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## **LEK94 - MTU Aero Engines develops new material**

- **Debut in low-pressure turbine of A380 engine**

Munich – Light in weight, heat-resistant and affordable: for use in low-pressure and intermediate-pressure turbines, MTU Aero Engines has succeeded in developing LEK94, a material that is setting new benchmarks. "A material of this type was still missing in the current offerings of high-temperature materials. There're lots of pricey and heavy high-end materials around, but with their overwhelming temperature and strength capabilities they tend to be overgunned in some of the applications," explains Dr. Jörg Esslinger, who supervises materials engineering at MTU. The new lightweight has promptly found a prominent home in the low-pressure turbine of the GP7000 powering the Airbus A380.

LEK94 is a nickel-base single-crystal superalloy designed for elevated service temperatures. Its relative low density makes it nearly ten percent lighter than comparable materials. For stage-1 rotor blades of the GP7000 low-pressure turbine, it provides about two kilograms in weight savings. The sophisticated balance struck between light weight and high temperature resistance makes LEK94 just right for use in the forward stages of low-pressure and intermediate-pressure turbines. According to Esslinger, "advanced efficient turbine concepts call for low weight and high speed. To keep centrifugal forces reasonable, the blades will necessarily have to be lightweight. Simultaneously, however, we're here faced with formidable temperatures that demand highly heat-resistant materials." The new material affords another, compelling advantage: the superalloy is affordable for the reason that rare, precious metals like rhenium, tungsten and tantalum are needed in tiny doses only.

Pratt & Whitney is sold on the LEK94 flyweight and has blessed its use in the GP7000. This makes it the first time MTU has managed to launch a material of its own in a Pratt & Whitney engine and win certification for it in the U.S. The next candidate for the material is already looming on the horizon: the TP400-D6 to power the emerging A400M military transport. MTU's Munich location is busy developing LEK94 rotor blades for the engine's intermediate-pressure turbine. Esslinger figures that "potentially, we could make the forward rotor blades and nozzle vanes of practically all our low-pressure and intermediate-pressure turbines in LEK94." Already, the idea has caught on among partners and competitors.

MTU Aero Engines is Germany's leading engine manufacturer, ranking among the global players in the industry. It cooperates closely with the world's major engine



manufacturers and is the globally largest independent provider of commercial engine maintenance services. In the military arena, MTU is the German industrial lead company for practically all engines flown by the country's armed forces. Having carved out leading positions in engine technologies, the company excels in low-pressure turbines, high-pressure compressors, engine control units, as well as manufacturing and repair techniques.

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Your contacts:

Odilo Mühling

Tel.: ++ 49 89 1489 2698

Fax: ++ 49 89 1489 8757

Martina Vollmuth

Tel.: ++ 49 89 1489 5333

Fax: ++ 49 89 1489 8757

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