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## COVER STORY







## DEPARTMENTS



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# Editor's Notebook

# Worth the Wait

BY JOY FINNEGAN, EDITOR-IN-CHIEF

As we went to press for this issue, Boeing delivered its first 787 Dreamliner to launch customer, All Nippon Airways (ANA). Boeing deserves huge congratulations now that the first 787 aircraft has been delivered in spite of the challenges experienced in making the aircraft service-ready. The dramatic story of the Boeing 787 Dreamliner's design, manufacture and struggles has been well-documented but a brief review is warranted.

Many assemblies of the aircraft were subcontracted for completion and then shipped to Boeing. Subcontracted assemblies included the manufacture of the wing, horizontal stabilizers and sections the fuselage among many other smaller subassemblies like wingtips, passenger doors, floor beams and wiring. The philosophy was that contracting this section of the aircraft out would shorten the production process. However, 787 some subcontractors had difficulty completing the work. They said they could not procure the needed parts, perform the subassembly on schedule, which left remaining assembly work for Boeing to complete.

Another delay occurred in 2007 when a shortage of aviation-grade fasteners was blamed. Quickly thereafter, more delays were blamed on foreign and domestic supply chain, including the ongoing fastener shortage and the lack of documentation from overseas suppliers. Challenges with the flight guidance software were also blamed. There were continuing challenges with the supply and work being done by subcontractors.

Early in 2008 Boeing attempted to gain better control of the supply chain issues by purchasing Vought Aircraft Industries interested in Global Aeronautica and shortly thereafter agreed to buy Vought's North Charleston, S. C. factory.

Late in 2008, those pesky fasteners cropped up again and Boeing said the wrong fasteners were installed and had to be replaced. Then there was a Boeing machinist strike leading to more delays. These are only a few highlights from the seemingly never-ending saga.

On an up note, in December 2008, the Federal Aviation Administration (FAA) approved the maintenance program for the 787. After a few more setbacks, the first high speed taxi tests were conducted in December 2009 followed quickly by the maiden flight that same month. A year later the company had four aircraft up and in flight test. And now, less that a year after that, the first customer delivery has taken place.

With the 787, Boeing gives the airlines the first mid-size airplane capable of flying long-range routes, enabling them to open new, non-stop routes. Composite materials, more-electric systems, advanced aerodynamics and modern engines combine to make the 787 more fuel efficient and provide lower operating costs.

When Jim McNerney, president and CEO of Boeing addresssed his shareholders earlier this year, he once again maintained steadfast focus on the goal. McNerney said,"First, complete 787 and 747-8 development and begin deliveries as planned this year. These programs are in the final phases of flight testing. The 787 has completed nearly 95 percent of the flight-test points needed to begin deliveries. Our second priority is to successfully shift to the higher production rates I just mentioned, in order to convert our backlog to earnings more quickly, and to open delivery slots for customers who want airplanes sooner than we currently have them available."

The 787's lightweight composite structure (50 percent composite by weight; 80 percent composite by volume) and advanced electric systems has already changed the way commercial jetliners will be designed and built going forward. "It will improve the operating economics for airlines," McNerney says. "Notwithstanding the challenges of execution that we've had on the 787, it becomes clearer with each and every flight that we got the airplane—and the innovation behind it—right. With 835 orders from 56 customers, it remains the best-selling new airplane in history."

The press in general has been hard on Boeing. But I want to take a moment to applaud the company's focus and determination. Boeing knew it had a great concept and amazing design. And, in spite of the setbacks, remained focused on getting that design in the air in a safe and responsible manner. The pressure was no doubt intense at Boeing for years prior to this milestone delivery. I can only imagine the consequences both financial and to the company's pride as delay after delay occurred.

But when setbacks happened, the company learned from them and carried on. Resolute focus and determination served Boeing well. AM

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# Sikorsky Helitech and FlightSafety Team to offer Training on P&W Engines in Australasia

Sikorsky Helitech, a Sikorsky Aerospace Services company based in Brisbane, Queensland, Australia, has signed an agreement with FlightSafety International to provide maintenance training for customers in the Asia Pacific area. The three- year agreement is the first of its kind to offer Pratt & Whitney Canada aircraft engine maintenance training in the region. "By leveraging our existing Technical Training School, we are able to add another valuable support capability to our portfolio. We are thrilled to be working with FlightSafety and look forward to advancing the relationship for the benefit of our Pratt & Whitney Canada customers in the region," said George Cheetham, managing director of Sikorsky Helitech.

The program will launch with an initial offering of 16 courses per year for maintenance training on four different P&WC engine types. Under the terms of the contract, FlightSafety will provide Sikorsky Helitech with training courseware, a graphical flight simulator, plus a wide range of training aids. Sikorsky Helitech instructors will be FlightSafety trained and certified.

## Applied Geo Technologies Achieves AS9100C Registration

Applied Geo Technologies, Inc. (AGT) has achieved AS9100C registration, which also incorporates the requirements of ISO 9001:2008, for its Choctaw, Miss. location, validating its quality management system meets and exceeds the needs of the aviation, space and defense markets. This achievement is the latest step in AGT's continuing quality processes and goals designed to provide mission-critical products and services to its government and commercial customers.

As a provider of cabling and wiring harness engineering design and manufacturing services for more than 20 years, AS9100C registration allows AGT to expand its expertise from ground vehicles into the aerospace market, where it currently provides wiring for the Patriot missile system and small commercial aircraft. "This achievement is a testimony to our employees' commitment for continual improvement," said David Ogg, AGT President and CEO.

## CFM Maintains Strong Presence in Russia

CFM International continues to maintain a strong leadership position within the Commonwealth of Independent States with CFM56 engines powering more than 300 single-aisle aircraft for 24 airlines throughout the region. CFM56 engines are a product of CFM International (CFM), a 50/50 joint company between Snecma (Safran group) and GE. The first CFM56 engines were delivered to Aeroflot in 1998 and the fleet has steadily grown while maintaining the industry-leading reliability that is the hallmark of the CFM56 product line.

"We have great relationships with all the airlines in the region and look forward to strengthening them even further in the future," said Lionel Gobert, vice president of International Sales for CFM International. "By 2013, we will have approximately 900 CFM56 engines in the region and we expect that number to grow to more than 1,200 by 2016, more than any other Western engine manufacturer."

All of the CFM56 engines being delivered in the CIS region today are either the CFM56-5B or CFM56-7BE configuration.

## FLYHTStream Meets European Mandatory Data Streaming

The French Bureau d'Enquetes et d'Analyses ("BEA") has recommended mandatory triggered data streaming technology on passenger aircraft. Calgary-based AeroMechanical Services, marketed under the FLYHT brand name, has developed technology that meets BEA recommendations.

The recommendation is contained within the BEA's third interim report on the loss of the Air France flight 447. The report, released July 29, outlines ten new safety recommendations including one that both the International Civil Aviation Organization (ICAO) and the European Aviation Safety Agency (EASA) require triggered data transmission from an aircraft in flight in the near future.

The BEA recommends: "…that EASA and ICAO make mandatory as quickly as possible, for airplanes making public transport flights with passengers over maritime or remote areas, triggering of data transmission to facilitate localization as soon as an emergency situation is detected on board" (from page 81 of the report).

In the past 24 months, FLYHT participated in the BEA's Data Recovery and Triggered Data Transmission working groups. The company demonstrated FLYHTStream, its on-demand triggered data streaming technology, on operational commercial aircraft, to representatives from international organizations, manufacturers and operators. FLYHTStream's capabilities for automated triggered position and data transmission meet the intended requirements of the rule-making proposal of the BEA, including to automatically transmit the exact position of an aircraft and key 'black box' data in real time.

The primary use of AMA's tools is to assist in supporting normal operations with in-flight troubleshooting. In an emergency, FLYHTStream provides position and data continuously from anywhere on the globe. Flight tests and triggering during normal airline operations have proven that accurate position reports and hundreds of data parameters can be sent continuously from an aircraft to the ground, on demand. FLYHTStream can be activated three ways; automatically, by the pilot, or by ground personnel. When it is activated, it provides position and other data and also provides auditory and visual messages in operations control centers. It also delivers critical details to cell phones or pagers to ensure all essential personnel are notified of the situation.

The system that enables FLYHTStream, FLYHT's patented Automated Flight Information Reporting System (AFIRS), can determine which data is outside normal operating ranges in real time. AFIRS then automatically transmits a message and supporting data to ground personnel and enables voice and text communication between the cockpit and the ground.

FLYHTStream is deployed on aircraft operated by several of FLYHT's commercial transport customers and has also been demonstrated on a Hawker Beechcraft business jet.

## AvFab Nabs STC for Hawker Beechcraft 400A Two-Place Divan

Aviation Fabricators (AvFab) recently received STC approval for their Beechcraft 400A Two-Place Divan. The STC allows for installation in all Beechjet and Hawker Beechcraft 400A series aircraft in addition to the 400 series. The AvFab Two-Place Divan adds capacity and refreshing the look of the cabin, according to HBC and is available with the option of close-out panels, and comes with integral shoulder harnesses mounted to the frame.

There is no airframe modification necessary. Installation only requires removing the existing seats/furnishings and then placing the divan into the desired location by locking it into the seat tracks. AvFab offers pricing quotes on the removed seats as potential trade-ins.

## Wilson Air Center Opens Fourth FBO at CHA

Wilson Air Center has brought their award-winning FBO service to Chattanooga Metropolitan Airport (KCHA). The facility officially opened in August and includes a newly constructed 9,000 sq. ft. executive terminal and complete, modern FBO campus featuring an office complex, hangar facilities, ramp and self-serve fuel farm.

A Grand Opening event held at the facility on August 11 brought out more than 250 Chattanooga community and business leaders from the area. The event featured a silent auction that raised nearly $11,000 for St. Jude's Children's Research Hospital and the 400 Chattanooga families who have undergone treatment there.

