



GE Engine Services

service solutions

engines
maintenance
material
finance
information

GEES Japan expands to provide world-class service

Airline customers in Asia have welcomed several exciting developments at GE Engine Services—Japan, Corp. This facility is dedicated to the comprehensive repair of large jet aircraft engine components for the Asia region. A joint venture company of GEES, All Nippon Airways (ANA), and Ishikawajima-Harima Heavy Industries (IHI), the center (FAA RS# GZ0Y576Y) is located in Yokoshiba, Japan and began operations in April 2000.

Its repair focus is the more sophisticated components, from high pressure compressor cases to turbine mid frames, compressor rear frames, and turbine rear frames, as well as all rotating disks, seals, and shafts for both CF6 and CFM56 engines. The shop also performs a broad spectrum of nondestructive inspections from fluorescent penetrant inspection to eddy current and ultrasonic.

Tris Colaizzi was recently named the facility's general manager, and brings more than 29

years of comprehensive aircraft engine repair experience to the role. "Our capabilities continue to expand with assistance from other established GEES shops," said Colaizzi. "For example, GEES Caledonian in Scotland has provided considerable engineering and shop expertise to train our operators and implement best practices that are enabling us to provide world-class component repair services.

"The center will continue to grow and provide expanded Asia region support for airline customers with the introduction of repairs for the GE90," he continued. "We'll work closely with Japan Airlines, ANA, IHI, and other Asian GE90 operators to ensure that GE90 maintenance is accomplished in this region. That approach will reduce engine maintenance turnaround time and, more importantly, customers' cost of ownership."



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IHI Named "Authorized CF34 Service Provider"

GE Engine Services (GEES) has named Ishikawajima-Harima Heavy Industries (IHI) of Japan an "Authorized CF34 Service Provider" for GE Aircraft Engines' best-selling CF34-3 and CF34-8 engines.

With this designation, IHI will offer CF34 operators another source of engine maintenance services performed to GEES quality standards. The agreement provides IHI with full GEES technical support, including training, engine manuals, and equipment. IHI also gains access to GE spare parts and component repairs, ensuring leading-edge technology for its overhaul process and excellent maintenance quality for CF34 operators. Additionally, the agreement enables IHI to perform GE warranty repairs.

IHI, Japan's largest aircraft engine manufacturer, has been involved in a number of GE engine programs over the past several decades and is a revenue-sharing participant in the CF34 and GE90 engine programs. The company's involvement includes design, development, engine testing, and manufacturing.

The CF34 engine family powers 50-, 70-, and 90-passenger regional jets in operation or under development by Bombardier and Embraer.



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GE helps Honeywell

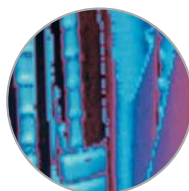
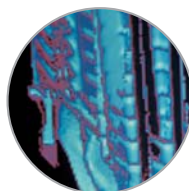
get the inside story

GE Inspection Technologies provides Computed Tomography (CT) 3D x-ray modeling services that see the exterior and interior of customer parts accurately, rapidly, and cost-effectively. Using GE's powerful CT machines that are capable of inspecting items from a small turbine blade to an entire engine, we provide services for a wide range of design and manufacturing applications in the aerospace and other industries. CT significantly shortened the inspection and measurement cycle that, in the past, could have taken weeks and required destructive evaluation.

Honeywell is one customer for whom GE has been providing CT expertise for several years. "We've incorporated CT up front, so we can find problems before they're problems," said Carl Juroff, Procurement Quality Engineer for Honeywell. "Making a casting and laying it out to print can take days. With CT, it doesn't care if there's a design or execution error, you're going to find it quickly. Even if the part is good, you can do the inspection without scrapping the part."

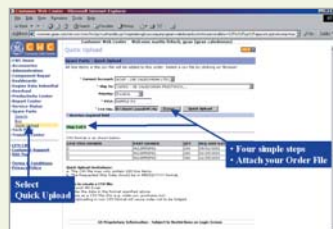
"The other thing we use CT for is parts in the field that we're concerned about. CT from GE has saved us millions of dollars over the past 5-6 years. In one case alone, we used it to scan an assembly that would have involved a very expensive teardown, visual inspection, and rebuilding. It would have taken at least 100 hours. When you multiply that by whatever the assembly population is, you can see the cost and time savings. We've saved money by avoiding problems and by reducing inspection costs when we have a problem, or think we might have a problem."

Another solution is for customers who want to reproduce an old part, GE images the part, producing a 3D "point cloud" model that provides internal and external data points that describe the subject—something not possible with coordinate measurement systems. With this service, the customer receives 3D information in the form of digital data that can be turned into a solid model, can be stored, manipulated, and used for stress analysis, and then can be used in the automated manufacturing process.



CWC > productivity tip

> "Quick Order" Upload



Since many POs contain multiple line items and schedules, a new "Quick Upload" feature lets a user attach a csv file instead of typing in each line item separately. A template ensures mistake-free entry. From the Spares Application, simply click on "Quick Upload" and follow four simple steps.



HPT blades get new life

GE's enhanced airfoil rejuvenation technologies and processes now provide airline customers with the option of performing any number of sequential repairs limited only by their incoming condition. This allows an increase in the number of times most blades can be repaired, increasing both customer value and reducing the number of new blades purchased.

