

Service Solutions

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OnPoint Solutions Provide Fleet Management Benefits



Fleet management services are a key element of GE's OnPoint* Solutions, utilizing GE's original engine manufacturer (OEM) expertise to drive customer productivity and keep ownership costs down. Working with each customer, GE develops engine maintenance and material programs that provide predictable maintenance costs, reduce cost of ownership and improve asset utilization.

"Customers benefit in many ways from our fleet management within an OnPoint Solution," says Angela Jarczyk, marketing manager, GE - Aviation, Services. "From engine workscooping to upgrade kits and high-technology repairs to innovative solutions for airline-specific issues, we work with customers to keep their aircraft flying.

"Through our day-to-day interaction with customers, we've been able to positively impact

their operations beyond routine fleet management activities."

Field Report

Here are a few examples of how OnPoint customers have benefited from GE's fleet management expertise:

Loganair

Operates a fleet of CT7*-powered Saab 340s* from its home base in Glasgow, Scotland.

- **Situation:** Loganair experienced a 36% increase in utilization in 2005. The airline serves lifeline routes to numerous unsupported airports and would like to minimize the expense of third-party maintenance in these remote locations. Getting planes home for service reduces the impact on the airline's total operation.
- **OnPoint solution:** GE works with Loganair's flight operations and maintenance personnel

GE's OnPoint Solutions Fleet Management

- Engine removal planning and scheduling
- Fleet planning
- **Customer-oriented metrics**
- Engine workscooping
- Service Bulletin and Airworthiness Directives incorporation and tracking
- **Life-limited parts (LLP) optimization**
- On-wing engine trending and diagnostics
- Worldwide field support
- **Aircraft on Ground (AOG) coverage**
- OEM technology and engineering expertise
- Reduced risk and internal administration

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imagination at work

to troubleshoot and make technical recommendations in order to avoid costly maintenance events at outstations while maximizing repair at the airline's own maintenance hub.

- **Customer benefits:** "The improvement in engineering support since we signed with GE OnPoint has been excellent," says Les Cameron, Loganair's technical services manager. "It's the sum of the pieces—helping us with igniters, high oil consumption, propeller gearbox updates and more frequent customer team meetings and visits from GE."



"As an OnPoint Solutions customer, Loganair has a direct point of contact to our technical and engineering resources," says Tom Hoferer, GE's Loganair program manager, Small Commercial Engine Services. "I serve as the conduit between the airline and GE, matching services and expertise to the particular need. Our goal is to help Loganair maintain operational flexibility on all fronts.

"For example, GE Product Support Engineering worked extensively with Loganair to troubleshoot high oil consumption. Through this effort, Loganair was able to push out a shop visit by three weeks, avoiding an unscheduled removal and the cost of leasing a spare engine," says Hoferer. "In addition, we worked with Loganair to update its manual trend monitoring system. Loganair is the second CT7 operator to convert to OnPoint's new digitized real-time diagnostics system."

Mesa Air Group

Regional airline based in Phoenix, Arizona; operates CF34-3B1-powered Bombardier* CRJ200* jets.

- **Situation:** GE observed that Mesa had opportunities for additional savings by derating its CF34-3 engines for certain flights, as the airline was doing with other engines.
- **OnPoint solution:** GE benchmarked similar operators and reviewed the procedures,

benefits and process changes required to implement derating, while addressing safety and cost issues.

- **Customer benefits:** Using takeoff derate, Mesa has seen improved reliability, increased time on wing (TOW) and fuel burn savings. Mesa's derating program will save the company close to half a million dollars during the term of the OnPoint program.

"Once we identified the opportunity, we worked with Mesa's flight operations and maintenance teams to determine when they could derate the engines, a move that puts less wear on the engines and has led to lower maintenance costs and customer savings," says Bill Bowman, GE's Mesa program manager, Small Commercial Engine Services. "In addition to the operational benefits, as Mesa utilizes more takeoff derate, GE provides a credit for the savings realized.



"Our team dovetails with Mesa's team on several levels, providing additional support for their organization. We schedule removals to

ensure coverage with spares, manage line-replaceable units, cover all maintenance issues and more—all part of our comprehensive maintenance solution for the airline."

Southwest Airlines

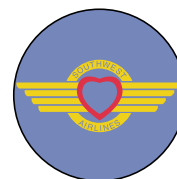
Dallas, Texas-based low-cost carrier, with a fleet of 219 CFM56-3-powered Boeing 737-300/-500* aircraft.

- **Situation:** Southwest is the largest U.S. carrier, based on domestic passengers enplaned. Optimizing operations by means of a unified fleet management plan is key to maintaining smooth operations for its more than 3,000 daily flights.
- **OnPoint solution:** Working with Southwest's engineering and maintenance teams, OnPoint has employed technology upgrades, optimized workscope and coordinated maintenance to improve engine performance and enhance fleet operations.
- **Customer benefits:** Southwest has realized a significant increase in TOW, avoided

maintenance events and has benefited operationally from proactive engine removal planning that reduces use of spare engines.

"When Southwest first signed its maintenance agreement with GE in 1997, the carrier's average time on wing was around 8,000 hours. Working with Southwest to determine our course of action, we've used OEM technology to upgrade their fleet, including the incorporation of 3-D aero TOW kits. Their average TOW is now more than 13,000 hours, and we expect it to reach 18,000 hours in the next few years," says Kathy MacKenzie, GE's Southwest Airlines program manager, CFM56* Engine Services. "Increased time on wing means lower maintenance costs. Southwest has realized significant savings over the life of the contract due to the upgrade kit.

