
Clean Aviation SWITCH Project to Advance Hybrid-Electric and Water Enhanced Turbofan Technologies

[@Airbus](#) [@MTUaeroeng](#) [@prattandwhitney](#) [@CollinsAero](#) [@GKNAero](#)
[@clean_aviation](#)

Toulouse, 29 November 2022 – A group of aerospace technology companies have announced the formation of a collaborative consortium to develop hybrid-electric and water-enhanced turbofan technology for future aircraft propulsion systems, supported by the European Union Clean Aviation Joint Undertaking (Clean Aviation). MTU Aero Engines AG (MTU), Pratt & Whitney, Collins Aerospace (Collins), GKN Aerospace, Airbus and others aim to demonstrate the potential of these technologies to improve fuel efficiency and reduce aircraft CO₂ emissions by up to 25% compared to today's state-of-the-art propulsion systems for short- and medium-range aircraft. The consortium is coordinated by MTU.

The Sustainable Water-Injecting Turbofan Comprising Hybrid-Electrics (SWITCH) project is focused on developing a novel propulsion concept built from two revolutionary and synergetic technologies: Water Enhanced Turbofan (WET) and hybrid-electric propulsion. By combining these technologies with Pratt & Whitney's GTF™ engine architecture, the SWITCH concept aims to significantly enhance efficiency and substantially reduce emissions across the full operating envelope of an aircraft. Technologies developed as part of SWITCH will be fully compatible with cleaner alternative fuels – such as Sustainable Aviation Fuel (SAF) — and will be evaluated for future use with hydrogen.

“This highly impactful SWITCH consortium provides a unique opportunity to demonstrate the benefits of both WET and hybrid-electric propulsion technologies, not only independently, but as parts of a system,” said Dr. Stefan Weber, senior vice president, Engineering and Technology, at MTU. “WET offers considerable potential to boost efficiency and reduce all emissions significantly for future aircraft propulsion systems, whether they are powered by conventional kerosene, SAF, or even hydrogen. Since the concept is gas turbine based, the WET concept fully leverages MTU's expertise.”

The hybrid-electric GTF powertrain will enable even greater efficiency across all phases of flight by leveraging highly efficient megawatt class electric motor generators, power electronics, and batteries to optimize the performance of the fuel-burning gas turbine. The WET concept recovers water vapor from the engine exhaust and re-injects it into the combustion chamber to significantly improve fuel efficiency, reduce NOx emissions, and lessen contrail forming emissions. These revolutionary technologies are designed to work together to deliver a step change reduction in emissions and energy use across the full operating system, while maintaining world class reliability and operability.

Follow us



If you wish to update your preferences to Airbus Communications, media@airbus.com
If you no longer wish to receive communications from Airbus, media@airbus.com

“This project will enable us to advance several key technologies on our roadmap to further extend the efficiency of the GTF engine architecture,” said Geoff Hunt, senior vice president, Engineering and Technology, at Pratt & Whitney. “Given the challenge of reducing the environmental impact of aviation, cross-industry collaboration and public-private partnerships like Clean Aviation will play a vital role in delivering the technology breakthroughs needed to make net zero emissions aviation a reality.”

Airbus will provide key expertise relating to the future integration of SWITCH technologies at the aircraft-level and will support the evaluation of performance benefits including aircraft design and integration of battery and energy management systems. “New propulsion technologies will play an important role in achieving aviation's net-zero goals, along with new aircraft designs and sustainable energy sources,” said Sabine Klauke, chief technology officer at Airbus. “We welcome this opportunity to collaborate and progress research into the next generation of advanced powertrain concepts.”

Collins will provide megawatt-class electric motor generators and power electronics, high-voltage DC distribution and protection, thermal management components and nacelle architectures for the project. “Hybrid-electric propulsion technology is a key enabler for increased efficiency across multiple different aircraft applications, from advanced air mobility to commercial airliners,” said Mauro Atalla, senior vice president, Engineering & Technology for Collins Aerospace. “Working with Clean Aviation and the SWITCH consortium, we will accelerate the development of these critical technologies from our state-of-the-art facilities in France, Germany, Ireland, Italy and the UK.”

GKN Aerospace will develop various engine structures with all-new functionalities, such as integrated electric machines and heat exchangers. “We are delighted to be collaborating in the SWITCH project and help address many exciting opportunities and challenges around thermal and electrical power management within a highly advanced propulsion system,” said Henrik Runnemalm, vice president, Global Technology Center, Sweden, at GKN Aerospace. “We will leverage our unique hot test rig in Trollhättan, Sweden, as well as our high voltage electrical wiring developed by our GKN Fokker business in the Netherlands.”

