



# **SKYSAILS PROPULSION SYSTEM**

## **FOR CARGO VESSELS**

A large, yellow, multi-lobed kite sail is shown against a clear blue sky. The sail is made of a grid of yellow panels connected by thin lines. It is attached to a central hub with several lines extending downwards. The sail is partially inflated, showing its curved shape. The background is a solid, deep blue sky with a few wispy clouds on the left side.

# WIND

## POWERFUL – UNLIMITED – FREE

Wind is the cheapest, most powerful, and greenest source of energy on the high seas.

Now, with SkySails, modern cargo ships can use the wind as a source of power - not only to lower fuel costs, but significantly reduce emission levels as well.

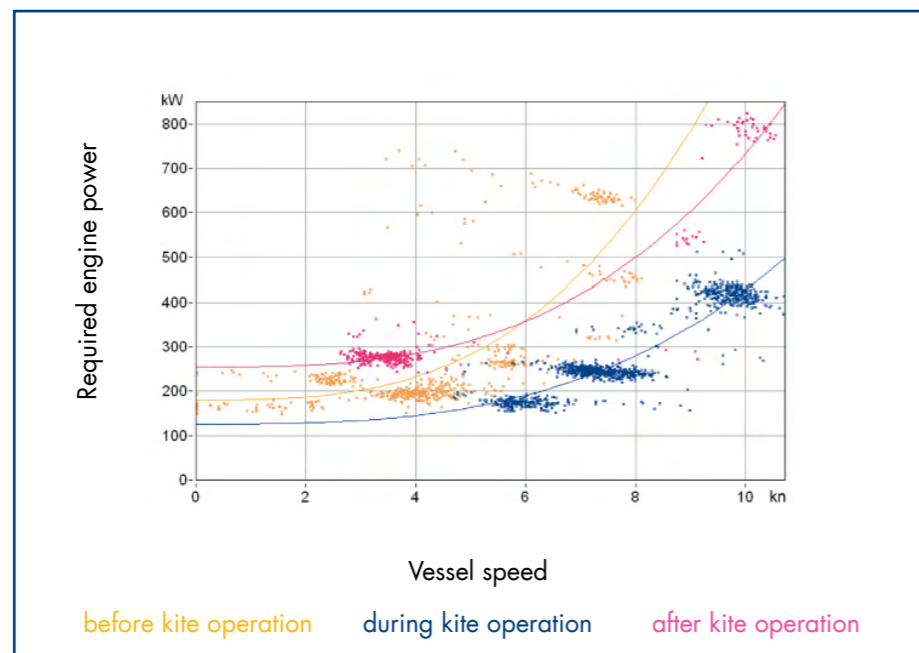
The worldwide patented SkySails propulsion system consists of three main components: a towing kite with rope, a launch and recovery system, and a control system for automated operation.

The SkySails system can be installed effortlessly as an auxiliary propulsion system on both new builds and existing vessels. The SkySails propulsion system is efficient, safe, and easy to use and the fact that wind is cheaper than oil makes SkySails one of world's most attractive technologies for simultaneously reducing operating costs and emissions.

**Interested?** Get in touch!



## REDUCE FUEL COSTS



Source: Measurement report MS Theseus, Futureship GmbH / GL Group



*"There is enormous, free wind energy potential on the high seas. With SkySails, we can cut fuel consumption of our ships in half on good days and save an average of 10-15% in fuel every year."*

Gerd Wessels, Managing Partner - WESSELS Reederei GmbH & Co. KG

The SkySails system tows the ship using large (up to 1,000 m<sup>2</sup>), dynamically flying kites, which generate up to 25 times more energy per square meter than conventional sails propulsion systems. In this way, for example, the proven SkySails C 320 with a kite area of 400 m<sup>2</sup> replaces up to 2 MW of propulsion power from the main engine.



**LOWER EMISSIONS**

**... AND ACT SUSTAINABLY**



Saving fuel also saves emissions. SkySails can reduce shipborne CO<sub>2</sub> emissions while decreasing the output of such pollutants as sulfur and nitrogen oxides at the same time. Due to the fact that the IMO takes into account the efficiency gains generated by SkySails propulsion, the use of SkySails can significantly improve the EEDI of ships.

Consumers are increasingly calling for products that will not harm the climate, a trend that is strongly influencing the rising demand for environmentally friendly and low-emission logistics.

