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EVERYTHING OLD IS NEW AGAIN: TRADING UNDER SAIL

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New technologies harken back to the days when the world's trade moved in ships like these, docked at the Port of Seattle at the end of the 19th century. Credit: getimage.com

Engineers at the University of Tokyo are working on a new propulsion system for ocean-going cargo ships that could turn the clock back, in a sense, to the days when wind-powered ships dominated the world's trade lanes.

The University's Wind Challenger project was launched several years ago to explore the possibility of melding the economy of wind power and the latest in modern engine technology by equipping 'hybrid' ships with huge aluminum and fiber-reinforced plastic sails that, they say, could cut fuel consumption by as much as 30 percent.

At a cost of about \$25 million each, the enormous "sails" would measure 164 feet high and 50 feet wide and be able to retract downwards when not needed. A ship would have several along its length, each independently configurable to maximize thrust from the wind.

The first sea trials on a reduced-size prototype ship are scheduled for mid-2016.



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New Applications of Old Technologies

The University is not the first, nor is it the only one, looking ways to harness the wind to power cargo ships as numerous others, from the late 19th century to the present, have explored similar paths to maximize fuel economy and increase efficiencies.

In the mid-1800s, German physicist Heinrich Gustav Magnus discovered what's come to be known as the "Magnus Effect" – a phenomenon demonstrating that a rotating cylinder exposed to a stream of wind generates a force perpendicular to the direction of the wind.

About 50 years later, aviation engineer Anton Flettner found a practical application of the Effect when he replaced the masts of a schooner with two 50-foot high, hollow, electrically rotated cylinders, becoming the first to demonstrate the feasibility of using the Magnus Effect to propel ships.

Flettner first cylinder-equipped 'rotorship' – the Baden Baden – crossed sailed from Hamburg to New York in 1926. The ship handled well and actually out-performed several conventional sailing vessels before it was lost in a storm five years later.

More recently, the German wind-turbine manufacturer Enercon launched and christened the 'rotor ship' E-Ship 1. The vessel, built in 2008, made her maiden voyage two years later, carrying a cargo of rotors and spare wind generator parts to Dublin for use at the Castledockrell windfarm.

Bermuda-based Magnuss Ltd. has been working on fine-tuning its patented VOSS (Vertically-variable Ocean Sail System), a mechanical sail based on the Magnus Effect that converts wind into forward thrust, augments ship propulsion, and reduces fuel consumption by as much as 50 percent.

The VOSS "can be retro-fitted on all existing cargo vessels and new builds," Magnuss has said, adding that, "By reducing fuel consumption...the potential global environmental impact due to the large size and inherent international nature of shipping promises to be substantial."

Another company, B9 Shipping of Belfast, Northern Ireland, has its iron in the fire and is reportedly working on a hybrid mix of sails and secondary bio-methane engine propulsion to power modern cargo ships.

On a More 'Traditional Tack'

But, at least one other company is utilizing pure sail power to move cargo in the old-fashioned way.

Five years ago, a French company began operating a 100-foot-long barkentine – the Tres Hombres – to carry wine from the French port of Brest to customers in Denmark.

The original company went bust, but the Tres Hombres sails on, carrying wine cargoes under the house flag of her new owner TransOceanic Wind Transport (TOWT), which, last year, added another sailing vessel – the refurbished 106-year old ketch, Irene of Bridgewater – to its fleet.

The Irene carried her first cargo for TOWT last February – a shipment of olive oil to Brazil from the Spanish port of Vigo to Brazil. Her return cargo was comprised of fruit, nuts and other products from Brazil and the Caribbean.

The company has also contracted with The Exeter Brewery to carry its organic Avocet-brand ale to France and is being considered by several other shippers as an alternative "green" method to get their products to market.

In an interview last spring with the UK's Western Morning News, TOWT Chief Executive Guillaume Le Grand said that by promoting sail-transported products and reducing their carbon footprint, they were "looking after future generations."



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The Irene “is just one of several projects lowering the carbon emissions of shipping cargo around the world,” he said. “Moving cargo by sail has been shown to have positive effects on the environment, and it has a great economic potential.”

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