The new terminal includes a massive open-floor plan lobby complete with fireplace, integrated coffee bar, a well-appointed executive conference room, and a fully equipped business center. The facility also features an upscale pilot's lounge with two private snooze rooms, private shower for flight crews, and bicycles for pilot use.

The entire facility has been constructed to LEED Standards from the U.S. Green Building Council, resulting in a more eco-friendly aviation facility.

"Wilson Air Center customers can expect the same quality and service at the new Chattanooga location that they receive at all our locations—along with all the extras that come with building a facility from the ground up," said Dave Ivey, vice president, Wilson Air Center.

# about people

### Eichten Joins PATS Aircraft Systems

PATS Aircraft Systems announced the hiring of **John Eichten** as its senior VP for sales and marketing. Eichten joins the Georgetown, Delaware-based provider of aircraft auxiliary fuel systems, aviation components, and VIP aircraft maintenance, modification and interior completion services, effective September 27. "John has a proven track record and an excellent reputation in our industry and he will make an immediate impact supporting PATS' growth plans," says John Martin, PATS President and CEO. Eichten joins PATS after more than 20 years of service with TIMCO Aviation Services in various sales, marketing and business development functions. In his new role, he will head up all PATS' sales and marketing efforts. Matt Hill, PATS' current VP, sales & marketing, will assume the role of developing PATS' long term strategic growth activities as VP, business development.

### Bombardier Appoints Éric Martel President, Customer Services

**Éric Martel** has accepted the role of president, Bombardier Customer Services & Specialized and Amphibious Aircraft. Martel has experience in both business and commercial aircraft and will drive continued performance improvements for the company's in-service fleet. Based at Bombardier's Montreal, Canada, headquarters, Martel will assume overall leadership of their service and support network and work to expand capabilities, global reach and responsiveness.

### Amar Chouaki and Miguel Chiang Promoted at AFI KLM E&M

**Amar Chouaki** is assigned a new mission within AFI KLM E&M. Appointed to head the sales team dedicated to the Central/South America region, he is now in charge of developing the group's footprint in the area by strengthening ties with existing customers and attracting new prospects in line with AFI KLM E&M's commercial and strategic objectives. A holder of a Civil Engineer degree and a PhD in Mechanics at ENS (Ecole Nationale Supérieure) Cachan, Chouaki started his career as a computational mechanics engineer (1994) and an associate

## about people

professor (1998) at Université Paris X. During these years, he performed R&D activities for aeronautics and aerospace companies. Chouaki joined the AFI KLM group in 2001 as project manager at the Third Party Cabin Modifications business unit. He managed several modifications programs for customers and then took a position as head of processing in the Third Party Cabin Modifications business unit, where he managed the Quality & Methods team. In 2006, he was put in charge of business development at the newly created DOA (Design Organization Approval) entity, grouping the Cabin Modifications business units for third Party customers and the Air France Fleet, and the Airworthiness Office.

Within the same group, **Miguel Chiang** will be responsible for developing and implementing the group's MRO sales strategy and business plans throughout the Central/South America region. Chiang holds a Master's degree in Mechanical Engineering (specialty: gas turbines) from Delft University of Technology and a degree from the Nyenrode Business University, both in the Netherlands. Chiang joined KLM E&M's Maintenance Division in 2002 as head of a business support unit, remaining in this position until 2005, when he became project manager overseeing the business implementation of the SAP software environment within KLM E&M. In 2007, he was appointed project manager for the implementation of Maintenix, the maintenance workflow management software and most recently worked in the marketing department at the combined AFI KLM E&M sales force as product support director, for Airframe Base Maintenance.

### New Senior VP and GM at Jet Aviation in St. Louis

Jet Aviation has appointed **Charles F. Krugh** as the new senior vice president and general manager at Jet Aviation St. Louis, effective in August. In this role, he will be responsible for the company's completions and maintenance business at the facility and reports directly to Dan Clare, president of Jet Aviation.

Krugh joins Jet Aviation St. Louis from Bombardier Aerospace, where he most recently served as general manager of the

## New 230 HP XP-408AC Engine for the Experimental Aircraft Market

Superior Air Parts, Inc., and AC Aeronautical have announced the joint development and introduction of the all-new 230 horsepower, four-cylinder XP-408 Advanced Competition (AC) engine for the high-end experimental aircraft market.

"Superior has always led the industry in introducing emerging technologies that advance the performance, efficiency and reliability of piston aircraft engines beyond what our competition can offer," stated Timothy T. Archer, Group CEO, Superior Air Parts, Inc.

"The XP-408AC has been designed with safety as a priority; efficiency as a requirement, and performance as a positive result," explained Andrew Higgs, director and chief architect of the 408 program, at AC Aeronautical LTD. "To be able to achieve these high goals you need to start with an engine that is made to the highest quality standards. That is what we have available by using Superior's outstanding XP-360 as the base engine. Take its proven quality and durability and add our racing inspired upgrades and you get an engine that delivers 230 horsepower and can do it reliably for a long time."

To advance the state-of-the-art in piston aircraft engine design, performance and reliability, the AC Aeronautical team took many cues from the world of Formula One auto racing to develop the engine's key components including the new crankshaft, connecting rods, pistons and piston pins.

Among the numerous advancements introduced for the XP-408AC are:

- Revolutionary, dynamically balanced crankshaft designed to dampen firing order vibration and increase the engine stroke to 408 cubic inches. Reduced vibration minimizes engine component stress and helps maximize engine reliability and efficiency.
- New four-bolt connecting rods, which better distribute the clamping loads to help stop bearing distortion.
- New heavily bridged slipper-racing pistons that are significantly stiffer than standard pistons. The new design is also 42 percent lighter than stock pistons. Each piston set is matched to within 0.5 gram.
- A significant weight reduction in the dynamically balanced crankshaft rotating assembly, resulting in a significant reduction in inertia with a corresponding reduction in the stress and vibration that is found in the traditional engine.

## Duncan Aviation Plans Intelli-Conference for Fall 2011

Duncan Aviation will host several Intelli-Conference business aviation events across the United States this fall. Duncan says the symposiums will provide face-to-face forum discussion with industry experts on hot industry topics as well as classes with Inspector Authorization (IA) renewal credit.

The one-day symposium format will be followed at all of the events, with class offerings adjusting to the requests of operators in each area. The symposiums will be modeled after many successful conferences that hundreds of Duncan Aviation customers and contacts have attended over the last decade. Attendees will be able to choose their sessions, which will last all day with a luncheon in the middle. There is no charge for the event and accompanying meals, although attendees are responsible for their own lodging and transportation.

Seminar classes will include topics like the following: The 731 Oil System, Aircraft Paint: A Primer, Getting Your Business Aircraft Online, Failure to Follow Procedures, Aviation Maintenance Model Code of Conduct and F.A.N.S. Many of the classes are approved for IA renewal credit. Registration for the classes is open now and more information can be obtained at http://www.DuncanAviation.aero/events.

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Wichita Service Center. A 23-year business aviation industry veteran, Krugh previously worked for Dassault Falcon Jet Corp and several independent service centers. He is an airframe and powerplant technician, and he holds a BSBA degree in computer and information systems technology. He also earned an MBA from Webster University in Little Rock, Arkansas.

### Reeves and Leitschuck to Lead Support for Duncan Lincoln

Duncan Aviation recently promoted **Monte Reeves** and **Tony Leitschuck** to leadership positions in customer service support at the company's Lincoln, Neb., facility. As manager of Customer Service, Monte Reeves will lead the customer service and line service team members as well as develop customer service goals and strategies. Reeves began his career with Duncan Aviation in 1991 in the Avionics Installations department. He later became an airframe mechanic, inspector and airframe structures team leader. He has spent nine years as a project manager in Lincoln, being promoted to assistant manager before his most recent promotion to manager. Tony Leitschuck will support Reeves as assistant manager of customer service. Leitschuck started as an airframe mechanic in 1989. He was promoted to lead mechanic and team leader by 1996 and became a project manager in 2000. He has served as team coordinator in that role. Before starting with Duncan Aviation, Leitschuck served in the Marine Corps.

### SR Technics Appoints New GM for the Americas

**Sean O'Connor** has been appointed general manager for SR Technics America, Inc. He assumed his new position in August. As general manager, O'Connor will be responsible for driving the expansion of SR Technics' business in the Americas. He will be based at the SR Technics America Inc., main office in Sunrise, Florida. O'Connor worked for Aer Lingus Ireland between 1973 and 1992 and held sales leadership positions with FLS Aerospace Ireland and FLS Aerospace USA from 1992 to 2005. With the merger of FLS and SR Technics in 2005 he joined the Group as Head of Sales Europe and during

## HBC Appoints ExecuJet in Lanseria as ASC

Hawker Beechcraft Global Customer Support (GCS) today announced the expansion of its relationship with ExecuJet in Lanseria, South Africa, by appointing it as an Authorized Service Center (ASC) for its Beechcraft King Air products. In 2010, HBC appointed ExecuJet Lanseria, as well as other ExecuJet locations, as an ASC for its Hawker product line.

"As our King Air customer base continues to grow internationally, it is important that we provide our owners with the utmost quality and convenience when it comes to servicing their aircraft," said Christi Tannahill, Hawker Beechcraft vice president, GCS.

HBC formed an alliance with ExecuJet in October 2010 which added Hawker-authorized and limited service centers to the Hawker Beechcraft Global Customer Support Network. In addition to Lanseria, the ExecuJet ASC locations include Dubai, United Arab Emirates and Sydney, Australia. Two Limited Service Centers (LSC) in Cape Town, South Africa, and Melbourne, Australia, were also designated as a part of the agreement covering HBC's current line of Hawker-series products.