Current funding for Phase 1 of SWITCH extends to 2025 and will include testing of a hybrid-electric GTF engine, WET technology and sub-system laboratory testing, and design activity around an integrated hybrid-electric and WET cycle propulsion system. Subject to successful testing of these key technologies and component designs, further phases of ground testing and flight tests are expected to follow.

Clean Aviation is a public-private partnership co-funded by the European Union between the European Commission, the aerospace industry, and research institutes, dedicated to advancing transformational aircraft technologies which will help enable net zero emissions

Follow us

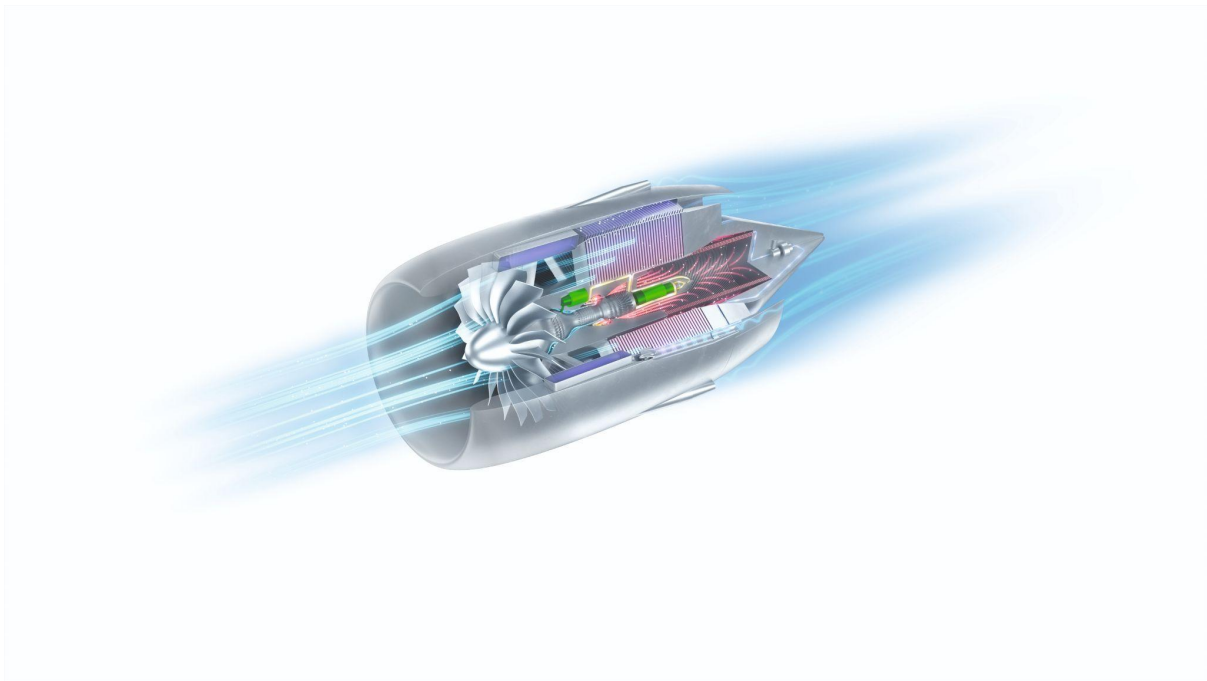


If you wish to update your preferences to Airbus Communications, media@airbus.com
If you no longer wish to receive communications from Airbus, media@airbus.com

for aviation by 2050. The project will be supported by UK Research and Innovation, and will leverage collaboration between multiple aerospace companies, universities and research organizations across 11 countries in Europe and the United States.

List of participating organisations and locations:

- MTU Aero Engines (Germany, Poland)
- Pratt & Whitney (USA, Poland)
- Airbus (France, Germany, Spain, UK)
- Collins Aerospace (France, Germany, Ireland, Italy, UK, USA)
- GKN Aerospace (Sweden, Netherlands)
- Aristotle University of Thessaloniki (Greece)
- Chalmers University of Technology (Sweden)
- DLR German Aerospace Center (Germany)
- University of Stuttgart (Germany)



COPYRIGHT MTU Aero Engines

Follow us



If you wish to update your preferences to Airbus Communications, media@airbus.com
If you no longer wish to receive communications from Airbus, media@airbus.com

About Airbus

Airbus pioneers sustainable aerospace for a safe and united world. The Company constantly innovates to provide efficient and technologically-advanced solutions in aerospace, defence, and connected services. In commercial aircraft, Airbus offers modern and fuel-efficient airliners and associated services. Airbus is also a European leader in defence and security and one of the world's leading space businesses. In helicopters, Airbus provides the most efficient civil and military rotorcraft solutions and services worldwide.

