

THE FUTURE OF SHIP DESIGN

Reducing risk with HAV Ocean LAB

How do you develop vessels that are more efficient, sustainable and reliable — before they are even built?

The answer lies in HAV Ocean LAB: a virtual test arena where future maritime solutions are developed and refined long before the first steel plate is cut.

EVIDENCE THROUGH SIMULATION

Rather than waiting until a vessel is launched to understand how it performs, HAV Ocean LAB enables early testing and optimisation in a digital twin of the real ocean. Hydrodynamics, energy consumption, weather conditions and operational patterns can all be simulated — allowing critical decisions to be made earlier, with significantly reduced technical and commercial risk.

“With HAV Ocean LAB, we can test hundreds of design alternatives virtually. Customers get faster answers, lower risk and a more robust basis for decision-making,” explains Stig Endre Moe, Manager Hydrodynamics at HAV Design.

The result is faster analyses, more confident choices, and vessels that perform as intended from day one.

“HAV Ocean LAB provides a space for collaboration between shipowners, yards and designers. This makes the process more dynamic and the end result better”

Stig Endre Moe, HAV Design

TEST. VERIFY. DECIDE.

Every design is simulated, verified and optimised through a proven methodology:

- 1 Concept development**
Rapid evaluation of multiple design options and solutions.
- 2 Simulation**
Realistic operational scenarios tested before investments are made.
- 3 Validation**
Simulated performance benchmarked against real-world behavior.
- 4 Decision**
Confidence that the design will perform as intended in real-life operations.



Stig Endre Moe
Manager Hydrodynamics at
HAV Design



WHAT IS HAV OCEAN LAB?

HAV Ocean LAB is a virtual test laboratory where digital twins of vessels and sea areas are created and evaluated. Hundreds of technological alternatives can be assessed to identify the optimal overall concept for operation, efficiency and service life.

The platform is the result of many years of research and development and is unique within the industry. It gives customers access to a simulation-based approach that was previously limited to specialised research environments.



DEVELOPED IN NORWAY FOR THE MARITIME INDUSTRY

The technology is developed by HAV Group, drawing on extensive expertise in vessel design, energy systems and digitalisation.

“HAV Ocean LAB mirrors reality and allows us to test complex, multidisciplinary systems. This gives our customers a clear technological advantage,” explains Moe.

By integrating real operational data, the simulations achieve a level of accuracy that provides a reliable indication of how the vessel will perform in service.

FROM CONCEPT TO CONFIDENT DECISIONS

When a customer presents a concept, whether a newbuild or a vessel upgrade, tailored digital models are created in HAV Ocean LAB. Bringing people together early in the process helps speed up iterations and strengthen decision-making.

“HAV Ocean LAB provides a space for collaboration between shipowners, yards and designers. This makes the process more dynamic — and the end result better,” says Moe.

The concept is then tested, validated and optimised through four steps:

1. Concept development:

Multiple designs and solutions are evaluated rapidly.

2. Simulation:

Realistic operational scenarios are tested before investments are made.

3. Verification:

Results are validated against real operating conditions.

4. Decision-making:

The customer gains confidence that the design will perform in practice.



CUSTOMER VALUE IN PRACTICE

For customers, this represents a new way of working, where decisions are based on data rather than assumptions. The outcome is shorter development cycles, fewer late-stage changes and improved lifecycle economics.

“When you know how a vessel will perform before you build it, risk is minimised and the outcome becomes predictable,” says Moe.

MAKING THE GREEN TRANSITION MEASURABLE

As environmental requirements become increasingly stringent, making the right choices early is critical. In HAV Ocean LAB, shipowners and designers can document how different solutions affect fuel consumption, emissions and energy efficiency — long before the vessel enters the water.

“HAV Ocean LAB makes green shipping tangible. You can see the effect of changes—not just on paper, but through model testing, sea trials and normal operation. Recently, model tests were carried out on a new hull design developed in HAV Ocean LAB, with outstanding results. The residual coefficient was way below comparable vessels in the test database at SINTEF Ocean in Trondheim,” says Moe.

SIMULATION-DRIVEN SHIP DESIGN

HAV Design views HAV Ocean LAB as more than a digital tool. It is a platform for collaboration, innovation and sustainable development, bringing engineers, ship-owners and partners together to shape the future of ship design.

“This is about more than technology. It’s about building confidence, innovation and competitiveness—together with our customers,” concludes Stig Endre Moe, Manager Hydrodynamics at HAV Design.

Would you like to learn more about how HAV Ocean LAB can reduce risk in your projects?



CONTACT:

Benedicte Garnes
Vice President Sales

+47 970 37 047
benedicte.garnes@havdesign.no

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