Enhanced rejuvenation minimizes the removal of base material to maintain an acceptable blade wall thickness throughout the overhaul life of a part. Utilizing Six Sigma tools, a multifunctional group consisting of the GE Global Research Center Manufacturing & Quality Technology Department, Repair Engineering, and Material Process Engineering Department has developed a new repair procedure. This procedure "saves the wall" (base material) and makes innovative use of environmental and thermal barrier coating removal and recoating technologies, extending blade life while maintaining "critical" properties.

Several factors such as wall thickness, life limits, and FOD determine what can be done with individual blades. Enhanced rejuvenation allows multiple rejuvenation cycles that extend blade life, and helps ensure that the decision about whether to repair won't be limited by the repair process.

GEES' rejuvenation goal has always been to reduce customer cost of ownership through repairs that increase the life cycles of the parts, allow more repairs and reuse of parts, and increase yields. Through technology, GEES has worked to increase the number of repairs, while making it possible for previously unrepairable parts to be repaired at least once.

Developed originally for the CF6 and CFM56 engines, these repair techniques have been extended to other engine lines such as the CF34 and GE90. GEES is continuing to invest in leading-edge repair development technologies to further drive down customers' cost of ownership.

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Revamped Customer Web Center lets you place orders instantly

Commercial Spares customers who order materials manually (fax, phone, mail, or email) can now benefit from new online order capability—just one feature of Spares CWC Version 3.10. The new Customer Web Center (CWC) provides productivity and data quality improvements for the customer and GE.

For example, GEES' Materials Spares Team received several hundred thousand order line items in 2001. The team knew that thirty percent of Large Commercial Engines' orders and 70 percent of Small Commercial Engines' orders were generated manually, meaning there was a real opportunity to make the ordering process more efficient for both the customer and GE.

Marty Fritsch, GEES CWC Black Belt, said "The new CWC provides a faster, more reliable site. GEES Materials challenged us to enhance the Spares order management processes so customers without EDI (Electronic Data Interchange) capability could place orders on the CWC with confidence and similar functionality.

"We wanted the new design to be driven by the voice of the customer, specifically those who placed a heavy volume of orders manually," Fritsch explained. "Our data showed that H&S Aviation would provide an excellent opportunity to reduce manual order processing. Working with them and Spares Customer Account Manager (CAM) Jerry Funk, we evaluated existing CWC capability and created enhancements to improve productivity. Together, we designed new, more efficient Purchase Order placement functionality, including: Multi-Line Item PO, Line Item Assignment and Modifications, Order Confirmations, and Bulk Order Uploads.



Andrew Featherstonhaugh, Operations Coordinator at H&S Aviation, commented on his collaboration on this project: "Direct feedback is so important, as customers have to use the CWC every day. The CWC has improved our level of customer satisfaction with its ease of use, and the time it provides for the CAM to concentrate on running the account. The open order report is a good source of information and being able to download

all reports is a great benefit. In today's economic situation in the aviation industry, it's always welcome when you get tools to do the job at no extra costs."

Fritsch concluded, "Each customer's processes and requirements are unique. Many need our help integrating the CWC with their internal processes. Spares CAMs will play a vital role in partnering with more customers to leverage the success experienced so far."

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GE Rotable Solutions, LogisTechs deliver innovative LRU materials solutions

GE Rotable Solutions (GERS) now has the ability to help airlines reduce spares (rotatable) inventory by 20–40 percent, while increasing fill-rate performance. GERS has extended its services menu by securing an exclusive relationship with LogisTechs Inc., an inventory planning and asset management firm. GE has a minority equity interest in the firm through GE Capital Aviation Services.

With LogisTechs' spares planning technology, GERS has a direct role in inventory optimization. This technology combines an airline's historical flight, part, and site data with its operational objectives and financial constraints to achieve optimal inventory mixes.

Understanding airline customers' focus on component reliability and driving down total cost of ownership, LogisTechs has already provided

significant tangible savings for customers like Air Canada, America West, and Horizon Air by proactively addressing crucial materials issues. Customers enjoy a dramatic reduction in the amount of capital invested on the spares needed to maintain valuable on-time rates. A reduction in material shortages and AOGs is concurrent with inventory reduction, resulting in an optimal inventory mix that pushes the system-wide material infrastructure to peak performance levels.

LogisTechs follows an exacting process of collecting data and defining fleet configurations. It uses that information to forecast parts demand and to determine an organization's operational goals and fiscal outlook. The company runs all information through its proprietary k2s-Knowledge to Spare® software, which produces efficient inventory strategies. Analysts then test the results in real-world simulations to verify how they will perform.

GERS' highly specific solutions put the right part in the right place at the right time. If customers want several scenarios created using different parameters—such as different budgetary values, using only existing stock, or setting higher fill-rate objectives—that's now possible. Whatever customers choose, GERS can tap this technology to significantly improve their on-time departure and arrival rates, knock down the number of material shortages, and save money.

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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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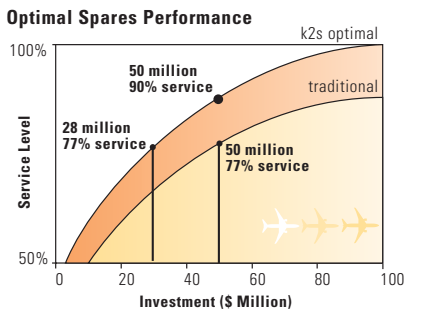
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This graph illustrates the difference in spares performance (per investment amount) between LogisTechs' method that uses k2s software and traditional spares planning. Achieve either the same performance from your spare inventory for much less investment, or get significantly higher performance for the same money.



GE Engine Services

We bring good things to life.

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