AIRCOAT

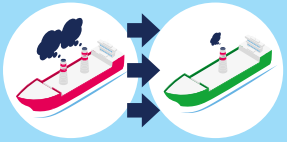
FLYING ON WATER

AIR-INDUCED FRICTION REDUCING SHIP COATING

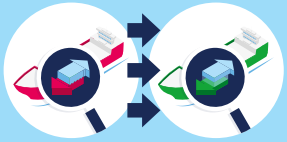
THE **AIRCOAT** CONCEPT

The AIRCOAT project promotes a ground-breaking passive air lubrication technology with a high potential to revolutionise the ship-coating sector by reducing energy consumption and ship emissions.

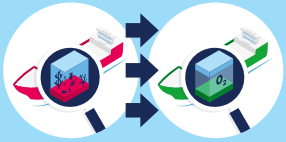
The project is based on observing, quantifying and defining the effect on AIRCOAT layer of 3 major principles: the air spring effect efficiency, the biofouling reduction, and the hydrodynamic performance.



REDUCING EMISSIONS



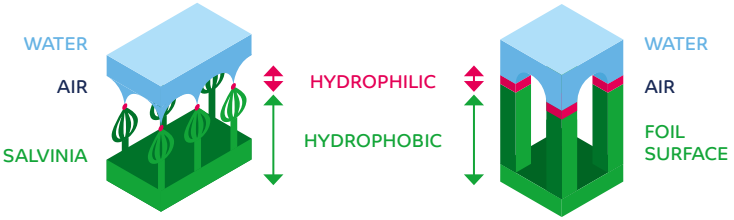
REDUCING FRICTIONAL RESISTANCE



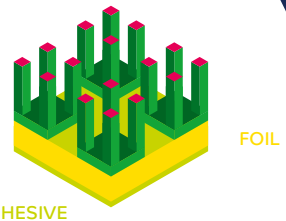
REDUCING BIOFOULING

REDUCING NOISE POLLUTION

SALVINIA
FLOATING FERN

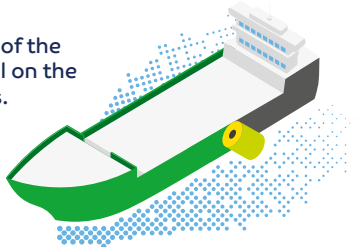


1. Development of the surface/foil implementing the Salvinia effect, that is able to trap a layer of air when submerged in water.



2. Apply the AIRCOAT material onto a self-adhesive foil.

3. Large-scale production of the AIRCOAT foil.



4. Application of the AIRCOAT foil on the hull of ships.

LESS FRICTION

LESS FUEL USE

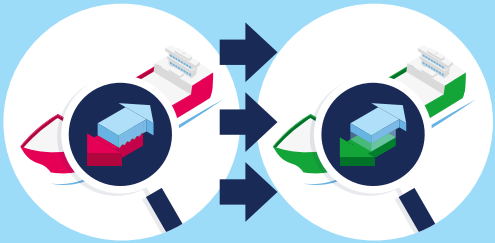
LESS EMISSIONS

SALVINIA PLANT, AIR RETAINING SURFACE

Inspired by the specific surface topology of a tropical water fern, Salvinia, a novel ship hull coating is being developed. In order to maintain its function under water, the floating Salvinia fern is equipped with a special micro- and nanostructure. The surface is covered with egg beater shape microstructures that are hydrophobic (repel water). Nature's trick is to produce hydrophilic areas on the egg beater tips that allows to trap an air layer on the plants surface. This is also know as the Salvinia effect.

DRAG REDUCTION

To investigate the friction reduction effect of the samples a number of hydrodynamic experiments are performed. Drag reduction aims to reduce fuel consumption of ships, limiting gas emissions. AIRCOAT project is running two types of experiments: laminar experiments with the rheometer measurements, and turbulent experiments with flow tank and cavitation tunnel experiments. To validate the experiments and to upscale the results, AIRCOAT performs numerical simulations by CFD (Computational Fluid Dynamics).

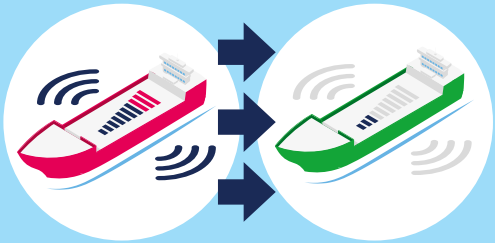


ANTIFOULING EXPERIMENTS

Biofouling is the accumulation of marine organisms on underwater surfaces, such as ship hulls. With the aim to demonstrate and validate the antifouling properties of the AIRCOAT prototypes, the project conducts laboratory experiments and tests under real conditions, with diverse fouling species, assessing their behaviour towards the different samples and the air layer.

NOISE REDUCTION

In order to investigate the acoustic noise emission of a surface with a permeant air layer, an acoustic noise model is designed and calculations are performed. The model developed is used together with the acoustic material data to calculate the reduction of underwater noise emission.



ABOUT AIRCOAT

This four-year project started on 1 May 2018 and received a total grant of 5.3 million Euros from the European Commission within the Horizon 2020 framework addressing the topic Innovations for energy efficiency and emission control in waterborne transport.

CONSORTIUM PARTNERS

Coordinated by the Fraunhofer Center for Maritime Logistics and Services CML and scientifically managed by the Karlsruhe Institute of Technology (which pioneered the air coating technology and demonstrated initial prototypes), AIRCOAT brings together a total of ten partners from six European countries.

AquaBioTech Group · Avery Dennison · B-I-C · danaos · Ilmatieteen laitos / Meteorologiska institutet / Finnish Meteorological Institute · Fraunhofer CML · HSVA · KIT Karlsruher Institut für Technologie · PPG Industries · REVOLVE

The AIRCOAT project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 764553.

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