## West Star STC for Falcon 50B to Include Engine Indication Systems

West Star Aviation recently received an FAA STC for the Falcon 50B Rockwell Collins Pro Line 21 to include Engine Indication Systems (EIS). In addition, the amended STC also allows installation to existing Falcon 50B operators with existing Proline 21 major retrofit installations.

The STC amendment allows for EIS installation during a new major retrofit installation including large format configurable displays, air data computers, flight management systems, flight director, autopilot, radar, radios, attitude/heading computers, WAAS/LPV GPS, and file servers. In addition to the EIS upgrade, operators will recognize added features such as Wall-to-Wall ADI, additional XM weather features, and configurable displays with a growth path to SVS. The installation comes with a five-year equipment warranty.

**Correction**

In the August/September issue of *Aviation Maintenance*, the incorrect address of Co-Operative Industries was listed on page 40. The correct address is:

**Co-Operative Industries Aerospace**
**1401 South Cherry Lane**
**Fort Worth, TX 76108**
**T: 817-740-4700**
**F: 817-624-4282**
**E: solutions@coopind.com**
**W: www.coopind.aero**

We apologize for the error and for any inconvenience to Co-Operative and their customers.

## Conklin & De Decker Update Budgeting Tool

Conklin & de Decker announced the latest release of their innovative Life Cycle Cost 2011 Volume II. A comprehensive aircraft budget and financial analysis tool, Life Cycle Cost from Conklin & de Decker, provides aircraft owners, operators, flight department managers, and aircraft consultants with extensive ownership and operating cost data for nearly 400 jets, turboprops, helicopters and piston aircraft.

The Life Cycle Cost (LCC) budgeting software is part of a family of aircraft operating & acquisition products developed by Conklin & de Decker that puts all cost aspects of owning and operating an aircraft into one easy-to-use program. Updated aircraft acquisition costs, taxes, fuel, maintenance and all other operating costs are included in this business aviation budgeting tool.

This Life Cycle Cost update also includes new features that will enhance and make the budgeting process more complete. Subscribers to the latest LCC will be able to quickly calculate 100 percent Bonus Depreciation tax, edit each engine's costs, make warranty adjustments for re-engined aircraft, and benefit from the change in the residual value data entry.

In addition, fuel and maintenance costs, as well as aircraft acquisition prices, have all been updated. Other features of Life Cycle Cost include the ability to: edit the maintenance costs, or add your own data, choose a guaranteed maintenance program, or "pay as you go," and more.

Live demonstrations of the latest Life Cycle Cost program and all the other Conklin & de Decker products will be available at the NBAA 64th Annual Meeting and Convention in Las Vegas, Nevada, October 10-12, 2011 at booth #N2317.

## JetBrokers Europe Reports Best Month on Record for Aircraft Sales

JetBrokers Europe, the Farnborough-based European arm of JetBrokers Inc, reports the best month on record in July in terms of pre-owned aircraft sales activity. In addition to sales of smaller aircraft, the JetBrokers team completed transactions for two mid-sized jets in July, a 2008 Cessna Citation Sovereign S/N 680-0189 and a 2004 Cessna Citation X S/N 750- 0228. Both aircraft were sold to private owners, based overseas. "The Citation X sale demonstrated the strength of our transatlantic offering. Whilst the aircraft was U.S. based, the owner was European, and with teams on both sides of the Atlantic we were able complete the transaction in less than three months," commented JetBrokers Europe Managing Director Tim Barber. (The average Citation X has been on the market for over one year.) JetBrokers Europe also succeeded in selling the Sovereign to an Asian buyer in half the average time that the current stock of 680's has been on the market.

## Boeing to Provide 787 Predictive Maintenance to Japan Airlines

Boeing announced that Japan Airlines will expand Airplane Health Management (AHM) coverage to its future Boeing 787 fleet. AHM is a software system that monitors, collects and analyzes airplane data to give airplane customers valuable, real-time maintenance information. This information allows Japan Airlines to initiate the needed maintenance immediately upon arrival at the airport gate.

Japan Airlines has 35 787 airplanes on order, and has licensed Airplane Health Management for these airplanes in addition to its existing fleet of 46 777 airplanes.

"The Airplane Health Management program has been helping Japan Airlines optimize the reliability of our fleet of 777s, and it will greatly support a successful introduction of the 787 into the family," said Nobuhiro Sato, executive officer of Engineering and Maintenance, Japan Airlines.

Japan Airlines was a developmental partner for the original Airplane Health Management development effort and has used the service continuously since 2005. The airline will use the AHM Real Time Fault Management Module on their 777 and 787 airplanes to communicate in-flight information to ground stations for diagnosis and quick operational decisions by scanning troubleshooting and historical repair data.

# about people

the last year as interim Global Head of Sales. "We are very pleased that we could appoint Sean who is such an accomplished aviation industry professional, with a strong track record at SR Technics," says James Stewart, CEO of SR Technics.

### Aviation Personnel International Promotes Colleen Kelly to Vice President

Sheryl Barden, president of Aviation Personnel International announced the promotion of **Colleen Kelly** to vice president, Client and Talent Relations, responsible for the retained recruitment of aviation professionals on behalf of Fortune 500 companies and private individuals that operate a flight department with one or more aircraft. "Colleen has been a lynchpin in identifying the best and brightest candidates for our aviation clients—not only from a skill set and experience perspective—but most importantly, from a culture and values fit," says Sheryl Barden, president of Aviation Personnel International. "She works closely with both Human Resources and flight operations leadership to understand their unique business and talent needs." Upon joining the company in September of 2007 as director of candidate services, Colleen was responsible for building relationships with each candidate in the five key professional areas of business and general aviation: leadership, flight deck, maintenance, cabin safety crew and scheduling/dispatch. Prior to API, Colleen was a director at Levi Strauss for seven years where she was a manager of both people and international projects. She holds a degree in Marketing and Consumer Behavior from the University of Arizona.

### PPG Names Cancilla Coatings Director, Wright Transparencies Director

PPG Industries' aerospace business has named **Mark Cancilla** global platform director for coatings and **Brent Wright** global platform director for transparencies, succeeding Cancilla. Cancilla began his PPG career in 1985 at the company's Pittsburgh headquarters as a glass engineer, then held engineering

## about people

and program management assignments. He joined PPG's aerospace transparencies business in 1998 as senior sales account manager at the Seattle regional office and moved to the Huntsville, Ala., transparencies facility in 2001 as manager of product design, development and quality. Cancilla became global business manager for aerospace transparencies the following year and global manager for commercial aerospace transparencies in 2006, when PPG acquired Sierracin/Sylmar Corp. and integrated its operations. He was named global platform director for transparencies in 2010.

Wright has advanced through procurement, program management, marketing and business development roles in the aircraft transparencies industry. He joined Sierracin/Sylmar Corp. as military transparencies marketing manager in 2001, became platform business manager for military transparencies with PPG in 2007, and added responsibility for transparent armor business in 2010. Wright earned a bachelor's degree in economics from the University of Utah and a Master of Business Administration degree from Texas Christian University.

### Northrop Grumman Appoints Prabu Nataraja VP, Tax

Northrop Grumman Corporation recently announced that it has appointed **Prabu Natarajan** vice president, Tax. Natarajan reports to James F. Palmer, corporate vice president and chief financial officer. In his new role, Natarajan will lead all tax initiatives across the company, including the implementation of tax strategies; research of complex tax issues; compliance with all international, federal, state and local regulatory filings; analysis of tax legislation and provision of tax-consulting services to the company's business sectors. He will also train and develop the tax professionals and other talent in the Tax Department. Natarajan earned a Bachelor of Laws degree from the University of Madras, India and Master of Laws degrees from Queen's University School of Law, Canada and from Harvard Law School.

## P&W EcoPower Engine Wash Extends to Helicopter Market

Pratt & Whitney has completed its first EcoPower engine washes on a U.S. Navy SH-60 Seahawk helicopter at Naval Base Coronado, Calif. The first EcoPower helicopter engine washes signify that EcoPower services are now available for military helicopters, in addition to large commercial and military aircraft.

"Helicopters operating in harsh environments with salt and sand need to be washed after almost every flight to maintain performance. EcoPower engine wash is the first environmentally sound solution for washing helicopter engines," says Lou Quattrocchi, Pratt & Whitney Product Line Management vice president. "The closed-loop system of the EcoPower engine wash uses pure water and no harsh chemicals, making the whole process safe and environmentally responsible. Helicopter engines can now be washed anywhere on the flight line with EcoPower."

## Dallas Airmotive Signs Three Contracts at LABACE

The 8th Annual Latin American Business Aviation Conference and Exposition (LABACE) in São Paulo turned out to be a busy one for Dallas Airmotive do Brasil with the signing of three contracts with Brasilian aircraft operators.

"The show was an overwhelming success for us," commented Hugh McElroy, president of the BBA Aviation Engine Repair and Overhaul Group who was on hand for each of the signings involving TFE731, PW100 and PT6A turbine engines. "While the three contract signings and the large volume of discussions with operators during the show are success indicators, the greater significance to us is the growing demand for what we can provide across many locations in South America. This increasing demand speaks loudly to us as to what services we can provide and where they are needed."

Dallas Airmotive do Brasil, located in Belo Horizonte, opened August 2009. "The demand for our services has outpaced our greatest expectations to the point that the company is adjusting its plans to accommodate increasing capacity," continued McElroy.

## AEM Offers Single-Source Solution for Fire Extinguisher

AEM Limited, a unit of AMETEK Aerospace and Defense, has broadened its aviation maintenance and repair capabilities by expanding its range of services and adding a new purpose-built facility at Stansted Airport for aircraft fire extinguishers repair and overhaul.

AEM's capabilities include all APU, engine fire, lavatory and portable fire extinguishers carried about aircraft. All work is done by skilled AEM technicians and meets ISO 9001 and AS/EN 9110 standards. AEM has extensive experience in the repair and overhaul of aircraft safety and life support systems, the company says.

