



**GE Engine Services**

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## CF6-50 upgrade in service with Air France

Air France has become the first airline to begin flying Boeing 747s with the new CF6-50 performance and durability upgrade, following FAA certification in late 2001.

The upgrade is producing the projected performance improvements for Air France. It's expected to allow the airline to achieve up to a 25 percent improvement in time on wing, as well as improved EGT margin retention, reduced shop visits, and lower scrap, repair, and material costs.

GE Aircraft Engines will provide a significant number of kits to support the airline's anticipated long-term 747-200/300 fleet. GE Engine Services performed CF6-50 upgrade engine testing and jointly managed the certification process with the GE CF6 Project team. Air France Industries is installing the kits in its facility during engine overhaul.



More than 150 kits are now on order with customers worldwide. To complement the upgrade and allow customers to customize packages for their requirements, GE is also making combustor liners and turbine mid-frames available.

"The upgraded engines have achieved excellent performance in test cell and show very promising performance retention and reliability," said Martine Selezneff, Senior Vice President Engine Overhaul, Air France. "Despite a significant investment, Air France is confident in achieving, through next years, the expected cost reductions and operational benefits."

Incorporating advanced turbine materials, and coating and cooling technology from the latest generation of aircraft engine design into an engine launched in the 1970s, the kits provide significant improvement in engine life, cost of ownership, and long-term residual value.



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The U.S. Federal Aviation Administration (FAA) granted certification to the facility in October (RS# GOKY523X).



## Expanded OWS center serving Asia

GE On Wing Support<sup>SM</sup> Services is now even better positioned to serve carriers flying in and out of northern Asia. On Wing Support Korea co-located with Asiana Airlines at the new Incheon International Airport in Seoul. This new center is more than triple the size of the former location at Gimpo Airport.

The facility provides on-wing and light maintenance support for engines and APUs, as well as stores and services spare engines for GE Engine Leasing and Shannon Engine Support. Site Leader Sae-Hun Park said the center supports airline customers by preparing CFM56 and CF6 engines for installation, through engine removals, and by quickly turning around engines for other GE facilities.

Stefanie Darlington, President and General Manager of GE On Wing Support, Inc., said, "We're very excited to be strategically located at Incheon. This dramatically increases our ability to respond more quickly to aircraft on ground and other quick-turn needs of Asiana and our other customers there."

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## GE services extend beyond aircraft

Auckland-based Air New Zealand asked GE Engine Services for ideas on how to further increase the performance of some of its customers' aeroderivative LM5000 Gas Generators used in power generation and cogeneration industrial applications. The Aviation Component Service Center (ACSC) team responded with an idea that leveraged an EGT margin-boosting package that had increased margins on the CF6-50 engine.

The first engine on which the package was installed produced an excellent EGT margin. Other joint technical initiatives were also employed to help minimize vibration level. As with the EGT margin-boosting package, this same engine exhibited very low vibration levels, both in the test cell and in operation.

Thanks to these joint effort solutions, Air New Zealand now includes these performance enhancement packages on all LM5000 engine overhauls. The company is also beginning to add the package to LM2500 engines.

John Callesen, Manager for Air New Zealand's Engineering Services Aero Derivative Engines Division stated, "Air New Zealand appreciates GE's suggestions on ways to enhance the product to our customers. We look forward to future joint efforts to provide additional value and quality."

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This is the second in a series of articles  
about the capabilities of Unison Industries.

## Ignition provides the spark

The ignition exciter, the "heart" of a turbine engine ignition system, takes input current from the aircraft electrical system, increases the voltage, and then delivers a powerful burst of energy to the ignition lead.

A typical exciter operates on a nominal input voltage of 115 VAC, 400 Hz, or 24 VDC. The ignition lead transfers energy from the exciter to the igniter plug. The plug transforms that energy into an electrical spark that ignites the fuel/air mixture in the engine's combustor.

