (more than 85% of the cases) an overtaking manoeuvre took less than 4 minutes (time for the ships being along each other) and was performed at a passing distance larger than twice the beam of the widest ship. However in two cases a passing distance of less than one ship beam was observed for an overtaking manoeuvre that took more than 5 minutes. In those problematic events ship-to-ship interactions importantly influenced the overtaking manoeuvre.

For a set of reported incidents (of which one corresponded to the problematic events obtained from the global overview) a more detailed evaluation was performed using the AIS-trajectories of both ships with dated bathymetric and tidal data. An example of time series of the operational parameters during the overtaking manoeuvre such as the ship speeds (over ground and through water), the passing distance, the longitudinal distance and the under keel clearance is given in the Google Earth illustration.

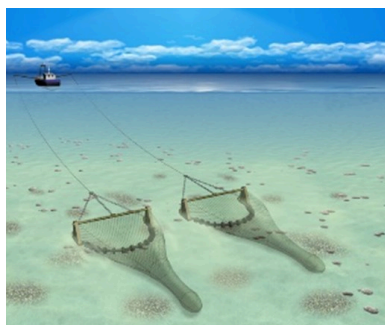


The inbound overtaking manoeuvre between an ultra large container ship (399 m x 60 m x 14.0 m) and a panamax tanker (183 m x 32 m x 11.7 m) clearly presents the effects of ship-to-ship interaction on ship motions. At start the large ship, overtaking the smaller ship, induces an additional drag on the smaller ship and thus reduced ship speed of the latter. Once the midships are separating again, the smaller overtaken ship is attracted towards the container ship in front with the ship speed increasing to the speed of the overtaking ship. At this point the overtaking manoeuvre stagnates and both ships remain at the same longitudinal position. In all incidents this phenomenon occurred and could not be compensated by the ships involved, resulting in grounding, collision or extreme evacuation manoeuvres. The interaction effects responsible for the reported incidents can be explained hydrodynamically based on systematic overtaking manoeuvres performed in the towing tank tests or obtained from numerical evaluations. In September 2025, Flanders Hydraulics organised a total number of four workshops for the parties involved in the nautical chain to explain the hydrodynamic forces during overtaking manoeuvres and the determining parameters. The workshops provided a deeper understanding and especially illustrated the boundary condition for sufficient speed difference when initiating the overtaking manoeuvre (a rule of thumb of $V_{\text{target}} < 0.7 V_{\text{own}}$ was put forward). The synergy between theory and practice was highly appreciated by all participants.

Towards sustainable fishing vessels



Example of beam trawler from the large fleet (source: IJTAMA).

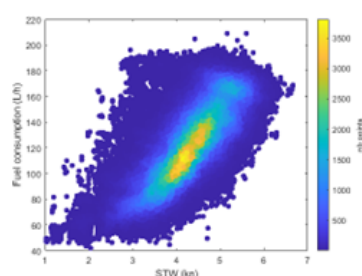


Example of a beam trawl - Source FAO

Facing volatile fossil fuel prices and stricter European sustainability regulations, the Belgian fishing sector, predominantly composed of beam trawlers, is at a crossroads. Ghent University is taking part in the project "Vissersvaartuig van de toekomst" (Fishing Vessel of the Future) coordinated by EV ILVO. A goal of the project is to identify the key environmental and operational parameters, which affect the current fuel use. This is performed via VISTools data analysis and the goal is to develop "quick wins" for existing vessels. In the longer term, the partnership is laying the groundwork for developing new vessels optimized for efficiency (hull shape, propeller) and alternative fuels. This essential research will provide shipowners with actionable advice, guiding the fleet toward a more secure and sustainable future.

Our first step was to analyze data from the actual fleet collected in VISTools to understand exactly how the fuel is being consumed and identify the main factors influencing fuel consumption. The operations of 20 vessels of the Belgian fleet (mostly beam trawl) were analyzed for the year 2024. Moreover, data provided by three shipyards made possible to give some insights on the modeling of fuel consumption taking into account hull characteristics (calm water and added wave resistance), windage area (added wind resistance), propeller and nozzle types (propeller efficiency), engine type. The added resistance caused by the fishing net (the main contributor to resistance during fishing) was not modeled. Instead, we used the actual measured forces from the net for our current analysis.

Since fishing operations represent 80% of the energy demand of a trip, our next phase of research (if granted) will focus specifically on



modeling these complex fishing net forces to virtually compare actual and new gear designs and different fishing practices.

