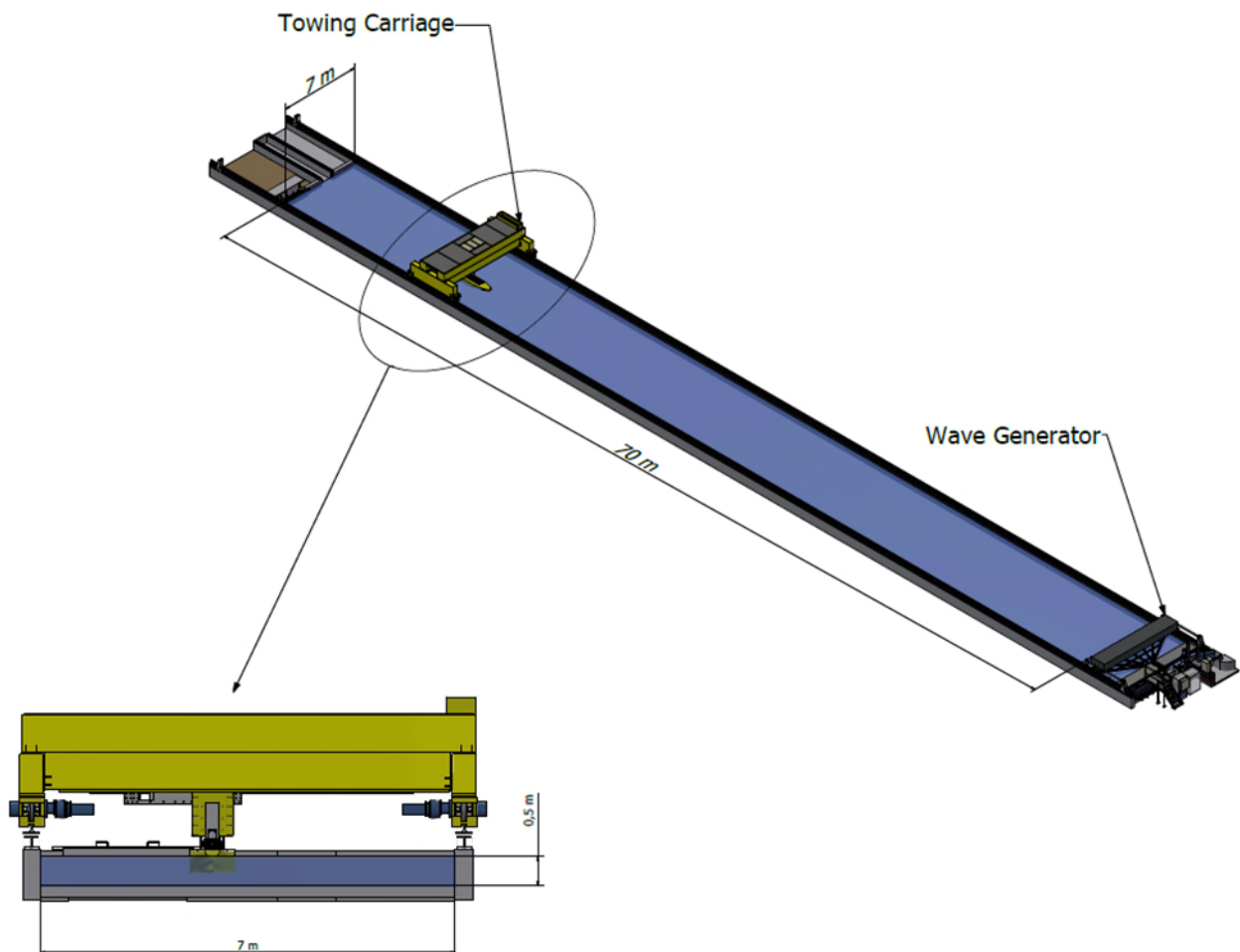


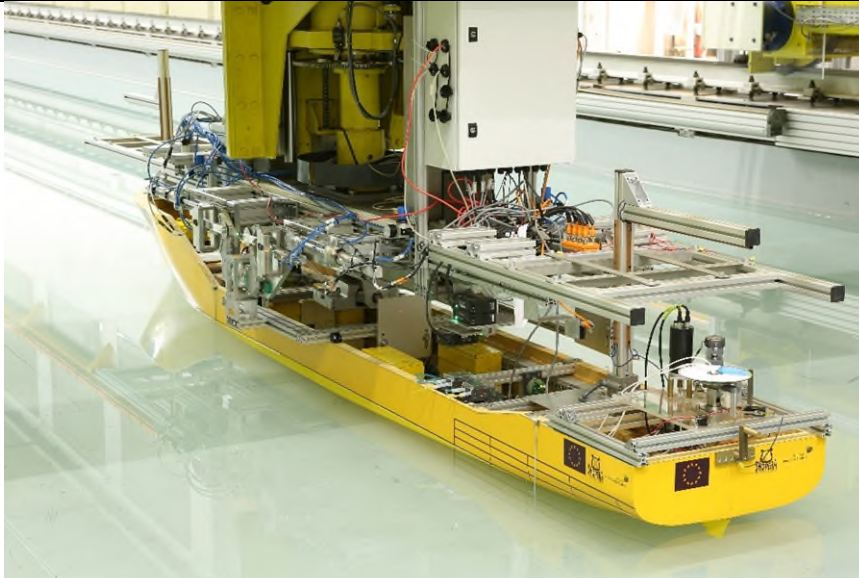
Name of organization Flanders Maritime Laboratory (Flanders Hydraulics (FH) – Ghent University (UGent))		Year of information updating 2023
Year established 1992		Year of joining the ITTC 1993
Address Berchemlei 115, 2140 Antwerp, Belgium		Status in the ITTC member
Contact details (phone, fax, e-mail) FH: +32 324 60 35 UGent +32 9 264 55 55 info@shallowwater.be		Website FH+UGent FH UGent
Type of facility Shallow water Towing Tank	Year constructed/upgraded 1992 (continuous upgrades)	
Name of facility Towing tank for Manoeuvres in Confined Water	Location (if different from the above address)	

Main characteristics (dimensions of tank/basin/test section; for simulators: full mission, part task or desktop)

Total length	[m]	87.5
Useful length	[m]	68.0
Width	[m]	7.0
Maximum water depth	[m]	0.50
Length of the ship models	[m]	3.5 – 4.5

Drawings of facility





Detailed characteristics (carriages, wave/current/wind generators, instrumentations, etc.)

General

Towing tank is fully automated, tests are executed 24/7, captive and free running.
 Shallow water testing in line with ITTC 7.5-02-06-02; vertical variations of the bottom are less than 10% of the UKC.
 Wave generator can generate regular and irregular long crested waves.

Technical information carriage

Captive + free running mode; in free running mode, acceleration and deceleration of ship is by carriage (captive)
 Carriage consists of three sub-systems

- Longitudinal (main) carriage, $v_{max} = 2.0 \text{ m/s}$; $a_{max} = 0.4 \text{ m/s}^2$; 68.0 m running distance
- Lateral carriage , $v_{max} = 1.3 \text{ m/s}$; $a_{max} = 0.7 \text{ m/s}^2$; 5.1 m running distance ($y = \pm 2.55 \text{ m}$)
- Yawing table , $v_{max} = 16.0 \text{ }^\circ/\text{s}$; $a_{max} = 8.0 \text{ }^\circ/\text{s}^2$; -130° to $+220^\circ$ reach

