

Press Release

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Milestone for the SAFari Project

Methanol Qualified as a Feedstock for Sustainable Aviation Fuel

The more than 23,000 large aircraft worldwide consume approximately 350 billion liters of fuel annually and account for about 3 percent of human-caused CO₂ emissions. For long-haul flights over 4,000 km in particular, there is no alternative to liquid fuels, as only these provide a sufficiently high energy density. The development of sustainable aviation fuels (SAF) has now reached an important milestone: Following successful qualification by the international standardization organization ASTM, methanol has been recognized as an approved feedstock for the alcohol-to-jet production pathway. This means that in the future, methanol-to-jet blending components can be produced and mixed with at least 50 percent by volume of conventional kerosene to create a “drop-in” fuel—one that is fully compatible and can be used without any modifications to aircraft, engines, or existing infrastructure.

This decision marks a significant milestone for the “SAFari” collaborative project, which is funded by the Federal Ministry of Transportation. It was published on July 30, 2026, with the revision of the international specification ASTM D7566 Annex 5. The project aims to develop an efficient production process for sustainable aviation fuel based on methanol, thereby providing another technological building block for the decarbonization of aviation.

Throughout the multi-year project, the project partners closely supported the ASTM qualification process as members of the Methanol-to-Jet Task Force. The findings from the evaluation process were thus incorporated into the project work at an early stage and taken into account in the development of the production process. In this context, the early assessment of fuel quality was a key indicator of the project’s success. Since only small quantities of fuel were initially available during this development phase, the prescreening method developed at the DLR Institute of Combustion Technology was employed. It enables a comprehensive evaluation of fuel quality even with small sample quantities and provides an early assessment of whether a fuel meets the requirements of the ASTM specification. The results were immediately incorporated into process and catalyst development and helped ensure that the methanol-to-jet (MTJ) blending components developed in the project were specifically tailored to meet the anticipated international specification requirements.

Sustainable Methanol as the Basis for a New Aviation Fuel

SAF production based on MTJ technologies uses sustainable methanol derived from biogenic sources or produced from hydrogen and captured CO₂. In the methanol-to-olefins (MTO) synthesis, this methanol is converted into short-chain olefins, with water—a byproduct—removing the oxygen from the process. The short-chain olefins are then combined in an oligomerization process to form long-chain olefins, resulting in a product mixture that is liquid at room temperature. Through hydrogenation with hydrogen, the olefins are converted into stable paraffins. The result is a fuel blend that meets the aviation industry's stringent requirements.

"In the SAFari project, we are working with our partners to develop an innovative process that aims to achieve a carbon-based SAF yield of over 85 percent by weight through customized catalysts and in-process recycling of material streams and heat. "With the successful completion of the ASTM qualification process, one of the biggest hurdles for demonstration and scaling has now been overcome," explains Dr. Elias Frei, Head of the Hydrogen Technologies Division at Fraunhofer ISE.

"Following the successful ASTM qualification, the project is now focusing on further optimizing and scaling up the manufacturing process," says Dr. Achim Schaadt, Head of the Sustainable Synthesis Products Division, looking ahead. "The goal is to produce larger quantities of fuel in order to conduct further research and demonstrations, thereby paving the way for the industrial implementation of methanol-based Sustainable Aviation Fuel," adds Dr. Franz Mantel, project manager of the SAFari project. The market potential for this technology is enormous: for European air traffic alone, the mandated quotas will result in approximately 40 million metric tons by 2050.

In addition to Fraunhofer ISE, the consortium for the SAFari project ("Sustainable Aviation Fuels based on Advanced Reaction and Process Intensification") includes ASG Analytik-Service AG, BP Europa SE, Clariant Produkte (Deutschland) GmbH, the German Aerospace Center (DLR) (DLR), Technip Energies France S.A.S., Südzucker AG, the Federal Association of the German Aviation Industry (BDL), and Airbus Helicopters Deutschland GmbH. The consortium thus covers the entire value chain. The SAFari project has been funded by the Federal Ministry of Transport (BMV) since December 1, 2022, for a period of six years.

Fact box

Project website

<https://www.ise.fraunhofer.de/en/research-projects/safari.html>



The main objective of the SAFari project is to produce and test sustainably produced kerosene (SAF) from methanol in a pilot plant with the goal of obtaining full ASTM certification and achieving a blend ratio that could eventually exceed 50% SAF. © istockphoto.com / guvendemir

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