

Achieving Lowest Operating Costs at Entry Into Service

The GENx* engine will help customers achieve an overall lower cost of ownership horizon through its innovative design and proven technologies—delivering advantages such as better fuel efficiency and a 20% time-on-wing improvement over current engines in its class.

It's so innovative, in fact, that GENx engine operators will be able to realize early bottom-line cost-of-ownership benefits gained as the result of GE's repair development and maturation programs. In the past, repairs in a

new engine program have essentially evolved during the life of the engine.

That is not the case with the GENx engine. The repair engineering team has already identified and scheduled more than 400 repairs for the GENx engine.

"The cost of ownership of the GENx engine was defined through design for reparability requirements placed upon engineering," says Alan Webb, GENx product leader in GE's services division.

"These requirements, together with an unprecedented number of repairs being in place when and as they are needed, are the key to achieving the GENx cost of ownership. These cost-of-ownership commitments are enabled by technology investments and are commercially supported through a Material Cost Guarantee [MCG] or a more inclusive OnPoint* solution."

Innovative Move

To identify repair requirements and establish priorities, GE relies on in-service experience with the GE90* engines, which share common architecture with the GENx. This is augmented by in-service experience gained during the 30-plus years of service of the CF6* and CFM56* engine families.

For unique GENx technologies, such as the composite fan case, blisks and turbine materials, repairs are derived largely through accelerated component testing, design projections and materials performance.

To establish further confidence in these plans, GE will complete 15,000 cycles of maturation testing prior to entry into service and will continue to accumulate cycles years ahead of GE's customer fleet leader. Repaired hardware will be incorporated into these simulated shop visits to validate their ability to reduce customers' cost of ownership.

GENx Repair Development Plan



400+ repairs—scheduled well in advance of need

Contact: **Alan Webb** alan.webb1@ge.com



vivaAerobus Taps Into OnPoint Solutions on Start-Up

vivaAerobus has signed a six-year OnPoint* service agreement that will utilize CFM International's (CFM) CFM56-3 Advanced Upgrade package. Under the agreement, GE will install the upgrade in the airline's 10 CFM56-3 engines as well as handle overhaul and maintenance needs.

"After evaluating the alternatives, the OnPoint agreement provided the lowest cost of ownership for our fleet and supported our entry into the market as a new low-cost carrier in Mexico," says Mike Szucs, vivaAerobus CEO. "vivaAerobus aims to be the airline for all of the people of Mexico."

The engine upgrade features advanced three-dimensional aerodynamics (3-D aero) technology in the high-pressure compressor blades and new high-pressure turbine hardware developed by CFM for the CFM56-5B and CFM56-7B engines on the Airbus A320* and Boeing Next-Generation 737* aircraft, respectively.

vivaAerobus began its low-fare flights on Nov. 30, 2006, from its base at Monterrey



(Mexico) Airport. Its shareholders bring years of experience in the transportation sector to their new venture. The airline was formed as a strategic alliance between the Mexican bus group, IAMSA (Inversionistas en Autotransportes Mexicanos SA de CV), and the Irish-backed RyanMex, the investment company of Dr. Tony Ryan, his family and other low-cost aviation specialists.

OnPoint Flexibility

OnPoint solutions are flexible, long-term commitments designed to meet customers' unique engine service needs. From overhaul, on wing support and new and used parts to component repair, technology upgrades, engine leasing and diagnostics, these solutions help

lower customers' cost of ownership and maximize the use of their assets.

"Whether they are a start-up, regional or mainline carrier, we work with each customer to design a solution to meet their goals and objectives," says Bill Millhaem, general manager of GE's material services division.

"We put together an OnPoint solution for vivaAerobus that provides all the benefits of the latest OEM technology without a significant upfront investment. This plan meets their cash flow needs in the short term while delivering fuel and maintenance savings over the long term."

Contact: **Angela Jarczyk** angela.jarczyk@ge.com

Erlanger Distribution Center has Global Reach

Job No. 1 for maintenance, repair and overhaul shops worldwide is to keep their fleets flying. Filling the massive international need for engine spare parts falls to the 100-plus-person team at GE Aviation's Erlanger Distribution Center in northern Kentucky.

Daily, some 4,000 part numbers are shipped out and approximately 1,200 part numbers are received to restock the shelves of the 400,000-square-foot facility, says Bill Schipper, fulfillment leader at the facility for the past 22 years.

"We are a 24/7 operation, running four shifts to guarantee coverage around the clock and through the weekend," says Schipper. "We handle all spare parts for GE and CFM* engines—large and small commercial and marine and industrial applications."

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GP7200 MRO Centers Established as Engine Flight Tests

With 70 test flights and more than 230 hours of total testing on the Airbus A380* completed as of press time, the Engine Alliance's* GP7200* engines are performing extremely well under all conditions, paving the way to certification late this year and entry into service in 2008.

The Engine Alliance (EA) will offer a broad spectrum of overhaul, repair and on-wing service solutions to help the engine's customers reduce operating and overhaul costs and resolve logistics issues. Says Bruce Hughes, president of the Engine Alliance, "Our goal is to not only provide an excellent engine for the A380 but to back it up with reliable, cost-effective overhaul and repair."

