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## MTU Aero Engines: "Claire" ushers in climate-friendlier air traffic era

- **Potential 30 percent CO<sub>2</sub> reductions**

Munich, July 18, 2007 – 15 percent, 20 percent, 30 percent – in three steps to climate-friendlier air traffic: MTU Aero Engines, in partnership with Bauhaus Luftfahrt, today unveiled an ambitious program designed to reduce the carbon dioxide emissions of aircraft engines. Its **Clean Air Engine (Claire)** technology project is to lower CO<sub>2</sub> emissions by as much as 30 percent by 2035. Dr. Rainer Martens, executive vice president and chief operating officer (COO), at a Munich press briefing announced that by 2025, a 20-percent reduction may well have become a reality.

Martens explained that all of the key components for Claire were already available, had been successfully tested and met MTU's expectations in terms of energy efficiency and cost-effectiveness. "I'm not talking visions here but projects that we've launched internally and that we can bring to market at the scheduled dates."

### **Geared turbofan, the sure key to success**

MTU's three-stage program bases on the geared turbofan: Using geared turbofan technology, which by then will have reached production maturity, plans are to lower CO<sub>2</sub> emissions by about 15 percent in the first stage. Key components of this propulsion concept are a high-speed low-pressure turbine, which is made by MTU, a high-pressure compressor built in partnership between MTU and Pratt & Whitney, and a gearbox specifically developed for the purpose by Italy's gearbox specialist Avio.

In a second step, CO<sub>2</sub> emissions will be further lowered, to 20 percent, by 2025, through the use of a novel counter-rotating fan MTU had already developed and tested in the eighties. By 2035, finally, MTU expects the targeted 30 percent reduction to have been achieved. The road to success here is equipping the counter-rotating geared turbofan with a recuperator.

### **Less noise**

Claire will not only reduce CO<sub>2</sub> emissions compared with a conventional engine, but also its noise. "We're taking an integrated multiple-track approach, so we're making advances also on the noise front," Martens explains. Optimizing the geared turbofan will cut the perceived noise level in half. That will pay handsome dividends inasmuch as even today, noise control plays a significant part in the fleet planning of airlines. MTU's COO is certain that quieter aircraft will permit the air traffic infrastructure to be used more efficiently by far.



### **Novel aircraft concepts**

MTU expects further improvements in aviation's environmental performance to come from new aircraft concepts. This is a topic the Bauhaus Luftfahrt e.V. association, founded by MTU Aero Engines, Liebherr Aerospace and EADS and headed by Prof. Dr. Klaus Broichhausen, is pursuing. The Bauhaus chairman used to work at MTU, where he was responsible for advanced technologies. Broichhausen explains: "One of the key problems we're looking into is how best to improve the integration of engines into aircraft platforms and so optimize aerodynamics. Overall, our concepts target a future air transportation system that makes air traffic on short- and medium-haul routes very, very quiet and provides maximum economy of resources and space."

Martens and Broichhausen concur that market viability is not decided solely on technological merit. Says Martens: "Success has always been a tradeoff between economy, ecology and technology. It is within this magic triangle that a company must try to find the proper balance for each of its products. The market will reject any excess of technology or ecology at the expense of price, and vice versa."

### **Multi-fuel engines**

Martens also explained that today's engines - with some minor modifications - could also be operated on biological fuel. Regarding the impact that this would have on his industry, he said: "Our engines actually don't need fossil kerosene." Since aircraft powerplants are multi-fuel engines, they can burn fuel from biological material just as well as fossil kerosene. Examples are already flying: in South Africa, aircraft have for years been traveling on synthetic fuels.

MTU Aero Engines is Germany's leading engine manufacturer and an established player globally. Taken over its affiliates, the company has 7,100 employees. Having carved out leadership positions in engine technologies, the company excels foremost in low-pressure turbines, high-pressure compressors, engine control units, as well as manufacturing and repair techniques. In fiscal 2006, it had 2.4 billion euros in sales.

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