About MTU Aero Engines

MTU Aero Engines AG is Germany's leading engine manufacturer. The company is a technological leader in low-pressure turbines, high-pressure compressors, turbine center frames as well as manufacturing processes and repair techniques. In the commercial OEM business, the company plays a key role in the development, manufacturing and marketing of high-tech components together with international partners. Some 30 percent of today's active aircraft in service worldwide have MTU components on board. In the commercial maintenance sector the company ranks among the top 3 service providers for commercial aircraft engines and industrial gas turbines. The activities are combined under the roof of MTU Maintenance. In the military arena, MTU Aero Engines is Germany's industrial lead company for practically all engines operated by the country's military. MTU operates a network of locations around the globe; Munich is home to its corporate headquarters. In fiscal 2021, the company had a workforce of more than 10,000 employees and posted consolidated sales of almost 4.2 billion euros.

About Pratt & Whitney

Pratt & Whitney, a unit of Raytheon Technologies (NYSE:RTX) is a world leader in the design, manufacture and service of aircraft and helicopter engines, and auxiliary power units. To learn more visit its www.prattwhitney.com. To receive press releases and other news directly, please sign up [here](#).

About Collins Aerospace

Collins Aerospace, a Raytheon Technologies business, is a leader in technologically advanced and intelligent solutions for the global aerospace and defense industry. Collins Aerospace has the extensive capabilities, comprehensive portfolio and broad expertise to solve customers' toughest challenges and to meet the demands of a rapidly evolving global market. For more information, visit CollinsAerospace.com.

About GKN Aerospace

GKN Aerospace is the world's leading multi-technology tier 1 aerospace supplier. As a global company serving the world's leading aircraft manufacturers, GKN Aerospace develops, builds and supplies an extensive range of advanced aerospace systems, components and technologies— for use in Defense and Commercial aircraft ranging from helicopters, business jets, passenger planes to the most advanced fighter aircraft. Lightweight composites, additive manufacturing, innovative engine systems and smart transparencies help to reduce emissions and weight on the aircraft and enhance passenger comfort. GKN Aerospace is market leading in aerostructures, engine systems and operates in 12 countries at 38 manufacturing locations employing approximately 15,000 people.

About Clean Aviation Joint Undertaking

Follow us



If you wish to update your preferences to Airbus Communications, media@airbus.com
If you no longer wish to receive communications from Airbus, media@airbus.com

The Clean Aviation Joint Undertaking is the European Union's leading research and innovation programme for transforming aviation towards a sustainable and climate neutral future. Pulling together the best talent and capabilities of the private and public sectors and developing cutting-edge technologies and making these available for a transformational leap in aircraft performance in the 2030s, the Clean Aviation Joint Undertaking will pave the way towards the EU's ambition of climate neutrality by 2050.

Operating at the centre of a broad and diverse eco-system of players across Europe ranging from the aeronautical community, pioneering SMEs, research establishments and academia, it acts as a hub for new ideas and bold innovations.

As a European public-private partnership, Clean Aviation pushes aeronautical science beyond the limits of imagination by creating new technologies that will significantly reduce aviation's impact on the planet, enabling future generations to enjoy the social and economic benefits of air travel far into the future.

Visit our website to find out more about Clean Aviation: www.clean-aviation.eu

Contacts for the media

Lois Benquet

Airbus
+33 6 42 88 10 65
lois.benquet@airbus.com

Martina Vollmuth

MTU Aero Engines
+49 (0)89 1489-5333
martina.vollmuth@mtu.de

Mads Neumann

Pratt & Whitney
+44(0)7468 757 744
media@prattwhitney.com

Alexander Killeffer

Collins Aerospace
+1 980 322 5087
alexander.killeffer@collins.com

Wesley Bates

GKN Aerospace
+1 469 261 9460
wesley.bates@usa.gknaerospace.com

Follow us



If you wish to update your preferences to Airbus Communications, media@airbus.com
If you no longer wish to receive communications from Airbus, media@airbus.com