Ultimately, this project will provide shipowners with the detailed data needed to invest in more efficient new vessels (optimized hull shapes, propellers) and transition to alternative fuels, securing the future of Belgian fisheries.

Activities

The second meeting of the 31st ITTC Manoeuvring Committee was held at Flanders Hydraulics in Antwerp, Belgium, on 20–21 November. As a member of the Manoeuvring Committee, José Villagómez organized and hosted the meeting. On the first day, the meeting took place in Antwerp, and on the second day in Ostend, where the Committee members had the opportunity to visit the MOC Towing Tank and witness demonstration runs of the facility in operation. The third meeting of the Manoeuvring Committee will be held in Tokyo, Japan, on 11–13 June 2026.

The first in-person meeting of the ITTC Resistance Committee was held in Naples, Italy on 2-3 December, which was attended by Maxim Candries. The meeting was hosted by Prof. De Luca at the University of Naples Federico II. During the meeting, the state of the art on resistance was discussed and a visit was paid to the towing tank of the Hydrodynamic Experience Laboratory. This 136 m long towing tank has a carriage with a maximum forward speed of 10.0 m/s. Several topics were discussed in detail, such as the resistance of high speed marine vehicles, CFD based form factors and resistance in shallow water.

Jeroen Verwilligen and Marc Mansuy attended the PIANC - Smart Rivers Conference (Memphis, Tennessee, USA). Jeroen presented 'Development and application of an AIS processing toolbox for inland navigation on the Walloon waterway network' written by Verwilligen, J.; Panahi, S.; Eloot, K.; Mansuy, M.; Swartenbroekx, C.; Bousmar, D. Marc presented 'From Full-Scale Trials to a Simplified 3DOF Manoeuvring Model: enabling Rapid Assessment of SFAZ Vessel Performance' written by Marc Mansuy, Guillaume Delefortrie, Maxime Candries, Inna Alliot-Polgouï, Alain Alliot, and Lionel Mesnil'. The presentation was part of the "Digital Twins" session, including a 15-minute talk followed by a 5-minute Q&A. The conference concluded with a technical visit onboard the MV Mississippi, the largest towboat of the US Army Corps of Engineers.

Researchers associated with the Knowledge centre recently published:

Chillce, G.; Zentari, L.; Van Hoydonck, W.; Bedos, A.; Ley, J.; Gornicz, T.; Yang, Y.J.; Oud, G.; Tenzer, M.; Rzeszutko, J.; el Moctar, O. (2025). Numerical calculation of hydrodynamic forces on inland waterway vessels during circular motion in shallow and extreme shallow waters. *Ocean Eng.* 318: 120095. <https://dx.doi.org/10.1016/j.oceaneng.2024.120095>

Mansuy M., Candries M., Delefortrie G., Alliot I, Alliot A, Mesnil L (2025) From full-scale trials to a simplified 3DOF manoeuvring model: enabling rapid assessment of SFAZ vessel performance, *in: SMART RIVERS 2025: Celebrating the World's Navigable Waterways, 8-12 September 2025: Conference Proceedings*, more

Page, S.; Mansuy, M.; Eloot, K.; Swartenbroekx, C.; Bousmar, D. (2025). Use Case of the Detailed Design Approach proposed by PIANC InCom WG 141 in the Study of the Accessibility of 135 m vessels on the Upper Scheldt in Wallonia (Belgium), *in: SMART RIVERS 2025: Celebrating the World's Navigable Waterways, 8-12 September 2025: Conference Proceedings*. pp. [1], more

Verwilligen, J.; Panahi, S.; Eloit, K.; Mansuy, M.; Swartenbroekx, C.; Bousmar, D. (2025). Development and application of an AIS processing toolbox for inland navigation on the Walloon waterway network, in: *SMART RIVERS 2025: Celebrating the World's Navigable Waterways, 8-12 September 2025: Conference Proceedings*. pp. [1-10], [more](#)

Congratulations



Danie Wium publicly defended his PhD thesis with success at Ghent University on Monday 17 November 2025. His doctoral research addresses a key challenge in contemporary super yacht design: How to safely increase window sizes while preserving structural integrity and design freedom? Danie Wium's research explored an alternative concept in which glass is structurally integrated as a load-bearing component of the superstructure. The work investigates both global and local structural behaviour, including deformation effects and yacht-specific load cases and studies innovative adhesive bonding techniques between glass and metallic components using a combination of numerical modelling and experimental validation. His PhD was performed at Ghent University's Ships and Marine Technology Division under a VLAIO Baekeland mandate, in collaboration with [MULTI.engineering](#).

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