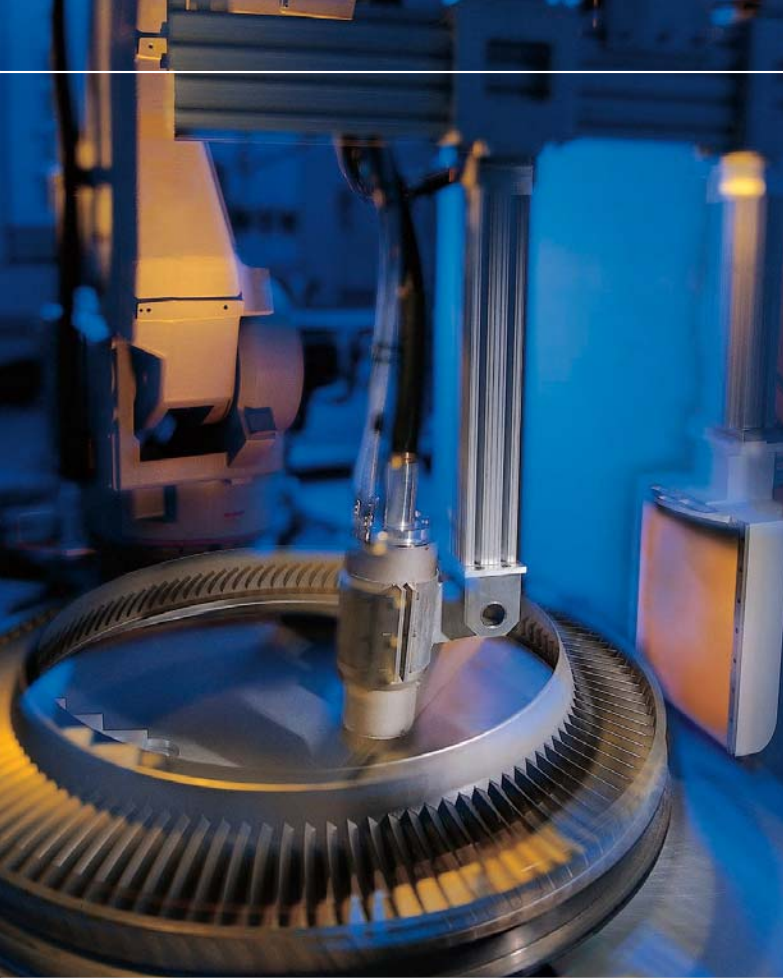
As expendable components, igniter plugs are replaced or "hard-timed" as a part of most operators' maintenance programs. They should be inspected at regular intervals for excessive tip erosion, cracked ceramic insulators, or any evidence of shell burn-through.



UPS recently selected Unison to provide igniters  
for its 49 CFM56-powered DC-8 aircraft and  
32 CF6-80C2-powered 767-300ERs.

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W W W . G E A . C O M



## Air Canada cost-effectively managing business through leasing



GE Engine Leasing recently completed lease transactions for 15 spare engines with Air Canada that are helping the carrier effectively manage its financing requirements during this industry downturn.

For example, in September, GE completed a sale/leaseback transaction covering 11 GE and non-GE engines worth approximately \$100 million (Canadian dollars). Earlier this year, Air Canada lease-financed with GE Engine Leasing the delivery of two factory-new CFM56-5B engines for its A320 fleet—conserving cash while providing the required spare engine support. GE also provided multi-year leases for two CF34-3B engines from its spare engine pool for the airline's growing CRJ\* fleet.

"GE Engine Leasing provided a high level of service with terms that met our financial and operational requirements," said Jon Turner, General Manager, Aircraft Programs, Air Canada. "It's helped us manage our business creatively and cost-effectively."

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## DR system to boost productivity

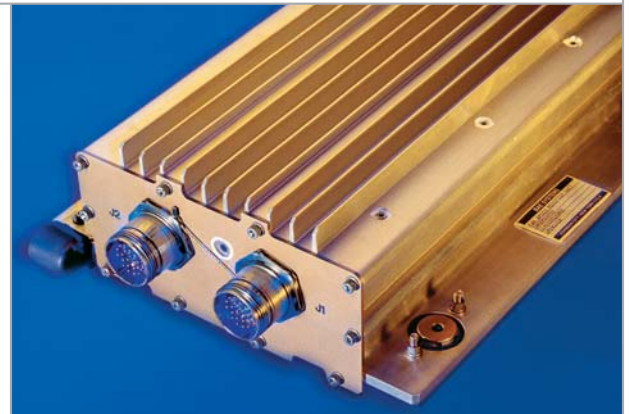
Techspace Aero, a leading Belgium-based turbine engine component manufacturing and overhaul services company, has purchased a high-resolution GE digital x-ray inspection system for use in its manufacturing line. The company produces casings, disks, vane assemblies, and accessory components for GE, Pratt & Whitney, and Snecma Moteurs.

