

## OCEANBIRD

Powered by Alfa Laval and Wallenius



## What we bring to AlfaWall Oceanbird



OCEANBIRD



## Reducing a lot on a few ...and even more from a lot





## Oceanbird Wing 560



OCEANBIRD

- In-house development of,
  - Mechanical and structural design
  - Hydraulic control system
  - Automation system
- Tilted as "out of operation" state
  - Lower design loads
  - Lower vessel reinforcements



Particulars of Product	
Designer:	AlfaWall Oceanbird
Product:	Oceanbird Wing 560
This is to verify:	
That the containment system has	been assessed by DNV and found to comply with current Rules of the Society, as specified below.
Basis for Approval	
notations and regulations for whic major obstacles ("show stoppers" of documentation agreed with DN of the design (e.g. assumptions u review of documents beyond the Definition of documents beyond the	b DNV is authorized to carry out htric part verification, confirming that a design is feasible and that the yound prevent the concept from being mailated. The review was based on at least a minimum scope of the verification of a safety indications of a safety indications of a safety indications. The verification of a safety functions. The review many uson request from the Client includer minimum requirements to reduce the uncertainties related to the concept.
Definition of degrees of assessme High-level (HL) describe those operal with the wider, macro system as a who	ent: iions that are more abstract in nature; wherein the overall goals and systemic features are typically more concerned ale.
Detailed-level (DL) describes more sp	secific individual components of a systematic operation, focusing on the details of sydimentary micro functions rather
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man macro, complex processes. Low- The documentation received and	level classification is typically more concerned with individual components within the system and how they operate, registered under DNV-Project Ecider P44032 has been assessed with respect to:
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## Sail systems What type of technologies exists?







https://www.norsepower.com/on-going



https://ayro.fr/projects/



https://southernspars.com/portfolio/missy/



https://bound4blue.com/en/news/odfjell-first-toinstall-suction-sails-on-deep-sea-chemical-tanker-104









• Sun rays strikes the earth at different angles – unequal heating of the earth surface

















## Wind is the right way forward

#### **Reduce OPEX**

- Less dependent on oil
- Uncertainties of future fuel prices, wind is free

#### Zero emissions

- No emissions like CO<sub>2</sub>, NOx, SOx and particles
- Reduce underwater noise

#### Reliability

- Wind is a constant energy source
- Opens for hybrid solution

#### Future proof

- Compliance with future legislation like CII
- No additional
   infrastructure needed





# Safety challenges and mitigations





# Safety challenges

How to ensure that "out of operation" state is reached?

Mitigations

• Real wind measurements for simulations





## Safety challenges Influence on maneuvering & course keeping

Wind propulsion units creates forward thrust and side force

- Rudder compensating for additional side force
- Resulting leeway and rudder angle are very much dependent on size and position of installed wind power







## Safety challenges Influence on maneuvering & course keeping

#### Mitigations

- Model tests
- Simulations
- Control system development
- Crew training
- Operational restrictions







## Safety challenges Influence on stability and comfort





## Safety challenges Influence on stability and comfort





## Safety challenges Mitigations

- Continuous FMEA & Hazard analysis
- Develop simulation models and train with measured environmental data
- Involve stakeholders
- Allow for vessel design iterations





#### THANK YOU

Emil Kotz <u>emil.kotz@theoceanbird.com</u> Customer Project Manager



Classified by Alfa Laval as: Business