The EA has named GE's facility in Nantgarw, Wales, as the first link in the GP7200's worldwide network of service centers. And, last year, Air France Industries (AFI), a world-leading multi-product aircraft maintenance provider, and the EA signed an Industrial Cooperation Agreement for AFI to operate a GP7200 maintenance, repair and overhaul (MRO) center in Paris, France.

As the engine is being developed and tested, engineers are proactively preparing for

maintenance, repair and overhaul of the engine once it enters service. "Our plan is to have repairs available and validated before they are ever needed," says Al Creque, marketing director for the Engine Alliance, a 50/50 joint venture of General Electric and Pratt & Whitney, a unit of United Technologies Corp. "We currently have more than 300 repairs and will continue this work in phases to ensure we are fully prepared for the first engine overhaul five or so years into service, in late 2013 or early 2014."

With a 116-inch-diameter fan, the GP7200 is not much smaller than the GE90*. On takeoff, the A380's four 70,000-pounds-thrust GP7200 engines will generate 177,700-plus horsepower, which equates to the maximum power output of 40 GE Evolution* series locomotives.

In early January, the GP7200-powered A380 underwent successful cold weather testing in



Iqaluit, Canada. "We continue to be very pleased with the GP7200's in-flight performance," reports Hughes. "The engine's fuel burn performance continues to track at or better than our specification to Airbus, and all other parameters are performing just as we expected."

Contact: **Al Creque** al.creque@ge.com

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Processing Efficiencies

The center's strategic location at the Cincinnati/Northern Kentucky International Airport allows for pickups later in the day, enabling shipment of more critical material to customers sooner.

"We actively stock 40,000-plus different part numbers. To minimize travel time through the facility, we dedicate bin locations for short lead-time items close to the shipping and receiving dock," says Schipper.

The center's team works in a dynamic, real-time environment. Wireless handheld computers help minimize paperwork and sort orders for processing according to the highest

priority. And new radiofrequency technology will enable instant inputting of inventory as it comes off the truck, streamlining order handling even further.

There is no charge for premium service. When there is an AOG (aircraft on the ground), the center has a four-hour commitment to have material ready to be picked up. Explains Schipper, "Customers access our stock via their account managers and can view and download their unique packing and shipping documents and FAA certification through their own web portal."

Kitting for Assembly Sites

Six years ago, the center began providing kits in support of GE's engine assembly at

Evendale and Peebles, Ohio; Durham, North Carolina; Albuquerque, New Mexico; and CFM assembly in Villaroche, France. "There are synergies associated with having all the material in one location," says Schipper, emphasizing the value of stocking parts for new-make and the aftermarket in one location. "We make seven runs a day to Evendale and Durham alone.

"This is an extremely efficient facility in terms of processing and delivering orders," says Schipper. "We have a 99.8% out-on-time fill rate and are continually tweaking our procedures and technology to exceed even that watermark."

Contact: **Bill Schipper** bill.schipper@ge.com

Acquisition of The Memphis Group Expands Customer Support Capabilities

In October 2006, GE Commercial Aviation Services (GECAS) acquired The Memphis Group (TMG). TMG is a leading distributor of recertified airframe components and related equipment—such as flight controls, avionics and line-replaceable units (LRUs)—to the international aviation market. The company serves a customer base of more than 1,000 airlines, aircraft leasing companies and manufacturers of aviation-related products. In addition, TMG has a component repair shop and a facility to dismantle aircraft.

The acquisition of The Memphis Group enables GE to purchase, or take on consignment, the surplus/excess aircraft and aircraft spare parts of airlines and leasing companies. As a result, GE is able to provide a broad array of used serviceable products that includes avionics equipment, accessories and engine parts in addition to its existing offerings on aircraft components, engines and thrust reversers.



TMG ships parts from warehouses in Memphis, Tennessee, and Hamburg, Germany, and from its hangar/warehouse in Greenwood, Mississippi—TMG's facility for dismantling aircraft. All three sites are climate-controlled.

In addition, TMG offers an Asset Management Program that is designed to generate revenue and reduce the inventory investment of airlines through consignment, sale/leaseback programs and inventory investment strategies.

“The acquisition complements GE Aviation's used materials business located in Irving, Texas,” explains Jim Reidenbach, vice president of business development for GE Commercial Aviation Services. “TMG will acquire aircraft for dismantling and will sell the airframe-related parts, and GE Aviation will receive the engines to serve its used serviceable material customers.”

Contact: **Jim Reidenbach** james.reidenbach@ge.com

THE AMERICAS

Kevin McAllister
kevin.mcallister@ge.com

ASIA

Chaker Chahrour
chaker.chahrour@ge.com

MIDDLE EAST

Muhammad Al-Lamadani
muhammad.al-lamadani@ge.com

EUROPE

Jack Lutze
jack.lutze@ge.com


CHINA

Mike Wilking
mike.wilking@ge.com

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GE
Aviation

General Electric Company
One Neumann Way
Mail Drop J4
Cincinnati, OH 45215 U.S.A.
Phone: +1.513.552.3272 (Internationally)
+1.877.432.3272 (Within U.S.)
Fax: +1.513.552.3329
www.geaviation.com/onpoint
E-mail: servicesolutions@ge.com

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AE-51271 (2/07)

Printed in U.S.A.



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