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## StarterGenerator.com Expands Inventory by 'Going Green'

StarterGenerator.com has expanded their starter generator LRU inventory resulting from multiple aftermarket purchases. StarterGenerator.com is a buyer and recycler of light turbine fixed wing and helicopter starter generators for civil aircraft, manufactured by companies including Goodrich (Lear Siegler, Lucas, TRW), Aircraft Parts Corp. (APC), Thales AES (Auxilec) and others.

"With a significant installed base of units circulating in a perpetual state of change, the aftermarket has proven to be a consistent and reliable source to complement our supply options", explained Garrett W. Schwarz, president of StarterGenerator.com. "We are seeing a lot of consolidation of companies and operations…These dynamics present buying opportunities as companies refocus and eliminate redundant inventory."

## Chromalloy Establishes Subsidiary in Seoul, South Korea

Chromalloy has established a new subsidiary in Seoul, South Korea – Chromalloy Korea, Ltd. The addition of Chromalloy Korea, Ltd., which will serve as a sales, marketing and customer support office, follows a two-year growth pattern in Chromalloy's Asia operations. In 2010 the company opened a new office in Beijing, China, and also doubled capacity at its turbine engine repair and manufacturing operation in Bangkok, Thailand.

"Operators in the region now have ready access through the new office in Seoul to an alternative source of high quality, high performance engine parts and advanced repairs for turbine components – and can take advantage of significant savings" says Armand F. Lauzon, Jr., president.

Chromalloy has announced other growth in its worldwide manufacturing, service and sales network. The company's new $30 million investment casting foundry in Tampa, Fla., went online last year and during 2011, Chromalloy will expand it with a new $5 million ceramic core production facility nearby.

Chromalloy currently has locations in 17 countries.

## MTU Aero Engines Hands over First GEnx Turbine Center Frame

MTU Aero Engines kicked off GEnx turbine center frame deliveries in August when it handed the first production module over to GE Aviation. In a last bolt ceremony held at MTU in Munich, Rhonda Sample, manager manufacturing programs at GE Aviation officially took delivery of the module from MTU CEO Egon Behle. Thus, deliveries of this MTU module for the U.S. manufacturer's fast-selling new engine started on time. Plans are to ramp up production to be able to ship one turbine center frame a day.

## LoPresti Aviation Debuts Their Latest Innovation


During the annual Cirrus Owners and Pilots Association (COPA) convention, representatives of LoPresti Aviation Engineering unveiled the company's latest innovation for general aviation, the new "NeverFlat Lifesaver" aircraft tire.

"We named it the NeverFlat because that's what it does—it never goes flat," Rj Siegel, LoPresti's CEO said. "It's the first aviation tire with a wound carbon fiber band embedded in the circumference of the tire. It's just about impossible to puncture this tire and even if you could it still wouldn't go flat. It's an unpressurized system with load and suspension characteristics matched to the aircraft's needs."

Siegel explained that first product is specifically mated to the takeoff and landing performance of the popular Cirrus SR20 and the SR22.

"Cirrus owners sit right at the leading edge of technology and they have always received our products with great enthusiasm," he said. "We expect no less with this exciting new tire. We consider it as profound as seatbelts. 99 percent of seatbelt wearers have never had their lives saved by wearing them but those who have, consider the technology indispensable. Similarly, 99 percent of pilots have never veered off the runway with a flat tire, but those who have are first in line for this next great safety product."

Siegel said that the new NeverFlat Lifesaver tires are in their final design stages and the company expects them to be available to Cirrus SR20 and SR22 owners in late December 2011."Using this new proprietary technology we've seen improved tire performance in all measurable areas. Wear, traction and rolling resistance," Siegel added. "We are so confident in the NeverFlat tires, we are offering them with a ten-year warranty against a flat."

## EVAS Smoke Protection Selected by Kalitta Air

VisionSafe and Kalitta Air finalized an agreement to equip Kalitta's Boeing 747's with EVAS, the Emergency Vision Assurance System technology that allows pilots to see in continuous dense smoke. With this agreement, Kalitta Air joins UPS, Fed Ex and JetBlue as large fleet operators that selected EVAS to provide their pilots with smoke protection and ability to see through blinding smoke in the cockpit.

"You really become a victim in a cockpit with smoke, so I try to give the best tools to get the aircraft safely on the ground," says Connie Kalitta, owner. In the event of smoke in the cockpit, EVAS maintains a pilot's critical field of vision by displacing the smoke with a transparent vision tunnel. "EVAS allows pilots to see their flight path, vital instruments and perform the key tasks of flying in dense, blinding smoke situations. It's a real safety enhancement and we're very pleased to be working with Kalitta Air," says EVAS manufacturer Visionsafe's president, Bertil Werjefelt.

## Delta Air Lines Places CFM56-7BE Engine Order

Delta Air Lines has ordered 200 CFM56-7BE engines to power 100 Boeing Next-Generation 737-900ER aircraft scheduled to begin delivery in 2013. The engine order is valued at approximately $2.2 billion U.S. at list price.

This new Delta order contributes to what has already been a very successful year for CFM. According to CFM, in 2011 to date, the company has received orders for more than 1,250 CFM56 engines at a value of approximately $12.5 billion U.S. at list price.

Delta was one of CFM's original commercial customers, launching the CFM56-2 into commercial service on the DC-8 Super 70 in 1982. Today, the airline operates a fleet of more than 200 CFM56-7B-powered Boeing Next-Generation 737 aircraft and CFM56-5-powered Airbus A320 family aircraft.

"The CFM56-7BE-powered 737-900ER is a great choice to replace older technology aircraft in our fleet," said Nat Pieper, vice president of Fleet Strategy and Transactions for Delta Air Lines. "With this airplane, we get outstanding operating economics and reliability."

## MIT Leaders for Global Ops Welcomes MAG-IAS as Industry Partner

The MIT Leaders for Global Operations (LGO) program welcomes MAG-IAS, a world-leading provider of metalworking and composites processing solutions for the durable goods industry, to its roster of highly select global manufacturing and operations companies from around the world.

MIT LGO is the nation's leading dual-degree graduate program in engineering and management innovation for students aiming for careers in operations and manufacturing. Students graduate with a Master of Business Administration from the MIT Sloan School of Management and a Master of Science from one of seven programs within the MIT School of Engineering. LGO benefits from the wealth of resources, world-renowned faculty, and connections offered by MIT, the world's leading institution focused on science and technology.

MAG joins 20 other MIT LGO partner organizations that include world leaders such as Amazon.com, Boeing, Caterpillar, Dell, General Motors, Novartis and United Technologies. As an MIT LGO partner company, MAG will gain access to MIT faculty and research as well as best practices of other partner companies, with the potential for joint operations projects. Partner companies host in-depth site visits and six-month student internships with MIT faculty support. MIT LGO interns offer high-value return by addressing critical business needs including production network strategy, energy waste reduction, and supply chain optimization. Partner companies also provide input into MIT LGO's curriculum and activities, ensuring that the program stays relevant and responsive to their most pressing operations challenges.

## Gulfstream Recycles 600 Tons Through New Program

Gulfstream Aerospace Corp. recently launched a multi-tiered recycling program that has successfully diverted more than 1.2 million pounds of recyclables from the company's waste stream.

Wood recycling has saved 782,620 pounds from the landfill since November 2010 when the Savannah-based program was implemented. Single-stream recycling of paper, metal, plastic and cardboard accounted for another 433,940 pounds between February 2011, when the program was established at the company's Savannah and Brunswick facilities, and June.

Prior to February, Gulfstream recycled 23 percent of its municipal solid waste. By June, that number had climbed to 41 percent. So far in 2011, Gulfstream Savannah has slashed its landfill trash by approximately one-third compared to the same period in 2010.

"I give credit for the success of these efforts to our employees," said Brooks Clark, director, Facilities and Security Services, Gulfstream. "They have been extremely diligent about recycling since we launched this new program in February."

## FlightSafety Celebrates the Grand Opening of Oklahoma Facility

FlightSafety International celebrated the grand opening of its new flight simulation training system design, manufacturing and support facility in Broken Arrow, Oklahoma in August.

"FlightSafety's new flight simulation training system design and manufacturing facility will enable us to further increase the efficiency of our manufacturing processes, augment our production capacity and enable us to provide our Learning Centers, Military and Airline Customers with the highest quality simulators and other advanced training devices required to support their training needs," said Bruce Whitman, president & CEO.

"We appreciate the support and assistance the City of Broken Arrow, Broken Arrow's Chamber of Commerce and Economic Development Corporation and the Oklahoma Department of Commerce have agreed to provide. We are proud to have been a member of the Broken Arrow business community since 1978 and look forward to being a part of this growing area for many years to come," said Rick Armstrong, vice president, Simulation.

The new state-of-the-art 375,000 square foot facility has 19 full flight simulator assembly positions. The building was designed in accordance with the Lean Manufacturing Flow process to ensure that the flight simulators and other advanced training devices the company builds are produced efficiently and with the high quality FlightSafety is recognized for the world over.

The new facility includes a dedicated area for component manufacturing, final assembly, and shipping and receiving as well as sections for engineering, customer service and logistics support, teammate offices and service areas. The entire facility will be designed and built to conserve energy and to provide an efficient and productive work environment.



## Honeywell Acquires EMS Technologies

Honeywell announced that it has completed its acquisition of EMS Technologies for approximately $491 million. EMS is a provider of connectivity solutions for mobile networking, rugged mobile computers and satellite communications.

The acquisition will enhance Honeywell's existing capabilities in rugged mobile computing technologies within its Automation and Control Solutions business (ACS) and satellite communications within its Aerospace business. EMS's Global Resource Management (GRM) division provides highly ruggedized mobile computing products and services for use in transportation, logistics, and workforce management settings as well as secure satellite-based asset tracking and messaging technology for search and rescue, warehousing, and field force automation environments.

