MTU Maintenance: World-class repair techniques

As one of the world's largest providers of commercial engine maintenance services, MTU Maintenance is continuously looking for cost-effective alternatives to the replacement with new parts. One of those are its high-tech repairs for which the company has earned a world-class reputation. Owing to decades of experience, and innovative processes, MTU succeeds in repairing also heavily worn parts, components and accessories to give them a second or third lease on life. MTU's repair approaches are globally unique, mostly patented and known under the trademark MTU\textsuperscript{plus} repairs.

MTU\textsuperscript{plus} repairs are highly specialized techniques that have been developed internally and approved by the aviation authorities EASA and FAA. The techniques cover all engine modules and run the gamut from automated selective stripping and application of coatings to highly heat-resistant brazing and high-precision welding. With these techniques, the stability of the parts is increased, and customers benefit from cost advantages. MTU\textsuperscript{plus} repairs are adapted to the processes of a customer-oriented high-tech company and tailored to the requirements of the industry, thereby saving time and money. Due to the reduced use of raw material such as aluminium or titanium, MTU's repair techniques also help towards protecting the environment.

High-tech parts repair

In parts repair, offerings range from individual services for specific needs up to the Total Part Care (TPC\textsuperscript{®}) package, a full all-round service that may also include engineering and logistics assistance and sees MTU assume responsibility for the supply of parts. As a one-stop shop provider, MTU Maintenance covers the entire engine spectrum, worldwide. Key to its success are intelligent solutions which are being continuously developed and optimized. In their work, the R&D teams benefit from decades of expertise MTU Aero Engines has accumulated in engine manufacturing and from its extensive collaboration with research institutions and universities across the globe.

Laser machining of V2500 high pressure turbine vanes

Adaptive Milling of a high pressure turbine blade tip
Novel high-tech processes open up new repair opportunities: special compressor components called blisks initially resisted repair, but that has now changed. Innovative technology helps MTU optimally repair these integrally bladed disks. Through patching, defective blades are given a new lease on life. In its military EJ200 program, the company has since developed comprehensive blisk repair capabilities; civil customers, such as operators of smaller engines for business jets as well as operators of the CF34 and V2500 up to the largest engine in the world, the GE90 may also benefit from these repairs.

The so-called MTUPlus ER Coating\textsuperscript{eco} is one of MTU’s innovative repair techniques. This highly heat-resistant erosion protection layer for high-pressure combuster blades is a nano technology that increases the on-wing time of these parts. This in turn, lowers the specific fuel consumption and CO\textsubscript{2} emissions.

A further example is the MTUPlus Thermal Barrier Coating, a protection layer for combuster parts which improves their thermo-mechanical strength and has proven to avoid adverse spalling. Increased isolation properties lower the thermal conductivity and thereby significantly reduce base material temperature.

Thanks to the innovative MTUPlus V2500 Vane Braze Repair even the most damaged vanes which would usually be defined as scrap can be made serviceable again. After cleaning the parts, the damages are treated with a special braze material. During following heat treatment, the braze material melts and, due to its fluidity, fills even the smallest cracks, thereby providing for an optimized stability of the parts.
Accessories

In addition to engine overhaul and individual engine component repairs, MTU Maintenance provides repair services also for engine accessories. These include components that although not directly forming part of the core engine are necessary to sustain its operation, such as starters, fuel and hydraulic pumps, actuators, sensors, valves and tubes. MTU Maintenance offers prompt and reliable repair services for these components at its center of excellence for accessories in Canada, the Accessory Repair Center (A.R.C.) which also provides logistics services for a quick response to customers' needs, the so-called line replaceable unit (LRU) management. The latest addition is the repair of the CF6-80 hydro-mechanical unit (HMU), responsible for fuel control of the engine.

Smart solutions for aging engines

As one of the first maintenance service providers worldwide, MTU Maintenance started to offer MTUPlus Mature Engines Solutions, a specific service for aging aircraft engines which combines alternative MRO solutions with additional services and saves customers costs, or ideally a complete shop visit. The use of material is a decisive factor when it comes to shop visit costs. For this reason, MTU Maintenance performs a custom-tailored evaluation of the engine and subsequently offers its customers a solution from which they profit most. With MTU’s “Smart Repairs”, customers benefit from an intelligent combination of an individual workscope, MTUPlus repairs and serviceable used material.

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