



## GE Aviation Completes ATI-Singapore Acquisition, Further Enhancing Repair Development Capabilities

GE Aviation has increased its ownership of Airfoil Technologies International–Singapore Pte. Ltd. (ATI-Singapore) from 49% to 100% by purchasing Teleflex Incorporated’s ownership stake in the business. By completing the acquisition of this leading-edge jet engine components repair operation, GE enhances the repair capabilities key to its global base of airline and industrial customers.

ATI-Singapore began operations in 1998 with a vision of establishing a compressor airfoil repair center of excellence. Eleven years later, it has grown to become a world leader in the repair of low- and high-pressure compressor (HPC) airfoils, having achieved industry-leading turnaround time and world-class quality excellence.

The acquisition of this operation supports GE’s growing Services network and expands the

company’s investments in Singapore, where GE operates several aerospace facilities. “The purchase of the remaining shares of ATI-Singapore allows us to better develop GE Aviation’s repair technologies and work more closely with our customers to provide the best benefits to meet their needs,” says David Joyce, GE Aviation president and chief executive officer.

GE has done everything possible to make this a seamless transition, with no interruption in



service and complete transparency. “ATI is a world-class repair shop, with the latest technical equipment for HPC airfoil repairs. They have always maintained great relationships with their customers with their excellent service and quality,” says Tom Gentile, vice president and general manager, GE Aviation, Services. “Those relationships remain as strong as ever following the acquisition. We will continue to grow both our GE and our external business by leveraging GE Aviation’s global sales team.”

### The ATI-Singapore File

- Located in Loyang Industrial Park, Singapore
- 138,000-square-foot facility
- More than 500 employees
- Combines state-of-the-art techniques for welding, machining and profiling with advanced process and production systems to achieve precision repairs in industry-leading turn times
- Repairs more than 2 million compressor airfoils each year
- Services all GE commercial aviation, marine and industrial engines
- Also has repair capability for compressor vanes and stator seals for certain GE and CFM\* engine lines

### Serving a Wide Variety of Engine Lines

The ATI-Singapore facility was originally built to service the CF6\* and CFM56\* engine families. Through the years, the operation has expanded its services to include all GE commercial

continued on page 2



ATI-Singapore Acquisition . . . continued from page 1

aviation, marine and industrial engines as well as Pratt & Whitney and Honeywell components. Today, the facility utilizes state-of-the-art equipment and technology to repair more than 2 million compressor airfoils annually.

**“ATI’s relationships remain as strong as ever following the acquisition.”** —Tom Gentile

The business continues to increase its portfolio of repair offerings and value-added customer services. Newer offerings include the operation’s scrap replacement and end-gapping programs, which help streamline customers’ supply chain and increase efficiencies. Additional capabilities include auto welding, CFM56 leading-edge chord restoration, CNC machining and the application of anti-erosion and anti-corrosion protective coatings.

With the full power of GE research and development behind them, the ATI-Singapore team will continue to optimize technology developments for compressor airfoils and other repairs executed at their facility. “We are extremely pleased to have ATI join the GE Aviation, Services team. Their addition enhances our ability to provide outstanding repair technology and service to our customers,” says Gentile.

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## GE’s Growing Relationship With Singapore

GE’s relationship with Singapore began 40 years ago, when the company opened several electronics manufacturing facilities. Today, Singapore is one of the largest markets in the Southeast Asia region for GE, with several key operations in the aviation sector, including:

- The **GE Aviation Service Operation (GEASO)**, which repairs and refurbishes high- and low-pressure turbine blades and vanes, combustors, rotating parts and seals for more than 100 aircraft engine customers around the world (and where a facility expansion will soon increase GEASO’s capacity and capabilities to include repairs on new engines, such

as the GENx\* engine for Boeing’s 787 Dreamliner\* and 747-8\* aircraft);

- A **30,000-square-foot material distribution and sales center** in the Changi area of Singapore, which provides used-serviceable parts and components that improve material availability and support for customers in the Asia-Pacific region from China to New Zealand; and
- The **Pacific Service Center in Singapore**, through which GE Aviation’s Systems organization provides customer support and innovative solutions to builders and operators of military and civil aircraft, engines and land vehicles.



Heat treat processing



End-gap process

## MRO Americas Provides Valuable Networking Venue

GE Aviation participated in a successful MRO Americas conference in Dallas, Texas, this April through its sponsoring, exhibiting and networking activities. In addition, Tom Gentile, GE Aviation, Services, vice president and general manager, joined other aviation industry leaders as part of a leadership summit panel. Gentile presented insights on the topic “Reinventing Commercial Aviation/MRO in a Changed World.” In a separate session, Mark Pearson, GE Aviation’s general manager, advanced technology and preliminary design (engines), presented views on “Next-Gen Engines and Upgrade Programs for Commercial Aircraft and the Implications for MRO.”

View all conference presentations online by visiting <http://www.aviationweek.com/events/html/mro09.htm> and clicking on a speaker’s name to access his or her presentation.



## Engine Performance Restoration

# GE Aviation to Launch Innovative ClearCore Engine Wash and Effluent Collection System

The aviation industry has long recognized the performance and economic benefits of engine washing. Currently in development, GE Aviation's innovative ClearCore\* engine wash and effluent collection system will deliver several key improvements over and above traditional methods. When it launches later this year, this offering will enhance GE's already extensive portfolio of OnPoint\* products and services.