Through its Aviation division, EMS provides terminals, antennas, in-cabin network devices, rugged data storage, and surveillance applications predominantly for use on aircraft and in other data gathering objectives.

"Adding EMS products into our aerospace business means that Honeywell can now define and deliver the next big leap in satellite communications technology, a key growth area in aviation," said Tim Mahoney, president and CEO of Honeywell Aerospace.

## Soloy MKII Sentinel Outfitted—Final Flight Eval Complete

In its final stages of airborne observation configuration, Soloy's MKII Sentinel aircraft was outfitted with two popular airborne observation cameras and flight evaluated.

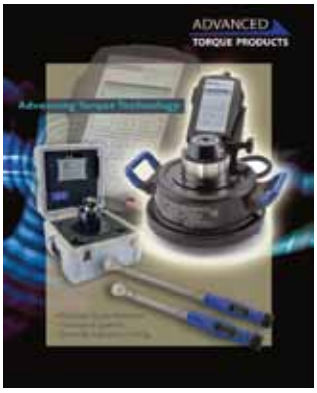
Recently L3 Wescam and FLIR each provided Soloy their latest cameras to mount for flight evaluation and demonstration to prospective customers.

Mounted on the Sentinel's STC'd wing hardpoint, Soloy test pilots flew the Sentinel through its normal flight envelop and confirmed handling characteristics with both the L3 MX15HDi and the FLIR Star Safire cameras.

Additionally, the wing mounted camera provided a rock solid image to the camera operator who found no vibration or lens angle interference from the camera's wing mounted position.

Law enforcement and airborne observation users seeking a flexible and cost effective alternative to the more expensive helicopter platform can schedule a Sentinel demonstration and experience the performance this airborne observation aircraft offers.

## Brochure Describes Digitally Controlled, Mechanical Bolting Products




Advanced Torque Products (ATP) has released a new, full-color, capabilities brochure describing its extensive line of bolting products. These products are especially suited to aircraft and aerospace maintenance, repair & overhaul, marine, land and wind turbine, industrial, automotive and commercial applications. ATP's digitally controlled, mechanical torque multipliers offer torque ranges from 600 to 40,000 ft./lbs., with accuracy to ±1 percent, even over extreme temperature fluctuations. These lightweight, all-mechanical multipliers require no external power and present a small, ergonomic footprint. A host of drive adapters and mounting fixtures accommodate existing tooling for nearly any application. Their digital controllers provide transmitter options, programmable scales for International measurement standards and peripheral interface for excellent adaptability. A line of hand-held torque wrenches with square drives, from 1/4" to 1" and in-between sizes, offers accuracy to ±3 percent. ATP calibration systems to 12,000 ft./lbs., with NIST-traceable accuracy to ±0.25 percent of full scale are also featured. Their interchangeable transducers permit recalibration without downtime. ATP strain gages and load cells for torque measurement are included in the brochure.

# mx reg log



## 1. Time for European-Style PMA?

The European Aviation Safety Agency (EASA) is floating the idea of encouraging the use of European-made, non-original equipment manufacturer (OEM) parts. Such parts would be like the U.S. parts manufacturer approval (PMA) components that are already used by some European airlines. However, the idea is controversial, mostly between European OEMs and MRO organizations.

Although European-made non-OEM parts—known as European Parts Approval, or EPA parts—are legal, they are not really equivalent to PMA parts because of complicating regulatory issues that discourage their use, says Werner Luehmann, manager of regulatory compliance and authorities liaison with Lufthansa Technik.

Installation of an EPA part requires a further "installation certification," he explains. An EPA part installation is considered, at a minimum, as a minor change to type design and has to be handled via the procedures of an EASA Part-21J Design Organization. This makes use of EPA parts impractical, cumbersome and costly. EASA has not yet set up a drafting group for the new idea although this task is on the agency's calendar.

The recent USEU bilateral agreement also notes: "…the European system has no stand-alone parts design approval. Replacement or modification parts are approved through design changes or STCs [supplemental type certificates]."

## 2. Conflict of Interest Rule

The Federal Aviation Administration (FAA) on Aug. 19 issued a final rule, banning airlines and other certificate holders from hiring former Flight Standards Service aviation safety inspectors until two years after their separation from the agency. The restrictions apply to former FAA employees who had oversight of other inspectors and of the certificate holders, the agency explained in a press release. The rule is meant to respond to concerns of Congress and the Department of Transportation's inspector general about the FAA's oversight of Southwest Airlines, where "an overly close relationship with the [carrier]" was perceived. First proposed in 2009, the rule becomes effective on Oct. 21, 2011.

## 3. FAA Funding to Flow

Just when the flow of stopgap funding for the Federal Aviation Administration (FAA) seemed about to be shut off by a single senator, the floodgates have reopened. The Senate on Sept. 15 passed the 22nd extension of FAA funding that will keep the agency afloat through Jan. 31, 2012, following earlier House action. Senators found a way to satisfy objections by Sen. Tom Coburn (R-Okla.) to highway beautification provisions in the bill. Now Congress has several months' breathing space to come up with multiyear FAA reauthorization legislation.

## 4. USEU BASA Codifies PMA Policies

As far as parts manufacturer approval (PMA) parts go, the recently signed Bilateral Aviation Safety Agreement (BASA) between the U.S. and the European Union (EU) simply codifies prior decisions by European Aviation Safety Agency (EASA) and the Joint Aviation Authorities (JAA). EASA made an executive decision in 2007 to accept noncritical PMA parts, says Pat Markham, vice president of technical services with HEICO. The USEU BASA this year incorporates everything that was in the decision and gives it more force, he says.

## 5. FAA Penalty Box Fills

FAA recently proposed a number of maintenance-related penalties:

*$1.1 million civil penalty against Aviation Technical Services for allegedly making improper repairs to 44 Southwest Airlines B-737-300s.

*$590,000 civil penalty against Alaska Airlines for allegedly operating a Boeing 737-400 on 2,107 flights when it was not in compliance with federal aviation regulations. FAA cites a flight deck ceiling fire, which was traced to the improper installation of a hose clamp.

*$298,500 civil penalty against Capital Cargo International Airlines, Inc. (CCIA) for allegedly operating eight Boeing 727 aircraft when the aircraft were not in compliance with federal aviation regulations. The FAA alleges that CCIA permitted an unqualified mechanic to perform certain aircraft inspections and to sign airworthiness releases on the company's aircraft.

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# INTERIOR UPGRADES FOR AGING AIRCRAFT

## CABIN UPDATES FOR AGING AIRCRAFT.

BY DALE SMITH

*Singapore-based, ST Aerospace recently completed a total interior/exterior refurbishing project on this DC-8 aircraft. The aircraft refurb included everything from design, engineering, installation and certification of the aircraft. Extensive reconfiguration of space, seats, galleys and lavatories within the cabin was accomplished.*

If you're looking for a bit of a silver lining around the dark clouds that have been overshadowing our industry a good sector to start with is cabin upgrades and refurbishment.

One reason that the U&R segment hasn't slumped quite as much as other areas is due in large part to its diversity. While one side of the business, new green aircraft completions has slowed, the updating and full-on refurbishment of older aircraft interiors has done a pretty good job of taking up the slack.

Refresh the cabin with new carpeting, upholstery, exterior paint and quite possibly the addition of a wireless broadband cabin connectivity system and you have pretty much anything a new jet can deliver at a fraction of the price.

Speaking of not buying new jets, one MRO representative gave an interesting perspective on why companies who can afford to buy a new jet are instead, opting to upgrade their older aircraft. "The strong negative sentiment towards corporate aircraft ownership has hurt new sales in the U.S.," he said. "Public companies seem to be a lot more comfortable with not attracting the attention of shareholders and the public and just flying what they have for a few more years."

But, as the old saying goes: "One man's ceiling is another man's floor." So slow new sales mean active refurbishing shops.

By specializing in the needs of owners with late-model "top tier" business jets, one group that has seen steady upgrade and refurbishing business has been Jet Aviation,

St. Louis, Inc. "We do everything from simple upgrades to major reconfigurations, but the trend is definitely towards larger projects again," explained Joan Pompa, the company's senior manager, modification sales. "Floor plan changes, new cabinetry components and total soft goods replacements are really big now."

It's not only the little guys flying Gulfstreams and Falcons; cabin upgrade and refurbishing projects are also popular with owners who want a few more years out of larger VIP aircraft. "I have a customer in here now with a 727 that's operated in Asia," Mike Plavchan, CEO, M and D Aviation said. "It has an interior in it that I installed 30-years ago when I was at Page AvJet. It was really plushed out back then. Now it's kind of tired."

"The hull value of the airplane is only around $500 thousand today. But the owner wants to fly it for another couple of years," he said. "What we're basically doing is some airframe system repairs and interior touch ups. With a $500 thousand hull value, it's not worth spending $20 million on a new interior."

But that doesn't mean owners won't do it. Singapore based, ST Aerospace recently completed a total interior/exterior refurbishing project on a DC-8 (When was the last time one of those was on a revenue flight?). The company started on the project in July of 2010 and delivered it in May of 2011.

"This was an all-inclusive project. Our scope of work for the aircraft extended from design, to engineering, installation and certification of the aircraft," an ST Aerospace spokesperson said. "Our in-design and engineering teams in Singapore and San Antonio, Texas, undertook an extensive reconfiguration of space, seats, galleys and lavatories within the cabin."

"Many times it's more economical investment-wise to upgrade to a newer aircraft, but it's up to the owner," Plavchan said. "If they want to stay with their current airplane that's what we do. But I try to give them good guidance from the beginning."

Because M and D Aviation specializes in the large VIP and VVIP aircraft upgrades and refurbishing projects, Plavchan said that one trend he is seeing is that owners, especially in Europe, the Middle East and China are taking advantage of the availability of low-cost, ex-airline airframes to move up to large cabin, long-range airplanes.