This new and advanced turnkey system from GE Inspection Technologies is designed for x-ray inspection of large cases. Techspace Aero will initially use the system for near-real-time weld inspection of CFM56 and CF34 boosters. Follow-on applications will include GE90 and P&W casings. The system is expected to be fully operational in March 2003.

Key benefits for Techspace Aero include significantly increased productivity due to system speed, the replacement of an older film-based x-ray inspection system and the associated chemicals, and the ability to archive digital data and share it with customers and internal engineering.

"We believe the GE system will deliver at least a 50 percent improvement in cycle time and labor productivity over conventional x-ray," said Ante Tomasovic, NDT Expert - Methods & Qualifications, Techspace Aero. "On top of that, its ability to handle digital records will help us streamline our process."

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## Fan speed modifier ready for takeoff

The fan speed modifier (FSM) upgrade received FAR25 certification for Boeing 747 applications in September, and is now ready for incorporation into customer fleets. This upgrade will be used first on CF6-50-powered B747 aircraft.

Projected to reduce engine cost of ownership up to 10 percent, the FSM system trims excess thrust to increase EGT margin, extending engine time on wing. An additional customer benefit is reduced material costs due to lower operating temperature. The upgrade system also features overnight on-wing installation.

An FSM system being developed for DC-10 and MD-11 aircraft applications is expected to be certified by mid-2003.

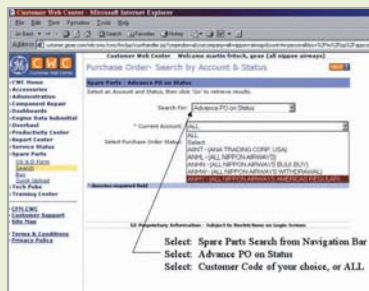
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# CWC > productivity tip

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> To help customers get the most from the capabilities built into the Customer Web Center (CWC), we're providing this easily implemented user tip.

The Commercial Spares Business uses customer codes to effectively manage customer accounts with multiple products and programs. If you have multiple accounts, you can narrow your search options by selecting one, or all of these codes. This feature provides more specific search criteria, by account.



## Aircalin sees real benefits with MCPH

New Caledonia-based Aircalin chose GEES' Maintenance Cost Per Hour<sup>SM</sup> (MCPH<sup>SM</sup>) program with the introduction of two A330 aircraft into its fleet. "We selected GE's CF6-80E engine for its performance, reliability, and cost-efficiency," said Jean-Michel Masson, CEO for Aircalin. "With the MCPH agreement, we can take full advantage of this choice—both from an operational and economic perspective. This is crucial to an airline with a small size fleet operating in the South Pacific."

"The introduction of the CF6-80E at Aircalin and the follow-on engine maintenance support has been carefully planned," said GEES Sales Director John Bennett. "Besides offering engine overhaul at a pre-determined dollar-per-flight-hour rate, the MCPH program offers significant program management benefits."

Aircalin will receive several benefits compared to Time & Material (T&M) services: financial predictability, GEES' proactive engine management

to minimize potential disruptions or delays, and engine overhaul management. At overhaul, GEES handles workscoping, engine records, and documentation of shop visit findings.

"Cost predictability via MCPH is very important because of the possibility for differences between the actual and budgeted occurrence of shop visits," explained Bennett. "This can create issues for any operator, but the impact to operators of smaller fleets could be even more significant. In addition, the administrative complexities of outsourcing engines on a T&M basis are eliminated with MCPH."

The MCPH program also provides operators with integrated solutions that utilize resources such as GE On Wing Support<sup>SM</sup> services and GE Engine Leasing. For example, Aircalin chose GEES' enhanced Remote Diagnostics services for its A330 aircraft and CF6-80E engines.



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The purpose of *Service Solutions* is to enhance communications with our customers. Please contact us if we at GE Engine Services can be of further service to you.

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\*CRJ is a trademark of Bombardier Inc.