ClearCore water wash collection unit

Engine washing is an initiative that helps operators more efficiently utilize their resources, while reducing fuel usage and carbon footprint. One area where ClearCore differentiates is in its effluent collection system. ClearCore's positive connection captures virtually all of the wash effluent and eliminates overspray and dripping. This arrangement addresses many of the typical environmental, health and worker safety concerns, and it greatly expands the number of locations within an airport or maintenance facility where engines can be washed. In addition, customers' engines equipped with GE's engine diagnostics can benefit from features such as wash optimization and scheduling, fuel savings reports and trending.

"Our customers have asked for a flexible OEM solution that will help them meet their engine washing needs while minimizing environmental impact," says Tim Swords, GE Aviation marketing leader, commercial engines. "ClearCore's patent-pending system for total effluent capture, filtration and re-use will provide maximum engine performance restoration, with minimal equipment wear and operational interruption."

## Successful Customer Trial

In May, GE successfully completed a customer trial of its ClearCore system with Virgin Atlantic Airways. Taking place at London Heathrow Airport on a Virgin 747-400\* aircraft powered by GE CF6-80C2 engines, the trial was conducted using a conventional shepherd's hook front-end engine wash system. This method is known to lead to exhaust gas temperature (EGT) margin improvements of up to 15 degrees and fuel burn savings of up to 1%. The wash was the first in a series that GE will provide for Virgin Atlantic as part of an OnPoint services agreement.

"We are constantly improving the sustainability of our business and are committed to optimizing fuel efficiency in our fleet," says Phil Maher, director of Engineering, Virgin Atlantic Airways. "We have an established engine wash program on all engine types that we operate and have seen benefits through improvements in EGT margin, reduced fuel consumption and, consequently, reduction in CO<sub>2</sub> emissions. We are delighted that GE has developed an effluent collection system, as this will allow us greater flexibility in terms of when and where we perform engine water washing without impacting the environment at a local level."

## Available by Year End

The ClearCore system will be available as a full service or equipment-only (collection or wash/collection) option. The system features onboard electrical and hydraulic power, with adjustability to accommodate most engine families. ClearCore equipment and services will be available for quotation in July 2009, with product availability by year end.

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## Engine Wash Benefits Include:

- EGT improvement up to 15 degrees
- Fuel burn savings up to 1%
- Extended time on wing
- Reduced carbon footprint

## ClearCore Delivers:

- Full service or equipment-only options
- Complete effluent capture, filtration and re-use
- OEM expertise and backing
- Engine diagnostics-enabled services
- Detergent capabilities
- Gate or hangar flexibility



## Component Repair Highlights

These and other recently released repairs for CF6\*, CF34\* and CFM56\* engines help improve customers' cost of ownership:

### CF6-50 Compressor Rotor Air Duct

**Assembly Aft End Replacement:** This repair provides customers with a duct that has a newly replaced and finished-machined forged aft end that extends the life of the part with full dimensional restoration. The repair will further extend part life by allowing multiple end-replacements on the same part.

### CF34-8C/E High-Pressure Compressor Case Stage 6 Bleed Port Manifold Replacement:

This upgraded part allows for an increase in vibration limits and reduced port cracking, mitigating early or unscheduled engine removals caused by these qualities.

### CFM56-5BP/-7 Low-Pressure Turbine (LPT) Case Rail Zero Rework Modification:

This change improves LPT case repair yield and generates significant savings by reducing the wear that can cause the case to be non-repairable.

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## CFM56-5B Tech Insertion Engines to Power New Fleet

# Gulf Air Signs 10-Year OnPoint Solutions Agreement

The Kingdom of Bahrain's flag carrier, Gulf Air, has signed a 10-year OnPoint\* solutions agreement with GE Aviation for engine maintenance, repair and overhaul to support its recent purchase of CFM56-5B engines. These CFM International engines will power 15 new Airbus A320\* family aircraft, which are scheduled for delivery to Gulf Air between late 2009 and 2013.

Gulf Air operates scheduled services to more than 40 destinations in Africa, Asia, Europe, the Middle East and Far East from its base at Bahrain International Airport. Regarding the recent agreements, Talal Al-Zain, chairman of Gulf Air, says, "Our partnership with GE started over 20 years ago and reflects our cooperation and GE's commitment to providing Gulf Air with the highest quality engine performance and reliability available."



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GULF AIR

"Selecting the CFM56-5B engine demonstrates our continued trust and confidence in this product's excellent technical capability. It also demonstrates our long-standing relationship



with CFM\*, who has powered our existing A320 and A340\* fleet with superior reliability."

### Tech Insertion Benefits

All of Gulf Air's CFM56-5B engines are of the Tech Insertion configuration, first introduced in fall 2007. Compared to the base CFM56-5B engine, this new design provides operators with a 1% improvement in fuel consumption, longer time on wing and lower maintenance costs of between 5% and 12% over the life of the product.

"GE Aviation is very pleased Gulf Air has selected our company to maintain and overhaul its CFM56-5B engine fleet," says Muhammad Al-Lamadani, GE's senior executive, regional sales. "The high reliability and low operating costs of the CFM56-5B-powered A320s will help support

Gulf Air's long-term profitability, and the fleet will also benefit from our world-class customer and product support organization."

GE's OnPoint solutions are customized service agreements tailored to the operational and financial needs of each customer for any size fleet. These agreements are designed to help lower customers' cost of ownership and maximize the use of their assets. Backed by GE's global support network, OnPoint services may include overhaul, on-wing support, new and used-serviceable parts, component repair, technology upgrades, engine leasing, diagnostics and integrated systems support.

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## Did You Know?

Through OnPoint\* overhaul offerings, GE Aviation can provide GE and CFM\* engine operators with increased slot availability as well as turnaround times that are among the best in the industry. Contact your GE representative for more details.

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