Companies that use SkySails propulsion demonstrate a genuine commitment to achieving measurable carbon abatement thus supporting the credibility and visibility of their corporate sustainability strategies.





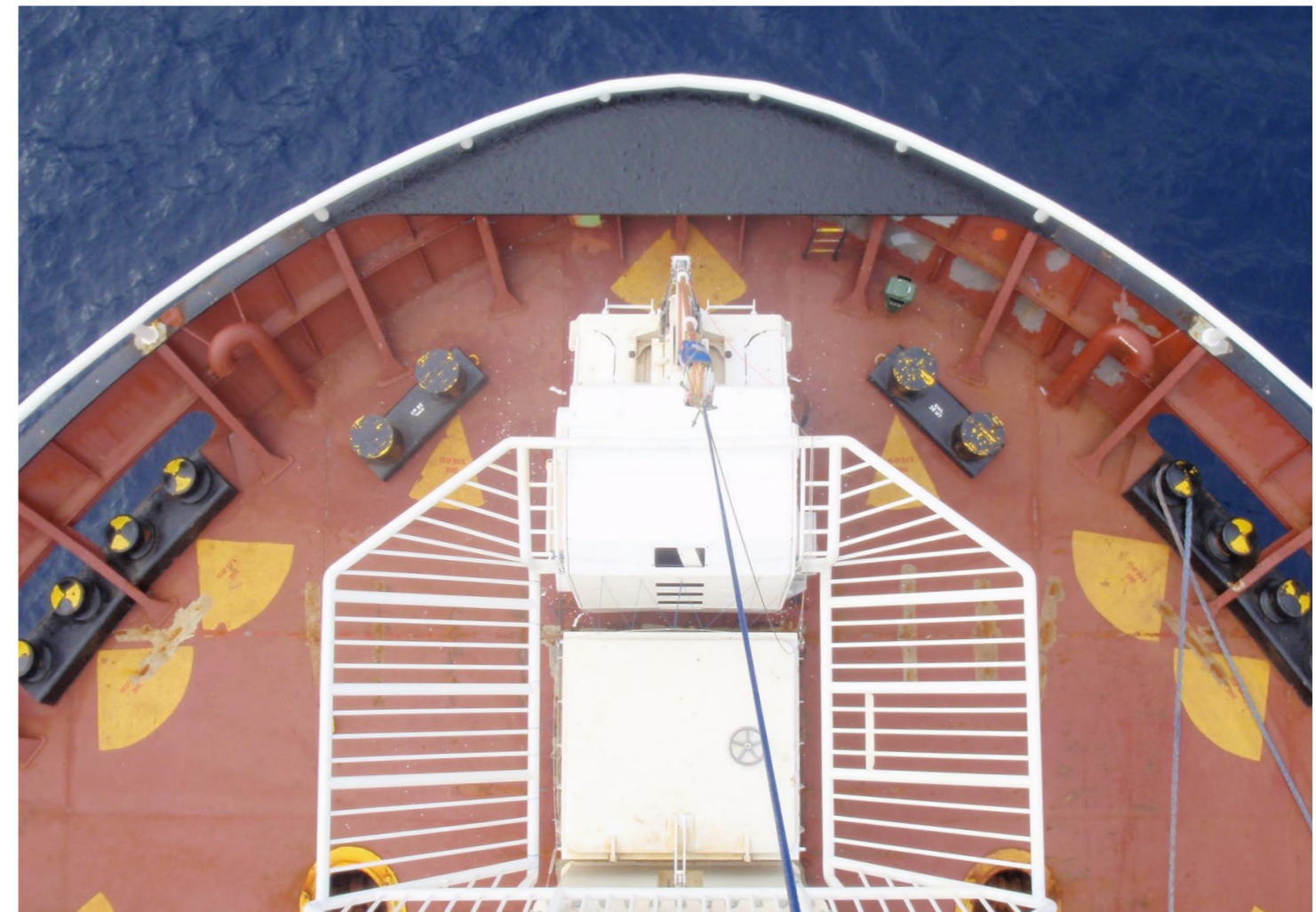
## INNOVATIVE TECHNOLOGY -

The towing kite is the core of the SkySails propulsion system. Together with the control pod and towing rope it forms what is called the "flying system." Steered by the control pod, the towing kite performs regular dynamic flight maneuvers in the air ahead of the ship to generate propulsion.

