

Advanced bearings open door to more fuel efficient aircraft propellers

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The positive results – achieved through the EU-funded SNRPBBEARING project – will now facilitate the development and testing of rapidly rotating turbofan propellers for civil aviation purposes, which need advanced bearings in order to minimise friction.

The aerospace sector is one of the EU's key high-tech fields, providing more than 500 000 jobs and generating a turnover of close to EUR 140 billion. The EU is a world leader in the production of civil aircraft, including helicopters, aircraft engines, parts and components, and the SNRPBBEARING project is part of an overall EU objective of ensuring that the sector remains at the cutting edge.

An aircraft propeller is a heavy piece of advanced machinery that

consists of a rotating hub with radiating blades. These produce thrust by pushing air. The new blade design, developed as part of the EU's Clean Sky programme, aims to increase air flow and thrust and thus crucially reduce [fuel consumption](#) and emissions.

In order to make this design a reality however, advanced blade bearings are needed for load management and blade angle control. Launched in February 2013, the SNRPBBEARING project identified and evaluated various designs before pursuing the concept that offered the most potential in terms of withstanding large loads and high temperatures.

Innovative sealants to keep both lubricants in and pollutants out were also investigated. Following a successful [preliminary design review](#), the team then worked on design improvements based on comments from manufacturers.

By the end of 2015, the SNRPBBEARING project was able to deliver 26 bearings for these propellers at a technology readiness level of five, which means thorough testing of the prototype in a representative environment has been carried out. The bearings are therefore ready for testing in a relevant full-scale realistic scenario, partially integrated with other systems.

There are other challenges to address, such as integrating novel engine and aircraft systems and addressing noise emanating from unshielded propellers. But when the demonstrator finally takes flight, the SNRPBBEARING project will have played a significant role in making this possible. In this way the project will have contributed towards more sustainable air travel with reduced fuel consumption and emissions.

The blades are one of the latest design concepts under development within the EU's ambitious Clean Sky research programme, which aims to ensure that European aerospace remains globally competitive. The

blades are the key deliverable of Clean Sky's Sustainable and Green Engine (SAGE) Integrated Technology Demonstrator, which specifically aims to advance engine technologies for all sectors of the civil aerospace market.

Clean Sky is one of the largest European research programmes ever, with a budget estimated at around EUR 1.6 billion for projects launched between 2008 and 2013. The objective of this unique public-private partnership has been to speed up technological breakthrough developments and shorten the time to market for new solutions tested on full scale demonstrators.

More information: For further information please visit the project coordinator website: www.ntn-snr.com/portal/fr/en-en/index.cfm

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