Name of organization **Hamburgische Schiffbau-Versuchsanstalt GmbH (HSVA)**	**Year of information updating** 2016
Year established 1913	**Year of joining the ITTC** since its foundation
Address **Bramfelder Strasse 164, 22305 Hamburg**	**Status in the ITTC** Advisory council member
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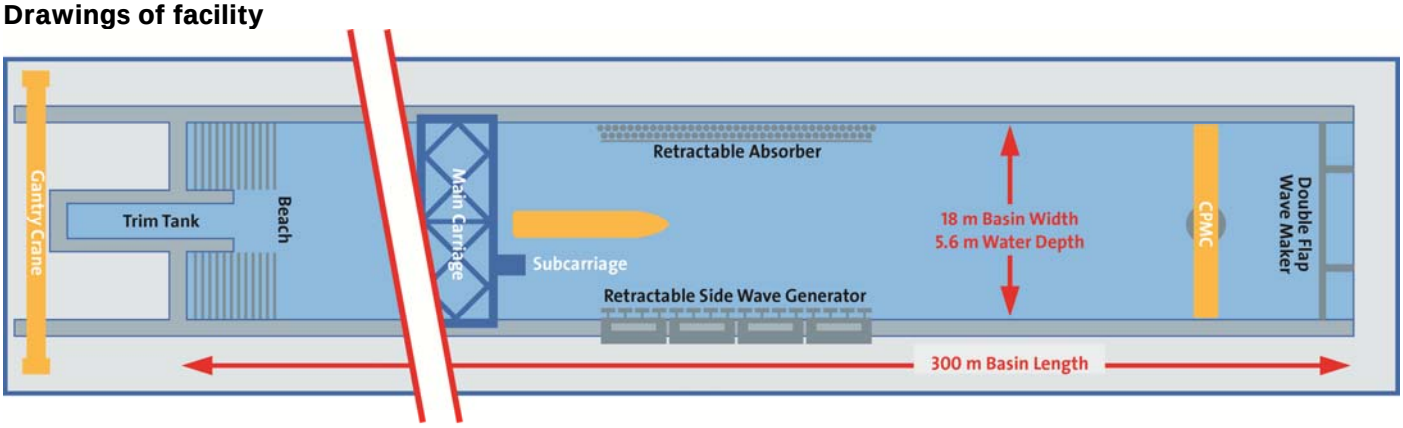
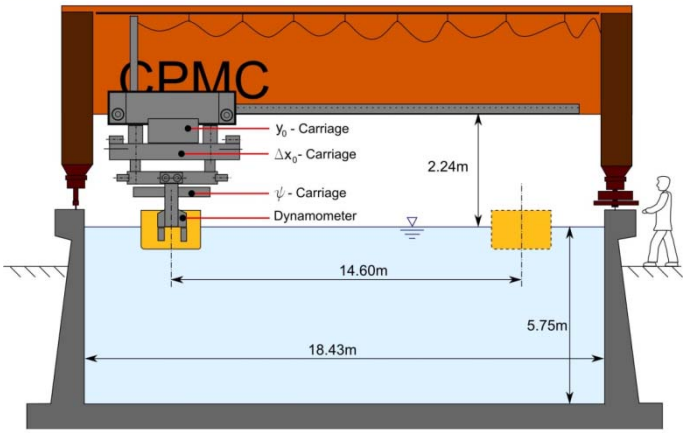
Type of facility Towing Tank, seakeeping and manoeuvring basin	**Year constructed / upgraded** 1965/1976/2011
Name of facility **HSVA Large Towing Tank**	

Main characteristics

- Length 300m
- Width 18m
- Depth 5.6m

Drawings of facility





Detailed characteristics

Main carriage
Manned Carriage, carriage equipped with transverse carriage.
4-wheel motor drive, electronically controlled
Maximum carriage speed 10.0 m/s
Model size 2-12m
Model tracking by human operator or fully automatic control

CPMC (Computerized Planar Motion Carriage)
HPMM attached to main carriage with longitudinal, transversal and yawing sub-carriage. To be used either in captive mode with computer-controlled enforced surge, sway and yaw motions and adjustable fixed heeling angle, optionally free to pitch and heave, or in tracking mode with all degrees of freedom free.
Devices for force measurement:

- one large and one small six-component hull force balance (captive mode only)
- one three-component rudder force balance
- for each of up to three propellers: one propeller dynamometer

Max. number of motors: 3
Max. number of rudder engines: 2
Sampling rate: 100 Hz.

Limits of motion:

	Deflection	Velocity	Acceleration
main carriage	200 m	4m/s	±0.2m/s^2
longitudinal subcarriage	±0.9 m	±0.62 m/s	±0.49 m/s^2
transversal subcarriage	±6.52 m	±1.9 m/s	±0.68 m/s^2
yawing subcarriage	±155 °	±23.5 °/s	±10.64 °/s^2

Double Flap Wave Generator
Wave generator type and extent: double flap type, hydraulic driven, 18m wide
Wave generation: regular waves (up to 0.60m at a period of 2.2s), irregular long-crested seas of several spectral shapes (up to 0.45m at a peak period of 2.2s), wave packets, user-defined wave trains
Wave absorber type and length: sparred wood grating at trimming tank side, 18m wide

Side Wave Generator
Wave generator type and extent: 40m snake type wave generator consisting of 80 hinged flaps each 0.5m in width, electric driven
Wave generation: regular waves (up to 0.40m at a period range from 1.8s to 3.2s), irregular long and short-crested seas of several spectral shapes (up to 0.23m at a peak period range from 1.8s to 3.2s), wave packets, user-defined wave trains, for beam and oblique waves in the range from 20° to 160° wave encounter angle
Wave absorber type and length: five layers of perforated vertical plates on the opposite tank, 60m in length

Model Tracking System
Optical tracking system measuring the 6 DoF of ship motions

Model Control System
Fully automatic by process control computer, PID autopilot

Applications

- Resistance, propulsion and tracking tests
- Flow observation (paint and underwater cameras)
- Bubble sweep down tests
- Wake measurements (axial, 3D laser velocimetry)
- Propeller open water tests
- Seakeeping tests (regular, irregular, short crested waves)
- Measurement of forces and pressure acting on hulls and offshore structures
- Rolling tests, determination of roll damping (roll decay, forced rolling)
- Mooring tests
- Steady-state, dynamic submarine tests
- Tidal turbines
- CPMC:

- In tracking mode for system identification, rudder manoeuvre simulations and IMO MSC.137(76) compliance: zigzag tests, optionally with
  - variable switching angle,
  - computer-controlled frictional correction and
  - computer-controlled revolution rate to simulate engine characteristics
- In captive mode for DP studies, Abkowitz method and research:
  - oblique towing
  - circular arcs
  - bollard pull ahead and astern with various rudder angles
  - sinusoidal tests: pure surge, sway and yaw and coupled sway-yaw

Published description
www.hsva.de

14th Symposium of Naval Hydromechanics, London 1976

Grim,O.; Oltmann,P.; Sharma, S.D. and Wolff:
"CPMC – A Novel Facility for Planar Motion Testing of Ship Models".
Proc. 11th ONR Symp. on Naval Hydrodynamics. London, U.K. (1976), pp. 115-131.

Jacobsen, K.: New side wave generator in HSVA's towing tank. In: Hansa, Heft 10/2011, S. 16–18, Schiffahrts-Verlag Hansa, Hamburg 2011, ISSN 0017-7504