

ECONOWIND-UNIT



© Wijnne Barends / Flying Focus

CONOSHIP
INTERNATIONAL

A Conoship company

ECONOWIND

Wind Assisted Ship Propulsion

Autonomous 40 ft containerized unit with two foldable VentiFoil
Over 200 kW feasible power reduction on propulsion per unit



Design Rationale eConowind-unit

The eConowind-unit is integrated in a 40 ft container from which two folding 'VentiFoil' can be deployed: ridged 'aspirated wing profiles' acting as sails. The VentiFoil is designed as optimal compact (non-rotating) wing profiles, creating superior thrust by means of the principle of 'boundary-layer-suction', for which ventilators are mounted in the VentiFoil.

Due to the generated thrust by the eConowind-unit, the thrust of the propeller can be reduced to maintain the same speed, see figure 2. This leads to fuel savings and emission reductions of 10 to 30%, depending on vessel type and number of eConowind-units, what brings us closer to IMO's goals on reduction of carbon emissions.



Fig.1: Equal sail-area for identical VentiFoil thrust of one (1) unit

Installation

The eConowind-unit can be very easily retrofitted on existing vessels, especially if container fittings are available on deck or hatchcovers, or otherwise on a dedicated foundation. The eConowind unit can be mounted with regular twistlocks, enabling 'plug & play' installation and/or removing from the hatchcovers for cargo loading and unloading.

For new vessels Conoship can integrate eConowind-units (or individual VentiFoil) in the design on dedicated positions.

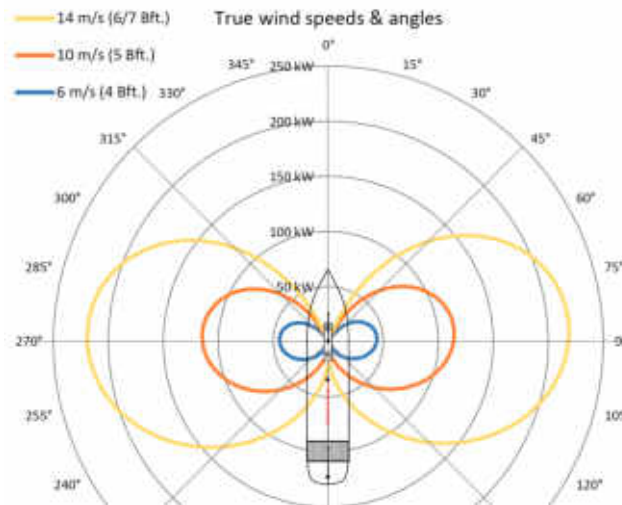


Fig.2: Propulsion power reduction of one (1) unit at $v_s = 12$ kn

Autonomous operation

From a bridge-panel the eConowind-unit can be closed or initiated for operation. The eConowind-unit senses the wind speed and -direction and autonomously deploys the VentiFoil, adjusting the ventilator power and optimizing the angle of each VentiFoil relative to the apparent wind.

In heavy and/or unfavourable wind conditions the VentiFoil are closed down automatically, minimising crew efforts and ensuring safe operations.

Main particulars

Dimensions	
Deployed	12.20 × 2.44 × 13.30 m
Closed	12.20 × 2.44 × 02.60 m
VentiFoil	1.80-1.30 × 1.10 × 10.30 m
Weight (complete)	9,600 kg

Centre of Gravity above container fitting

Deployed	2.60 m
Closed	1.55 m

Material

Container	Steel
VentiFoil	Aluminium

Electrical particulars

Power demand

Main power supply	Ca. 20.0 kW
Ventilators	2 × 7.5 kW
Voltage	3 phase, 400-460 V @ 50-60 Hz
Control unit	Phoenix Axio-line PLC
Frequency controller	2x Schneider Altivar

Operational conditions

Max. operational apparent wind speed	17 m/s
Thrust (max. continuous)	25 kN
Typical forces per container fitting (vessel specific)	
Pull (up) / Push (down)	80 / 140 kN
Shear (forward) / Shear (sideways)	40 / 40 kN