Using National & EU Level Funding in Commercialization of Norsepower Rotor Sail

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Introduction to Norsepower

- Visit https://www.youtube.com/watch?v=G-fuPbhtTFo to see the video

Company

Background and current status

- Norsepower has brought to market the first proven auxiliary wind propulsion system
- The first Rotor Sail was tested on land during 2014
- The first commercial project with two Rotor Sails was delivered between 2014-2015 to Bore's M/S Estraden
- Viking Line's cruise ferry Viking Grace started Rotor Sail assisted cruises in April, 2018
- Maersk Pelican started Rotor Sail -assisted voyages in August, 2018

Introduction

Auxiliary Wind Propulsion

- Depending on wind conditions up to 50% of service power is replaced with wind propulsion
  → HYBRID system
  - Average savings depend on configuration and on the wind conditions of the route / route area
- Norsepower's technology is well suited to:
  - Tankers
  - Bulk cargo vessels
  - Ro-Ro, Ropax, Ferries, Short Route Ferries
  - Cruise ships
- Compatible with all other ways to save fuel

DELTAMARIN

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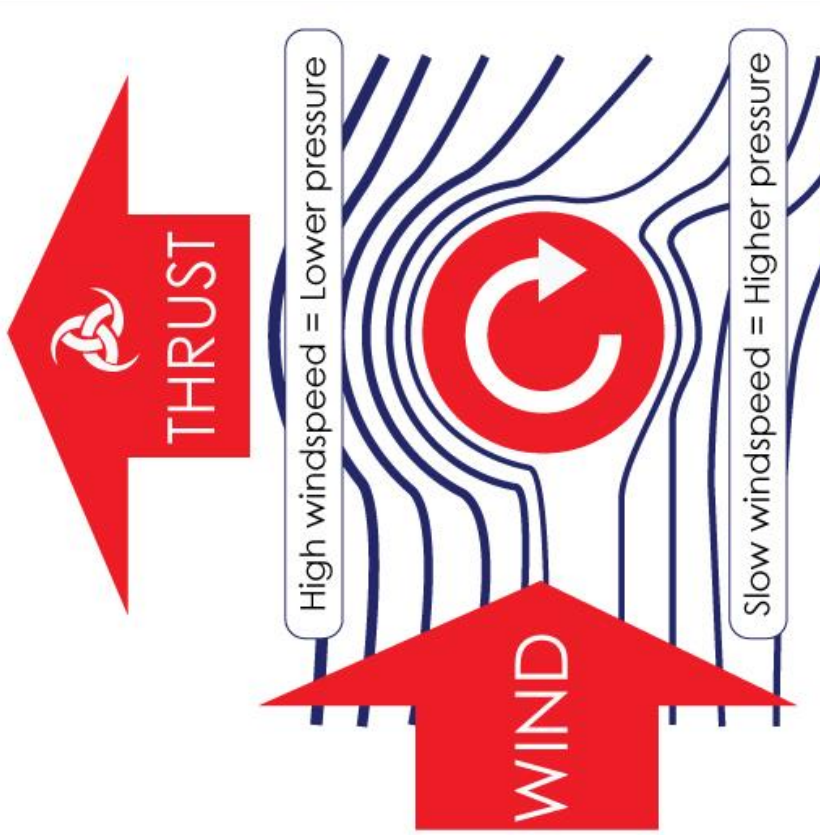
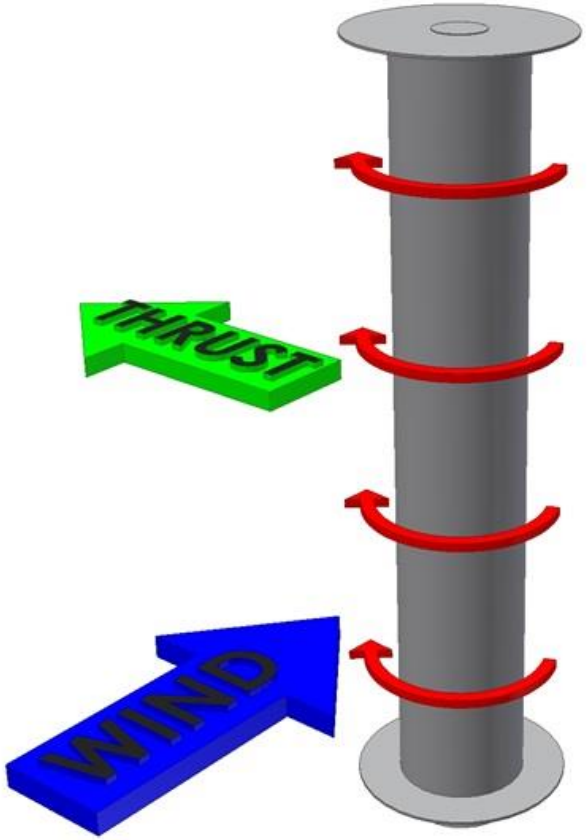
Rotor Sail

Physics of the Rotor Sail: Magnus Effect explained

- When wind meets a spinning object, it results in a high and low pressure differential, which creates thrust at a 90 degree angle to the wind
- Flettner (DE) and Savonius (FI) discovered the fundamentals of a "Flettner rotor" in 1920s
- Norsepower has modernised the technology entirely by introducing high tech materials and automated operation





Commercialization of Norsepower Rotor Sail: Key milestones and funding (1/2)

- Norsepower was founded in November 2012, based on seed funding from first investors and key persons
- First national grant funding for the seed phase was obtained already in 2012 from:
  - Centre for Economic Development, Transport and the Environment (ELY-keskus)
  - Tekes – the Finnish Funding Agency for Technology and Innovation, which is currently known as Business Finland
- The seed funding enabled developing the product and business plans into a "launch-ready" state, and closing the first project agreement with shipping company Bore in March 2013
- The actual pilot project for Bore's RoRo ship Estraden was funded by combining new equity financing with further project financing from Business Finland
- In the end of 2015, after the pilot project, Norsepower's technology was technically proven and ready to be commercialized

Commercialization of Norsepower Rotor Sail: Key milestones and funding (2/2)

- In the end of 2015, Norsepower closed an EUR3M equity investment round to enable commercialization
  - A new Tekes project was started in 2016 in order to enable piloting of Norsepower's largest Rotor Sail model
  - Project agreement with Maersk was closed in the end of 2016, supported by project financing from UK's Energy Technologies Institute
  - In the end of 2016, Norsepower's application for European Commission's Horizon2020 project financing was approved, enabling development of Norsepower's medium-sized Rotor Sail, which was later installed on board Viking Grace
- In 2017, Norsepower was accepted to Business Finland's "NIY" (Young Innovative Companies) finance program
- First 100% commercial order for Norsepower Rotor Sails was received in 2018
- In October 2018, Norsepower closed an EUR3,6M equity investment round to accelerate Norsepower's growth

Next steps

Commercialization of Rotor Sails continues, including...

- Partner search and production ramp-up in Asia
  - Chinese partners are needed for the manufactung of steel and composite components of Rotor Sails.
  - The target is to deliver more than 100 Rotor Sails in China in 2024.
- Further optimization of manufacturing aspects of the technology and downscaling of manufacturing costs.
- Sales and marketing activities to increase market awareness and to accelerate growth of the order backlog.

MISSION

To reduce the environmental impact of shipping by providing efficient, easy to use and reliable auxiliary wind propulsion for ships.

VISION

To maintain the market leader position in a growing market for auxiliary wind propulsion systems for large ships.

norsepower™

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