"GE's OnPoint Diagnostics program is used to monitor Southwest's fleet," says MacKenzie. "In one recent example, we detected anomalies in temperature and fuel flow. Southwest did an immediate borescope inspection and found substantial high-pressure turbine shroud distress. The engine was removed and Southwest was able to avoid a potentially more significant disruption in its operation.



"Another big win for Southwest has been staggered removal of engines—a very effective strategy in managing their fleet. We remove engines

coming up for LLP replacement in the winter months," says MacKenzie. "This year, we also worked with Southwest to identify engines that were losing exhaust gas temperature margin—engines that would be most at risk for removal in the hot summer months. We pulled those engines off wing in May, and they were back in service, freshly overhauled for operation during the busy summer months.

"Compared to previous years, this proactive maintenance plan has paid off for Southwest. They had fewer summer removals and, where typically they would lease three to five spare engines, this summer they have not had to use any."

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Unison Overhauls Repair Policy to Offer Customers an Alternative

Sometimes the best response to a repair request is not a repair. That is the position of Chuck Currier, director of customer service at Unison Industries, a subsidiary of GE - Aviation, Services.

Airline maintenance, repair and overhaul centers and other service organizations sending their ignition leads to Unison for overhaul may choose Unison's newly introduced alternative: Instead of overhauling the lead, Unison will supply a new lead, complete with a new product warranty, for approximately the same price as would be charged for a major overhaul.

"Our ignition lead replacement program is good for our customers, and good for us," says Currier. "When the integrity of a lead's conduit has been compromised, it takes just about as long to repair the lead as to build a new one, so we would rather supply a new lead to our customer."

According to Currier, customers have responded enthusiastically to the new program. "Customers love it. We just have to make sure we maintain enough inventory to meet demand."

Unison's ignition lead replacement program is just one way the company is rethinking customer service. Another is Unison's new method of providing technical manuals and service bulletins to customers. The laborious, time-consuming process that required the customer to mail an order, then wait for the publications to be delivered, has been replaced by Unison's enhanced technical documentation process that employs a new Web-based order and fulfillment system.

"Now, our customers can order documents online and receive them electronically, often on the same day," says Currier. "We recently introduced the new order and fulfillment system for all our turbine engine products, and we plan to do the same soon for our piston engine products. By automating the process, we have reduced the time that elapses between a customer's identifying a need and our meeting that need."

"And timely response is always one of the primary goals of customer service."



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GE90 Maturation Program Expands to Xiamen, China

In June, the GE90-115B maturation program, already being conducted at the GE test facility in Ohio, at IHI facilities in Japan and at Snecma Moteurs facilities in France, was expanded to GE's Xiamen, China, facility. In 2007, additional tests will begin at the National Institute for Aerospace Technology in Madrid, Spain.

"We were very fortunate to have the capability at our Xiamen facility test cell to conduct these maturation tests," says Tom Wygle, general manager of the GE90* Project. "The state-of-the-art facility and the team at the facility have helped us remain on track with this extensive testing program."

and is nearing its second scheduled shop visit. The second engine in the program has completed 3,000 cycles and three 330-minute diversions as part of an extended-range twin operations (ETOPS) demonstration. Engines in the program will collectively accumulate 40,000 cycles and undergo five shop visits by 2009.



Engines in the maturation program run constantly, other than when they are shut down for routine servicing, to simulate 30 years of typical airline service within a matter of months.

Already, engines in the maturation program have accumulated more than 25,000 cycles—equivalent to more than 15 years of airline service. The fleet leader in the program has accumulated more than 4,500 cycles

"We believe we've developed a new way to mature new jet engines," says Scott Donnelly, president and CEO of GE - Aviation. "The GE90-115B maturation program has become a blueprint for how we will mature our new high-thrust commercial engines."

Snecma of France, Avio S.p.A. of Italy and IHI of Japan are revenue-sharing participants in the GE90-115B engine program.

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OnPoint CF34 Biz Jet Modernization on Target

GE - Aviation has launched a modernization program that enables Bombardier* Challenger* 601 engines to be maintained in the same manner as Challenger 604 and 605 engines. Through this program, CF34-1A/-3A/-3A2 operators can transform their hard-time engines to on-condition engines—an upgrade that frees these engines from scheduled hot-section inspections and overhauls.

“Transitioning from a hard-time to an on-condition engine maintenance plan provides many benefits, including extended time on

Component Upgrades Include:

- Adding high-pressure turbine (HPT) borescope capability
- Replacing HPT Bradelloy shroud with steel shrouds
- Incorporating a more robust HPT stator
- Incorporating a more robust combustion liner and transition liner

wing, increased aircraft resale value and lower overall cost of operation,” says Bill Hoernschemeyer, general manager of Corporate Aviation Sales. “The modernization will allow operators to enroll in our OnPoint* Rate Per Hour services plan at a cost more than 60% lower than the current hard-time rate.”

The program essentially retrofits the hot section of the CF34-1A/-3A/-3A2 to resemble that of the airline-proven CF34-3A1. This upgrade creates a more robust engine that will support an on-condition maintenance plan, pending a full Maintenance Steering Group 3 analysis with Bombardier.

The modernization program can be performed, along with a scheduled overhaul, at GE’s Strother (Kansas) facility, GE Branded Service Shops or at other GE-authorized shops. For further information about support and OnPoint Solutions services for business jet operators, log onto www.geaviation.com/bizaviation/.



Modernization Program Benefits

- No scheduled overhauls or hot-section inspections
- Improved time on wing
- Lower operating costs
- Increased resale value

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