"We have a customer in Northern Europe who is currently operating a Global," he said. "He needs something bigger and with more range. He just signed a contract with us to outfit a triple-seven."

## New Lives for Older Airliners

While jumping from a Global to a 777 may seem extreme, at this end of the price spectrum it's really pretty easy to justify. A quick check of a price guide lists a well used 777-200 for $42 million. Put in a new interior and you're out the door for around $65 million.

Speaking of competition for new Globals, attractively priced ex-regional size jets are also attracting buyers. Based in Peterborough, Ontario, Canada, Flying Colours Corp., has created a very active business by reconfiguring Canadair CRJ 200's into corporate aircraft.

"We take a CRJ 200 with a standard 50-passenger cabin and replace it with a brand new, Challenger 850 style executive interior," explained Sean Gillespie, the company's director of sales and marketing. "Everything from the forward galley – all new cabinetry, new seats, entertainment centers, sidewalls – it's all new."

"It's treated like any other Bombardier Challenger that comes in here for an upgrade or refurbishing. It just has a history," he said. "As the prices for pre-owned Challenger 850s has gone up, our business for the airline conversions has gone up. We just delivered our ninth CRJ 200 conversion and we have a number of the projects booked now."

## Look Before you Leap

While today's market is primed for turning older airliners into new corporate and VIP aircraft, there's a fine line between profit and poor business. So every project has to be looked at individually.

"We do a very detailed inspection of each CRJ aircraft. Floorboard corrosion has come up on a number of the airplanes we've done," Gillespie said. "There are some things that are maintained better on some airlines than they are on others."

"There have been modifications that have happened over time that, from an interiors perspective, whether they be structural or not, mean we have to deal with each one individually," he said. "That's a challenge."

Another challenge that can evolve into a scheduling nightmare is the availability of original engineering drawings for cabins and equipment. If you're ripping it all out and starting from scratch that's one thing, but if you're trying to update an existing installation that's quite another problem.

"Modifications to existing electrical systems can be a bear without the original drawings," Plavchan said. "If you don't have them we have to reengineer the drawings and that can change the entire project. While it's not an interior issue, we're having that problem with the 727 I mentioned earlier."

"It has the old Page AvJet fuel tank modification in it. The company has been out of business since 1991. There is no documentation available," he said. "What we've got to do is pull the old aux tanks out and do the wiring harness upgrade and have it re-STC'd."

## Keeping Everything in Balance

Another major consideration when you're doing a new interior configuration on a larger, single- or twin-isle aircraft is weight and balance. Owners can get awfully carried away with filling all that interior space with theaters, hot tubs, staterooms – you name it.

ST Aerospace's recent DC-8 project is a great example. "This was an all-inclusive project. Our scope of work for

the aircraft extended from design, to engineering, installation and certification of the aircraft," an ST Aerospace spokesperson said. "The complex project involved the conversion of existing lavatories into a new storage area and a library cum crew station; conversion of an air-stair closet into a storage area with shelving; the replacement of all seating, tables, lavatory and galley features. We also installed new entertainment fixtures including LCD TVs and acoustic curtains."

"Some designers create a very heavy interior which impacts the aircraft's payload," Plavchan said. "An example is a client who wanted five, 67 pound refrigerators. They have to give up something."

"The key engineer to any of this – especially the larger airplanes – is your weight and balance guy. That's key not only for safety, but also because a lot of times you get into the aircraft having to make a certain city pair distance," he added. "If you don't make that city pair you jeopardize the contract and will quite possibly pay a penalty. We keep our weight and balance guys involved all along."

*Flying Colours CRJ ExecLiner before (airline interior), above, and after, below, with an executive interior.*




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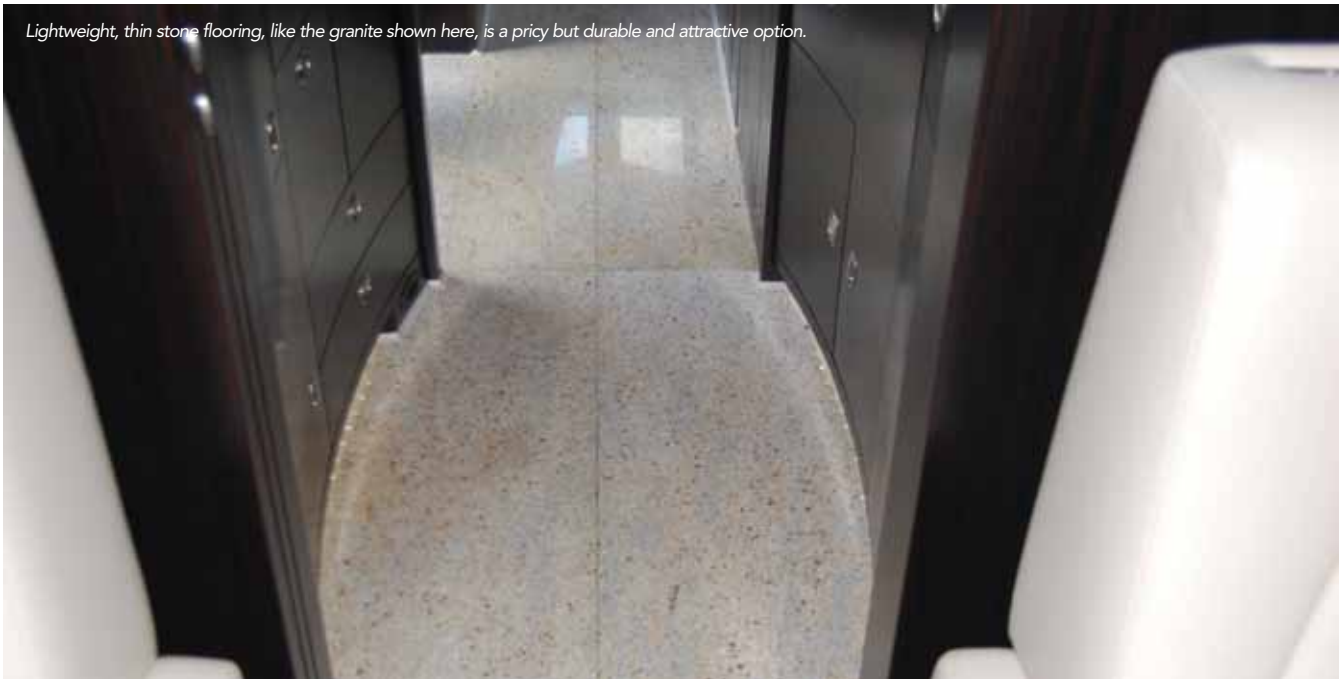

*Lightweight, thin stone flooring, like the granite shown here, is a pricy but durable and attractive option.*

## New Technologies Help Lighten the Load

While the larger available interior spaces and seemingly bottomless budgets of some customers keep pushing the boundaries of what interior designers stuff into larger aircraft, there have been a number of new products introduced that have helped swing the scales back into the favor of the MROs.

"The backing materials used in today's veneers is much thinner [lighter] today than it used to be," Ms. Pompa said. "It used to be four-ply and now it's two-ply. The new backing is a lot stronger so you don't need the thickness."

"Another thing today are composites for interior panels," she added. "We tend to use higher-end materials like Aramid fiber composites – carbon fiber in strategic areas now. If we do all new shell panels, we can save weight and give better sound deadening."

While saving weight is important, finding new products and finishes that make a multi-million dollar jet look like every penny of it is an ongoing challenge. One such new product is a new lightweight stone flooring material developed List Components & Furniture GmbH. Flying Colours is the exclusive North American center for the materials.

"It's very thin granite stone flooring that's popular in entry areas, galleys and lavs," Gillespie said. "High wear, high moisture areas. We've installed it in a couple of aircraft already – a Global and a Challenger. It's very popular in Europe now."

"It's a luxury option. Pricy compared to standard carpeting or other materials you typically use in those areas," he added. "But it's very maintenance friendly and will last a long time."

Another very important part of any aircraft –especially long-range jets is the lavatory. And corrosion has been a major issue with these areas since the invention of the relief tube. "One big improvement we can offer is a new lav overboard waste system that is made of composites," Ms. Pompa said. "Now there are no problems with corrosion to deal with. It's a very popular upgrade now from a maintenance perspective."

## The Long Term Look

Upgrades and refurbishing is hot now, but what does the future look like. Well, according to the folks we talked to it look pretty darn good. "Obviously, everyone is waiting for the prices of used aircraft to stabilize," Gillespie said. "But I think prices will stabilize and this type of work will continue to grow."

"China, Asia, India, and Russia continue to grow," he said. "Most of these buyers are new to aircraft ownership and buying new airplanes. But give it five years or so and they'll see the value of buying used airplanes. That will really drive a big requirement for refurbishing." AM

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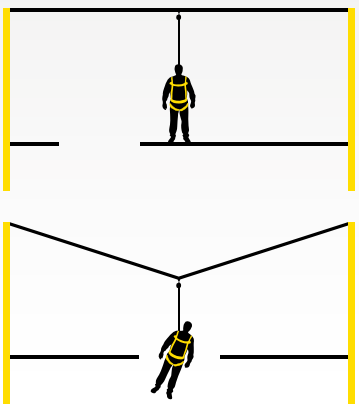

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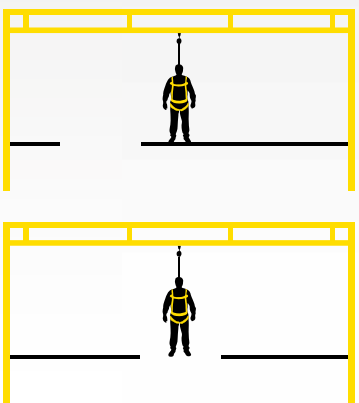


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# THE NEED FOR AVIATION-SPECIFIC NDT TRAINING FOR IN-SERVICE INSPECTIONS

BY TIMOTHY KINSELLA, DASSAULT FALCON NDT PROGRAM MANAGER

Currently, training of in-service NDT technicians relies on commercially available courses. While a few of these programs cover aviation manufacturing processes and flaws few, if any, cover them as they relate to in-service aviation issues.