Ship can be attached to roll steering engine to steer up to 4 DOF

Auxiliary carriage (fixed lateral position) can be used to perform ship-ship interaction tests.

Technical information wave gauge

Kinematic characteristics of wave maker, $v_{max} = 0.6 \text{ m/s}$; $a_{max} = 4.4 \text{ m/s}^2$; stroke : 0.3 m

Technical information measurement devices

Equipment is renewed at regular times and in-house technical team is available to perform customization upon project requirement. Non-exhaustive list of measurement devices:

- Force dynamometers,
- Propeller rotation, thrust and torque measurement; testing of L-drives, Z-drives, lateral thrusters,...
- Rudder forces (long., trans., moment) and angle measurement,
- Vertical motion at up to four positions,
- Wave height measurement devices,
- Pressure cells (hull attachment).

Applications (Tests performed)

Captive test matrix (variation of water depth, draft, speed...) -> digital twin ship for shallow and confined water.

Specialized programs in shallow and confined water for ship-ship interaction, bank effects, etc.

Free running tests for validation purposes.

Tuning (captive, free running) and validation (free running) of track controllers for autonomous shipping.

Seakeeping tests in shallow water, including manoeuvring in waves.

Published description (Publications on this facility)

Delefortrie, G.; Geerts, S.; Vantorre, M. (2016). The Towing Tank for Manoeuvres in Shallow Water. MASHCON 2016, Hamburg, Germany.

Van Kerkhove, G.; Vantorre, M.; Delefortrie, G. (2009). Advanced model testing techniques for ship behaviour in shallow and confined water, in: (2009). AMT '09 - The 1st International Conference on Advanced Model Measurement Technology for the EU Maritime Industry, 1st - 2nd September 2009, Ecole Centrale de Nantes, France: conference proceedings, pp. 158-172