This tractive force is transmitted to the ship through a towing rope made of high-strength synthetic fiber. A specialized cable integrated within this rope ensures the supply of power to the control pod and the communication with the control system on the ship.

The launch and recovery system, along with the control system, are on-board components that are designed for easy integration and installed permanently on the ship.

The components are designed according to the requirements of the main classification societies.



## PROVEN COMPONENTS

All deck components and the "flying system" are housed in the bow area so as not to reduce the ship's cargo space.

The system does not impair the passage under bridges or loading and discharging operations in port since there are no obstructive superstructures and the towing kite is recovered as the ship approaches land.

SkySails collaborates with a powerful network of leading development partners and suppliers from the shipbuilding and aviation industries. In essence the SkySails technology is a combination of carefully tested and proven components from both industries, one example being modified mooring winches from the offshore sector.





## SAFE & EASY OPERATION



The ship's officers operate the SkySails system using a control panel installed on the bridge. The launch and recovery process is automated and requires only a few simple actions by the crew.

First, the telescopic mast raises the towing kite, which is folded like an accordion, from its storage compartment. The mast then extends upwards after which the kite unfurls to its full size and is ready to be launched. The winch releases the towing rope until the kite has reached its operating altitude.

The towing kite is controlled automatically at all times while in flight mode. An autopilot software ensures that the towing kite flies defined patterns based on wind direction and velocity, as well as the speed of the ship, so that it generates optimal propulsion. The SkySails control panel on the bridge keeps the ship's officers informed at all times about the system's operating status.

SkySails propulsion's multi-level security and backup systems ensure safe ship operations. Emergency actions can be initiated from the bridge at the press of a button.

Recovery of the towing kite is performed in the reverse order as the launch: The winch retracts the towing rope and the kite is docked to the mast. The towing kite is then reefed, after which the telescopic mast retracts, and the kite and control pod are lowered into the storage compartment.

The launch and recovery of the flying system each take about 15 minutes.

The regular crew number is sufficient for operating the SkySails system, which means that no additional personnel costs are incurred.

SkySails offers customized training programs that not only acquaint participants with the theoretical principles, but use intense hands-on training sessions to thoroughly practice operating the system. This training program fully prepares crews to manage and use the system safely and effectively. In addition, it puts them in the position to train other crew members.



*"SkySails propulsion integrates perfectly into on-board operations. The system is safe, can be used easily by trained crews and does not get in the way of loading or offloading. Plus the ship remains fully maneuverable while the kite is in action."*

Lutz Heldt – Captain



## FIVE SIMPLE STEPS TO YOUR SKYSAILS

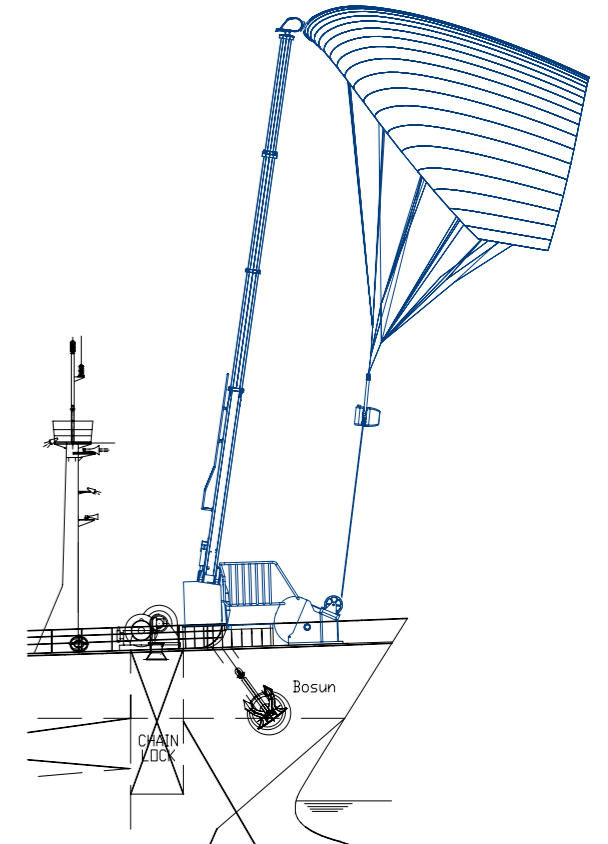
The SkySails system is suitable for being installed on new builds and retrofitted onto existing vessels.