The world of in-service aviation inspection requires skills and knowledge that are not common to infrastructure, petrochemical, or other industries. NDT technicians should have instruction designed specifically for the inspection of aircraft in the field. There is also a need for instruction on the unique in-service aviation NDT environment, as well as the in-service inspection of aviation composite materials and structures.

## The In-Service Aviation NDT Environment

NDT services for in-service inspection of aircraft are generally provided by repair stations and independent NDT shops. The manufacturing environment is easily controlled in that technicians typically employ a limited range of methods and techniques that they see every day and are trained with regard to the materials, processes and flaws that they will see in that manufacturing environment rather than the in-service environment. For example, NDT technicians in manufacturing will not be called upon to look for corrosion, fatigue cracks, or stress corrosion cracks.

The in-service environment however, is much more flexible. Technicians often see a wide variety of aircraft types, both old and new, and their maintenance manuals often contain confusing or incomplete NDT procedures. It is not uncommon for technicians to perform a few techniques that they are very familiar with on a routine basis. But since they are simply certified in say, ultrasonic (UT) or eddy current (ET), they can be called upon at any time to perform any techniques within those methods. For example, a technician might routinely perform ET conductivity testing for heat damage or cracks in wheels. Yet he may, at any time, be called upon to perform a multi-frequency test, a test for corrosion

on the backside of a skin, a bolt hole inspection, or a thickness measurement of metal cladding. The knowledge and skills required to perform these tests are perishable.

The purpose of training and qualification goes beyond the ability to turn on a machine and follow a detailed procedure. To be effective the technician needs to be able to determine when something is not working properly (not always obvious), determine what to do about it and properly evaluate the resulting indications. It is therefore very important that technicians receive refresher training in those aspects of the method that they may not be using on a regular basis but might be required to use on short notice with no preparation. In addition, complacency or over-confidence tends to increase with time when no defects are found. Alternatively a technician may become less confident and over-sensitive in his inspections resulting in over rejections.

The training, qualification and proficiency of NDT personnel in the aviation industry are critical. The accept/reject decisions are often not simply black and white. Some knowledge of aircraft design; metal and composite materials; manufacturing, repair, and their associated flaws; in-service issues such as corrosion, fatigue, and various types of structural damage; and hands-on practical experience on actual retired aircraft are essential.

For example, a well-known service company that specializes in pipeline and power generation, was asked to X-ray some aircraft parts. They did a fine job of producing the X-rays and made excellent images, but admitted that they could not or would not evaluate them because they did not understand the parts, or the nature of the aircraft corrosion that they were looking for. The types of flaws that in-service technicians are looking for vary widely. Some of the unique aviation circumstances that are likely to be encountered are shown in Figure 1: compressor stalls that put pressure on many components, extreme crosswind landings that could cause wingtip or fuselage damage, bird or lightning strikes that can cause significant damage, landing with the nose gear turned 90 degrees, engines inhaling ground equipment, runway excursions and more. All of these situations require the technician to have an idea of the construction and the stresses encountered in the incident in order to assess the likely location of invisible damage.

*Figure 1. Wide varieties of structural damage.*

Another important aspect of reliability is consistency. There is a measure of reliability called Probability of Detection (POD) which takes into account all aspects of the inspection including the inspection, instrumentation, technique, inspector and human factors, and is referred to as having a POD of 90/95. This basically means that there is a 95 percent confidence that a flaw of a particular size will be found 90 percent of the time. Figure 2 shows POD curves for five typical inspectors. The x-axis represents flaw length and the y-axis represents probability of detection. You can see that while the average POD was an acceptable 0.7 mm, inspector variation went from approximately 0.3mm to a high of approximately 0.9 mm. The variability from inspector to inspector is just as important as the average POD. Considerably different results might be obtained by two inspectors, one on night shift

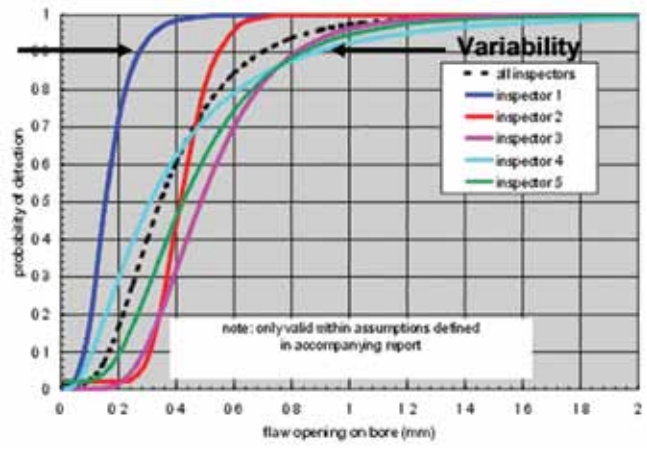


*Figure 2. Variability goes here with the title: Typical POD curves*

and one on days, doing the same job. Another scenario would be trying to assess the seriousness of a fleet-wide problem when inspectors of significantly different performance were reporting results from several scattered repair stations. In this case, in order to make good engineering and program decisions, it is necessary to get consistent information from the field.

To assess the need for refresher training an informal reliability study was conducted. It studied a number of qualified, conscientious Level II and III technicians and revealed the following results. They were tasked to inspect 420 sites that contained 68 defects. No technician found all the defects. The proportion of defects detected ranged from 29 percent to 71 percent. The cracks that were missed ranged in size from 0.058" to 0.286" (3 were over 0.100"). This is a potential safety issue. The false call rate (defect-free areas rejected) was as high as 19.4 percent. This is also an economic issue.

Every false call results in unnecessary maintenance dollars spent. This exercise clearly demonstrated the range in performance that can be encountered every day. The refresher class students that participated in this test unanimously agreed that it improved their performance by making them aware of things they had forgotten and bad habits they had fallen into. Based on the debriefings of the POD study, all left with a better awareness of the human factors that can effect their performance. Complacency is one of the major human factors contributing to NDT performance issues. This can come from doing the same job over and over, or from doing the same job for a long time and not finding any defects.

The fluorescent penetrant method is very susceptible to complacency. Penetrant is often thought of as the simplest NDT method whereas in fact—there are many subtle things that can go wrong—it is actually one of the most difficult to perform properly all the time as it involves a great deal of chemistry and physics that is not obvious from the apparently simple steps of the process. Examples of this are shown below in Figure 3. The picture at left shows the failure of a fan hub on an MD-881 which killed two people. The photographs on the right show the remains of an DC-102 that experienced a fan hub failure that caused the loss of all hydraulic systems and the death of 112 people and another 171 injuries. In both of these cases, the failure cracks were present and detectable at overhauls prior to the incidents, but were not found. These inspections were performed by competent engine overhaul shops. Nothing was found wrong with the inspection processes performed and the NTSB and FAA cited "human factors" as the reason for missing them. While the root cause of these failures were titanium inclusions in the disks that acted as stress concentrations and the source of the cracks, it is possible that the failures could have been prevented if the cracks had been found. The fact that human factors were cited as the reason for missing the cracks, speaks to the need for refresher training3.

One facility that offers the opportunity to work on actual retired aircraft is the FAA's Airworthiness Assurance NDI Validation Center (AANC). It is located in a 24,000 sq ft hangar facility at the west end of Albuquerque International Airport. Established in 1991 as the FAA Aging Aircraft NDI Validation Center, the center was renamed in 1995 the Airworthiness Assurance NDI Validation Center. The AANC is operated by Sandia National Laboratories in Albuquerque, N.M. for the FAA William J. Hughes Technical Center, Atlantic City, N.J.

The AANC offers the type of hands-on proficiency opportunities that would be very limited at a general aviation facility. The AANC was specifically designed with this type of effort in mind and is therefore unique. AANC offers a wide variety of retired aircraft with known structural problems such as fatigue cracks, corrosion, heat damage, etc. The aircraft available on which to train include:

- Boeing 737
- MD-88
- Boeing 747
- McDonnell Douglas DC-9
- U.S. Coast Guard HU-25
- Dassault Falcon 20
- Fairchild Metro II
- Bell 205 (UH-1) and 206 (TH-57) helicopters
- Two large McDonnell Douglas DC-9 structural sections

*Figure 3. Fan hub failures*






*Figure 4. Some of the aircraft available at AANC*

## NDT OF COMPOSITES

Besides refresher training on the basic methods on conventional metal structures, a major aviation specific training issue is the NDT of composites. These materials and structures are significantly different from metal structures.

For example, composites can be made up of laminate skins that are then bonded to laminated or metal understructure. Several skins can enclose an area that is filled with honeycomb or foam. The laminates are made up of reinforcing fibers of various materials (commonly carbon, aramid, or fiberglass) which are held together by a matrix of typically thermosets or thermoplastic resins. The reinforcing fibers can in turn come in

various forms such as strands, tows, roving, tape, woven cloth, mats, knits, and braids. Honeycomb comes in different sizes and materials that also effect results, from aluminum to treated paper. All of these variations effect the NDT techniques in different ways and the technician has to know how all these various material forms effect the interrogating energy in order to properly interpret the indications his equipment produces.

