WET engine: MTU Aero Engines develops drive of the future with wet combustion

* **Gas turbine-based concept significantly reduces impact on the climate**
* **Operation with SAFs and hydrogen in all thrust categories possible**

Berlin, June 23, 2022 – Through its Clean Air Engine (Claire) technology agenda, MTU is hard at work on reducing the climate impact and energy use of aviation propulsion systems in three stages. Zero emissions is the big goal. The company is focusing its efforts on the evolution of the gas turbine on the basis of the Geared Turbofan (GTF) and on revolutionary concepts. The favored revolutionary concepts include the Flying Fuel Cell and the Water-Enhanced Turbofan, or WET Engine. “This GTF-based engine will significantly reduce CO2 and NOx emissions as well as formation of contrails,” says MTU COO Lars Wagner.

“Since the concept is based on the gas turbine, the WET engine can rely in full on MTU’s expertise,” explains Dr. Stefan Weber, Senior Vice President Engineering and Technology at MTU in Munich. The WET engine uses residual heat from the engine’s exhaust gas. To do this, a steam generator is used to evaporate water and inject it into the combustion chamber. This kind of “wet” combustion increases the engine’s efficiency, but that isn’t all. It also reduces nitrogen oxide emissions massively. The water needed for this is collected from the exhaust gas inside a condenser connected to a water separator. Fuel consumption, CO2 emissions, and formation of contrails are also sharply reduced.

Weber continues: “The WET Engine can be operated with jet fuel, sustainable aviation fuels (SAFs), and hydrogen, and it can be used in short-, medium-, and long-haul flights. That means it covers the range where almost all of the aviation sector’s climate impact is generated.” By reducing climate impact by about 80 percent, this concept will achieve near climate neutrality as early as 2035. “It is also highly efficient, so it cuts costs and conserves valuable resources.”

In addition to the planned market launch in 2035, the Water-Enhanced Turbofan is to undergo further optimization between now and 2050. Near drop-in fuels – SAFs with chemical adjustments – can be used to achieve maximum reductions in climate impact. The adjustments needed, if any, will be minor. “If the WET Engine was operated with hydrogen, it would not only have further advantages in terms of climate-related emissions, but would also potentially reduce the engine’s weight and air resistance thanks to more-compact design and construction, as the heat exchangers needed for the concept can utilize the full cooling potential of cryogenic hydrogen,” explains Dr. Claus Riegler, Senior Vice President Technology & Engineering Advanced Programs at Germany’s leading engine manufacturer in Munich.

**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 three 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 over 10,000 employees and posted consolidated sales of almost 4.2 billion euros.

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