

Industry: Marine – Wind Propulsion
End User: Aloft Systems
Application: Automated Wing Sail
Thordon Grade: ThorPlas-Blue
Date of Original Installation: January 2023

About:

Aloft makes clean, renewable, and free wind energy available for ship propulsion. Their rugged, wing sails can be deployed on any vessel as easily as loading cargo, reducing fuel consumption and emissions immediately. Aloft's self-contained wind propulsion units automatically maximize thrust in changing conditions and stow themselves away, when necessary, all without operator intervention, seamlessly integrating into normal operations.

Challenge:

The rigid sail system is an aluminum and composite airfoil housed in a 16m (53ft) shipping container that deploys automatically when the wind is sufficient to propel the vessel along. Two Aloft sail units, each containing a pair of 15m (49.2ft) long, 3m (9.8ft) wide folding sails, can reduce fuel consumption and emissions by at least 6%. The sails tower 18.3m (60ft) above deck when fully extended.

There are two critical bearing applications in the mechanism of the Aloft sail. The first is the main trim bearing pair which allows the sail to pivot 360 degrees to set the appropriate angle of the sail that will generate thrust and push the vessel forward. These bearings also must support the weight of the sail, and carry all of the force generated by the sail without binding. The second is the bearings that allow the mast to fold up when the sail is in use and then down again to stow when the sail is not being used. These bearings carry the weight of the sail and the folding system as well as the force from the sail.

If any of the bearings in this mechanism seizes or becomes loose, the positioning motors could be damaged, or worst, a safety issue could arise where the sail cannot be properly stowed.



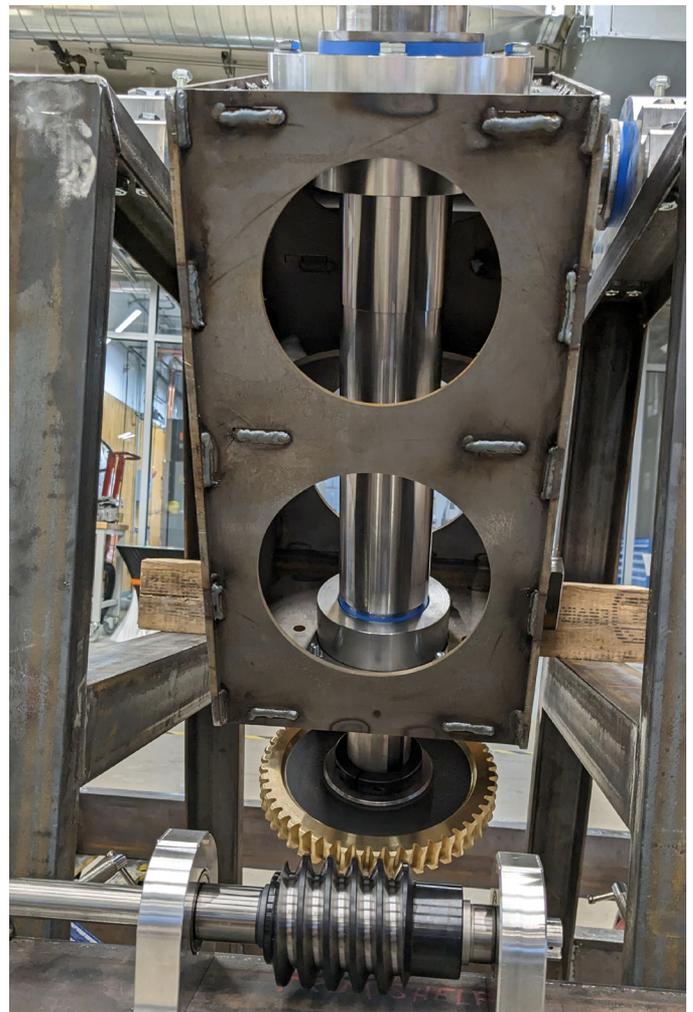
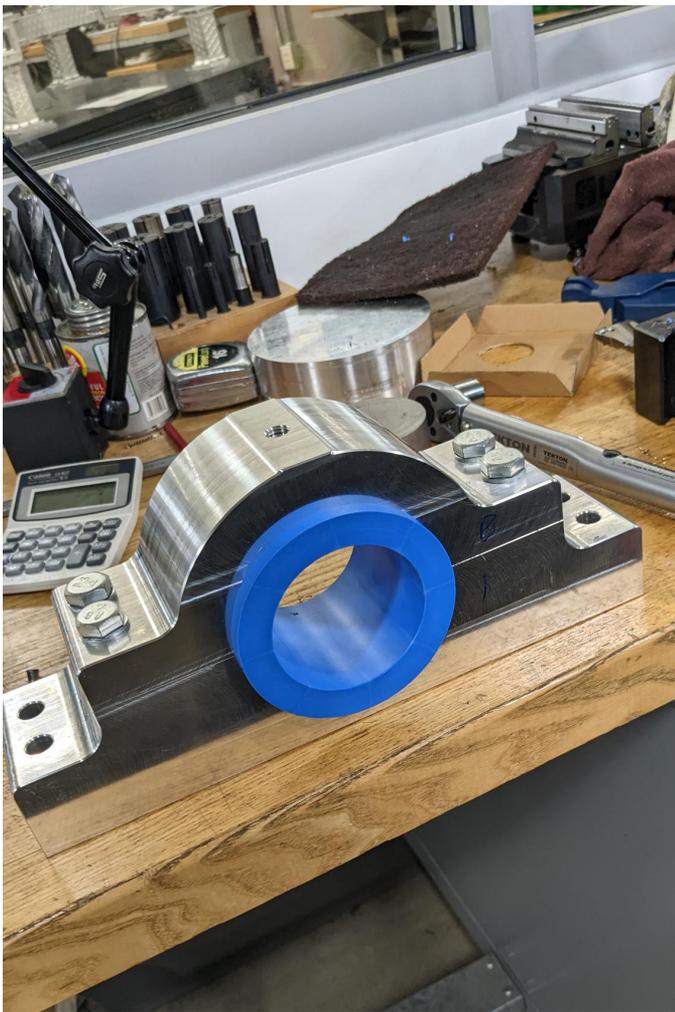
Solution:

Aloft contacted a number of bearing manufacturers, but decided on the Thordon material because it is a robust and low-maintenance solution. It was important to Aloft to have a fit-and-forget solution that is capable of withstanding high loads and pressures. And with ThorPlas-Blue there's no maintenance, no grease, and no corrosion. Thordon's commitment to sustainability and focus on reducing maritime pollution also aligns with Aloft's mission and values.

Result:

In January 2023, four ThorPlas-Blue bearings were machined and installed on a ¼ scale prototype to allow the sails to fold, rotate 360 degrees, and pivot to optimize wind conditions. In March 2023, this prototype sail was installed and tested on the Bangs Island Mussel vessel, *Perseverance* where the sail achieved an impressive 4% reduction in fuel consumption. The sail exceeded expectations by delivering remarkable results even without being optimized or correctly sized for the vessel.

Thordon is Aloft's preferred bearing supplier for their new sails and is excited to supply the material to full-scale units when Aloft has partnered with a shipowner to trial the system. As a member of the International Wind Ship Association (IWSA), Thordon is keen to support new developments in sustainable propulsion technology.



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