Your personal SkySails representative, together with our technical project manager, will assist and support you through the entire installation process.



*"Installing SkySails propulsion on our ships was remarkably easy. We encountered no problems integrating it into our new builds or retrofitting it. The SkySails service team proved to be an extremely dependable and competent partner during both the installation process and ongoing system operations."*

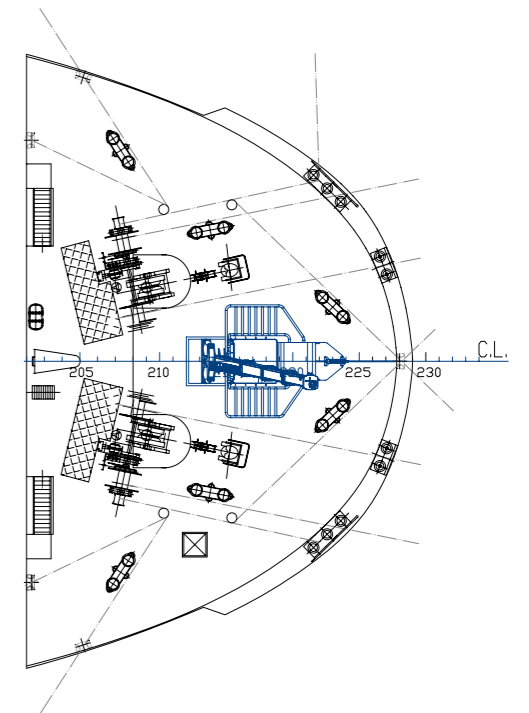
Barry Koenen, Technical Superintendent - WESSELS Reederei GmbH & Co. KG



The SkySails system is installed on the vessel at the location of your choice and under guidance of our SkySails service team. The ship can remain afloat during installation.

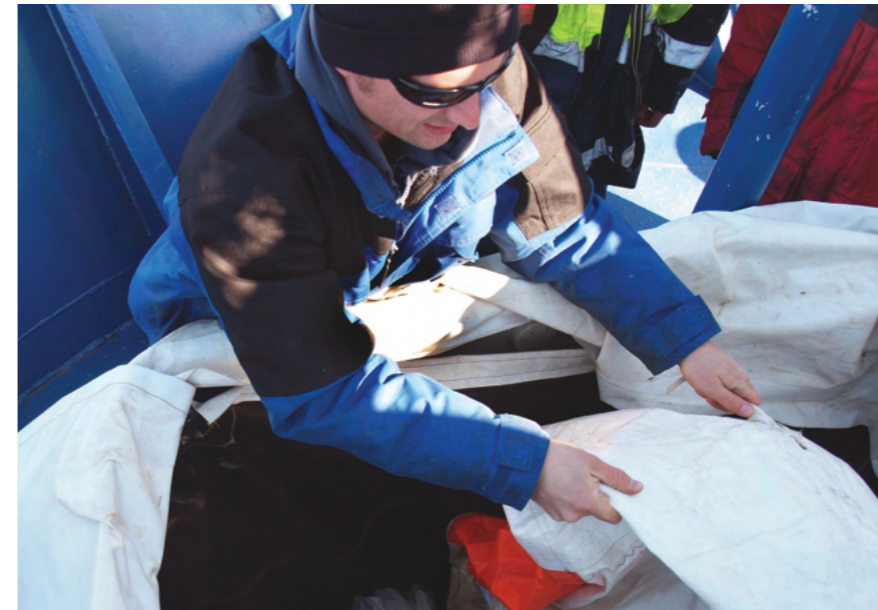
There are five simple steps to your SkySails propulsion on board:

- 1 Preparation of the foundations and laying the cables and hydraulic lines.
- 2 Installation of the SkySails components on the forecastle and the control panel on the bridge.
- 3 Connection of the components to the electrical and hydraulic systems, winding the towing rope onto the winch and stowing the towing kite and control pod in the storage compartment.
- 4 Inspection and approval of the entire system installation on board the ship by the owner's representative. System commissioning, sea trials and first flight.
- 5 Training on the job and handing over the system to the crew.





