

Auto-Carrying Ship Could Usher in Era of Sustainable Shipping



An artist's conception of the Oceanbird wind-powered cargo ship.

Could the solution for achieving truly sustainable shipping be blowing in the wind, literally?

The *Oceanbird*, an automobile-carrying cargo ship, may soon be sailing to a port near you on a stiff breeze. Swedish shipping company Wallenius Marine leading a study of wind-powered ships, along with a Swedish consortium of the KTH Centre for Naval Architecture, and maritime tech developer SSPA, with funding from the Swedish Transport Administration, with a goal of designing Wind Powered Car Carrier (WPCC) by 2021.

Oceanbird features vertical metal or composite wings to harness wind energy for propulsion. They will be raised and lowered telescopically and will be fully rotational. The ship will have diesel engines for entering and leaving port, and to augment the sails to maintain schedules. Wind-powered car carriers will generate less speed than today's conventionally-powered ships, and will take about 12 days to cross the Atlantic instead of the usual seven or eight. The tradeoff is a vastly reduced fuel costs and emissions. The WPCC will carry 7,000 automobiles.

"We've been working on this for several years," said Carl-Johan Söder, a naval architect with Wallenius Marine during a webinar today (September 10, 2020). "Today we're introducing design 3.0."

Approximately 450 large car transporters currently carry vehicles across the oceans between continents, each using

about 40 tons of fossil fuel per day. According to the International Maritime Organization (IMO), the maritime transport industry has established a goal of reducing overall carbon emissions by half by 2050. The WPCC team is aiming even higher.

“We are going much further and aiming for a reduction of 80-90 percent,” said Prof. [Jakob Kuttenkeuler](#) of the KTH Centre of Naval Architecture in Stockholm. “This entails a paradigm shift as today’s ships travel far too fast and with high fuel consumption. We are developing the world’s first emission free shipping concept in modern times.”

Kuttenkeuler said the design is a blend of aerospace and marine engineering. “The rigging should be aerodynamically optimized, robust, light and cheap to manufacture. It can be likened to designing sailing mechanics for an airplane that is going to be tossed about at sea.”

The Swedish Transport Administration provided US\$3.01 million to the consortium for the WPCC research project. KTH was commissioned to provide aerodynamic and sailing mechanics expertise including calculations of performance and route optimization. SSPA will perform water hydrodynamic modelling and testing to validate concepts and designs.

A 1:25 scale model of the WPCC is being evaluated at SSPA in Gothenburg, Sweden.

“We have done extensive computer simulations. Now we need to confirm these simulations with the experiments to get more accurate numbers of the performance and the forces acting on the ship,” said Sofia Werner, Manager Strategic Research Hydrodynamics at SSPA.

Students at KTH developed a seven-meter model to conduct “sea trials” at Viggbyholm, north of Stockholm.

“Putting it in water the first time helps a lot afterwards.

Now we know more precisely how the boat will behave and we can calculate how to make it stable,” says Ulysse Dhomé, Project Supervisor at KTH.

Per Tunell, COO, Wallenius Marine said the Wind Powered Car Carrier project “changes the prerequisites for oceangoing sea transportation.”

The team said the wind concept can be applied to other types of ships in the future.

“The industry faces enormous challenges in terms of sustainability and this type of solution with wind powered ships on the oceans is by far the most interesting solution for achieving truly sustainable shipping,” Tunell said.

The research effort will run until 2023, and the team expects to have a full-size ship soon after.

“I’m absolute sure this will happen,” said Tunnell.
“Definitely.”