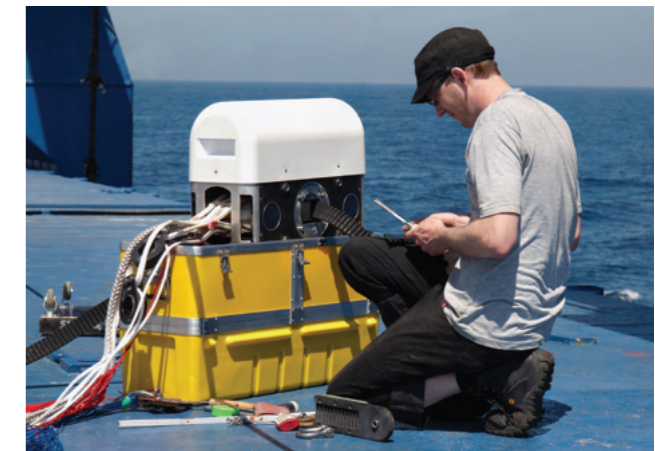
## COMPETENT SERVICE – ACROSS THE GLOBE



From professional advice and project management, to installation and commissioning, all the way to maintenance and repairs, you will receive competent service covering all aspects of SkySails propulsion.

Technicians and replacement parts can be brought to almost any port in the world in the shortest possible time. This is just one way that SkySails ensures that your SkySails propulsion system has the highest possible availability rate and a long service life.

SkySails can also provide you with additional customized services, such as weather routing. This way you can take full advantage of the potential and benefits that SkySails propulsion has to offer.







## ABOUT SKYSAILS

Wind power is the backbone of the global energy transition. Yet, with current technology spreading the use of this powerful source of renewable energy is limited. SkySails has developed a propulsion system for cargo ships revolutionizing the way wind energy is exploited and converted into power. In this way, SkySails significantly expands the range of applications for wind power and thus makes a significant contribution to achieving the energy revolution.

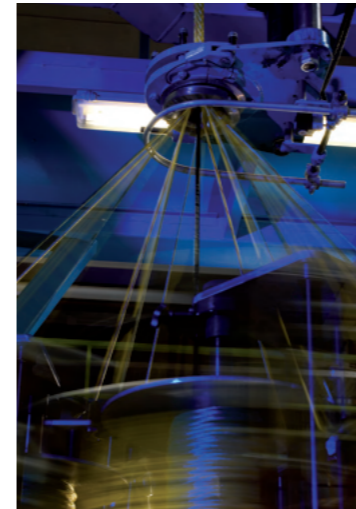
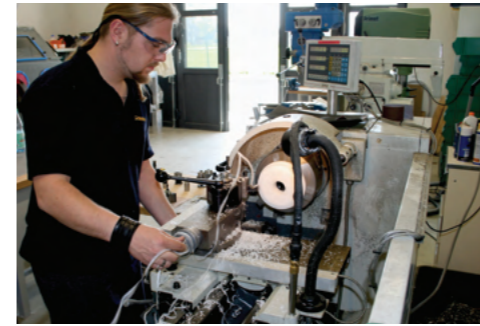
Automatic kites are the key technology for capturing the vast potential of high-altitude winds and SkySails is the first company in the world that has succeeded in developing industrial applications for harnessing this enormous energy potential. More than 75 million euros have been invested in developing the SkySails technology since foundation of the company.

The SkySails propulsion for cargo ships has been tested in the tough day-to-day use on board of seagoing vessels. By deploying fully automatic kites of up to 400 m<sup>2</sup> in size, it can replace up to 2 MW of power from the main engine in good wind conditions.

- SkySails is the only company in the world that has build and commercialized fully automatic kite systems with a size of up to 400 m<sup>2</sup> (2 MW).
- The company's broad and global IP portfolio includes international extensive patent protections for all major components.
- SkySails Power has unique experience in the use of high-altitude winds. All major components are developed in house.

SkySails Marine is part of the SkySails Group of companies. SkySails was established in 2001 by industrial engineer Stephan Wrage and is market and technology leader in the field of automatic kite systems.

Our rapidly growing team consists of 150 highly motivated employees representing a wide range of disciplines and specialties – from aerospace engineers, to software developers, mechanical engineers, technicians and management professionals – all help to develop, manufacture and market the SkySails technology.



TOWING ROPE PRODUCTION  
Gleistein Ropes, Bremen

KITE PRODUCTION SITE  
North Sails NZ







SkySails Group GmbH

Luisenweg 40

20537 Hamburg – Germany

Phone: +49 40 – 702 99 – 0

Fax: +49 40 – 702 99 – 333

E-mail: [contact@skysails.de](mailto:contact@skysails.de)

<https://skysails-group.com>