## What's Needed Now

The unique world of in-service aviation inspection requires skills and knowledge that are not common to infrastructure, petrochemical, or other industries. Both the performance of tests and the interpretation of results also require a knowledge of aging aircraft issues and maintenance concepts. In response to all these issues, the aviation portion of any initial or refresher training course should include:

- FAA regulations
- Personnel qualification issues
- Human Factors and its effects on Probability of Detection (PoD)
- Aerodynamics, design, stress, including the concepts of fail safe, safe life, damage tolerance and how they fit into the determination of inspection intervals
- The origin and detection of in-service flaws such as fatigue, and corrosion

Because there are many technicians that are already certified that never received any specific aviation training, Dassault Falcon developed refresher courses in cooperation with Sandia at AANC for conventional inspections, and teamed with Advanced Composites Technology for the NDT of Composites. Regardless of the approach taken, an effective program should include:

- Instructors that are a combination of experienced, active technicians and engineers
- Overview of applicable NDT methods, techniques and reference standards
- Extensive testing of actual flawed on-aircraft structures
- Student fabrication and testing of composite specimens
- Hands-on comparison of various NDT methods and techniques on actual composite components
- Review of less frequently encountered theory and instrument issues
- Hands-on practice and/or practical exams on actually flawed, retired aircraft

It is critical that technicians understand composite material forms and structural concepts. Prior to inspecting a composite structure it is critical to know its construction such as material and material form, thickness, thickness variations, and the location and nature of bonded substructure. For example, a laminate of unidirectional carbon tape will look very different to ultrasound than a woven carbon fabric. In addition, carbon reinforcing fibers come in different diameters which may effect the inspection. Also, fiberglass plies are generally twice as thick as carbon plies and some structures may contain both.

Composites, by definition contain a combination of materials, and some of these materials may not be evident at first, such as fiberglass or primer between carbon and aluminum (corrosion protection) or a layer of aluminum or brass mesh just under the first layer or two of a laminate for lightning protection. Therefore, in order to understand and evaluate the signals obtained it is necessary to understand the particular structure and what techniques and reference standards are appropriate. It is critical that drawings be available for this information. It can be a big mistake to simply calibrate on what is assumed to be a local good area as is often done with metal structures.

Metal structures have a limited number of flaw situations. They can contain fatigue cracks, corrosion, and physical damage, all of which almost always occur at the surface. Damage in composites is frequently not visible and can be at different layers that don't exist in metals. Figure 5a illustrates two carbon laminates bonded to a piece of aluminum such as flange. Porosity, voids, or microcracks in the laminates or adhesive might be acceptable in manufacturing, but act as stress risers and may lead to cracks in service. In service defects include the possibility of delaminations in the laminate, and disbonds between the laminates and the aluminum structure. Actual structures are even more complicated than this with laminate thickness changes and carbon stiffeners than could be either co-cured or secondarily bonded, each of which look different to ultrasound. A honeycomb sandwich structure offers even more flaw possibilities as shown n Figure 5b. For example, in addition to those typical of laminates, there may be water entrapment (which can cause corrosion, or damage if it freezes and expands), core splice failures, crushed core (in many cases, the skin will spring back after impact and leave no visible external evidence) and sheared

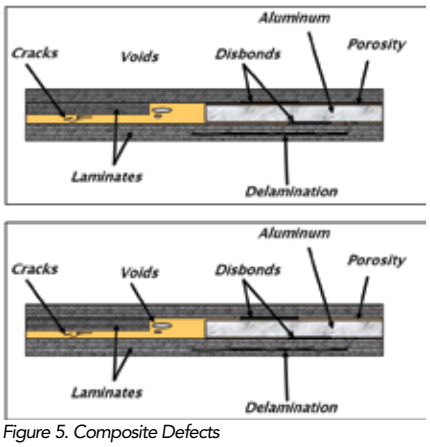

*Figure 5. Composite Defects*


*Figure 6. Students fabricating composite panels*

(torn) core. Complicating things even further is the fact that, due to the nature of fiber reinforced composites, actual damage may extend much farther than what is evident visually near an impact site.

Inspection of composite structures employs methods and techniques that will not be familiar to a technician who simply has the typical Level II in ultrasonics. Some of the ultrasonic techniques include through transmission, resonance, ring pattern, mechanical impedance, phased array, and the use of the full RF waveform which few technicians are familiar with, much less comfortable with. Other methods include radiography, many different forms of infrared, and shearography (a modified form of holography). Technicians who might use these methods must have additional training in their capabilities and limitations, and maintain proficiency in their use.

Hands-on exercises give the students the opportunity to see first hand not just how different NDT methods responded to different flaws and flaw locations, but also how fabrication issues can also effect the results. The students are allowed to design and fabricate their own specimens so they have a better understanding of the relationships between the material, fabrications, defects and NDT capabilities (Figure 6).

For example, Figure 7 illustrates a specimen made by students that consists of a carbon laminate bonded to

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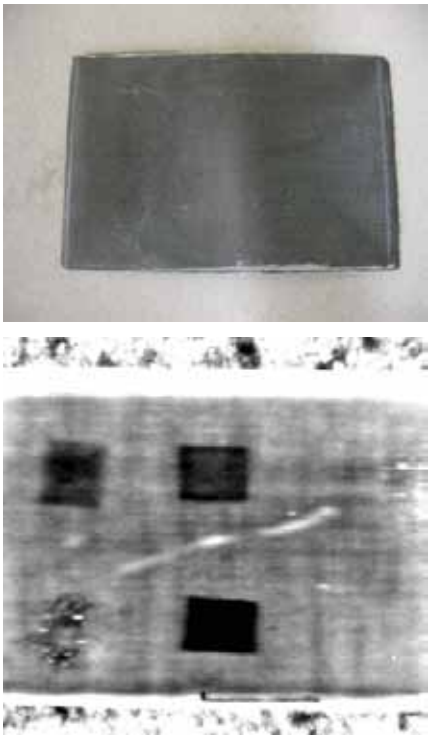


*Figure 7. Carbon panel with inclusions*

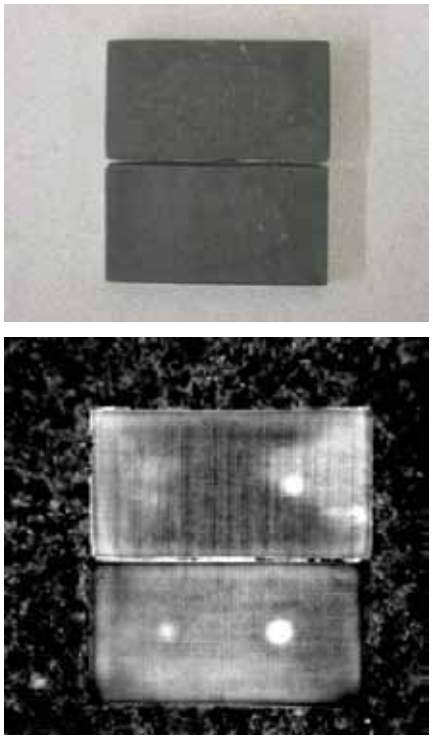


*Figure 8. Carbon panels with holes.*

an aluminum plate (Figure 7 top). The carbon laminate contained a variety of inclusions which were readily detectable by infrared (Figure 7 bottom), but many of them were undetectable by ultrasound. While demonstrating the appropriate NDT techniques on all possible types of composite material, structure and flaw combinations may be beyond the scope of a class, the importance of the technician understanding the basics of how an interrogating energy interacts with a flawed component is clear. That knowledge in turn allows the technician to determine which technique, method and reference standard will or will not work in particular situation.

Another example is the two specimens made by students shown in Figure 8. This shows two panels with carbon laminates bonded to an aluminum block. One panel has a layer of fiberglass between the carbon and aluminum and both panels have holes drilled to the aluminum bond line.

They thought the specimens had exactly the same materials, the same flaws and were cured exactly the same way, but this was clearly not the case when examined with infrared and ultrasound, providing yet another opportunity to better understand the NDT indications they might encounter. The infrared image (Figure 8 bottom) shows three of the four holes as well as inconsistencies in the carbon laminate of panel 1. Ultrasonics on the other hand, saw very little difference in the two panels.

This illustrates the importance of properly designed and fabricated reference standards. First, as with any inspection, the materials and structure of the reference standard must match the structure to be inspected. Secondly, the artificial flaws must be carefully selected relative to both the type of flaw of interest and the inspection technique to be used. From these examples it is clear that many flaws give entirely different responses to different interrogating techniques.

Finally, in addition to all these technical reasons for providing refresher and composites training, there is also the fact that most of the aviation industry requires technicians be trained, qualified and certified, in accordance with NAS-410, National Aerospace Standard for Certification and Qualification of Nondestructive Test Personnel. This specification requires that technicians be trained and examined on materials and components that are typical of what they will encounter on the job. Therefore it is not sufficient to be trained and examined by a provider who deals only with bridges, power plants or other infrastructure. Training and examination must be performed by someone who has the knowledge, experience, and resources to provide the necessary aerospace point

*Figure 9. Students working on aircraft at AANC*

# PMA MARKET BOUNCES BACK

## BUT PERILS REMAIN

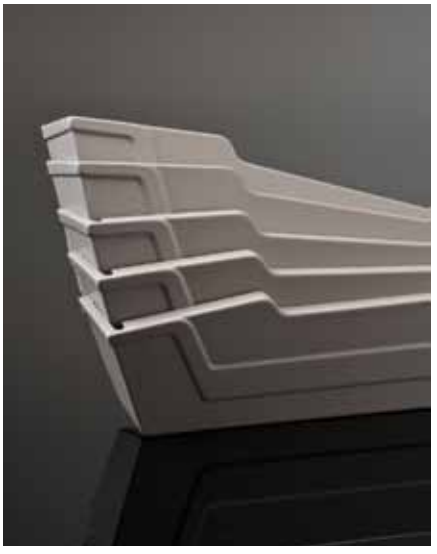
BY CHARLOTTE ADAMS

Despite the best efforts of original equipment manufacturers (OEMs) to eliminate competition in the aftermarket, the parts manufacturer approval (PMA) industry has not only survived, but thrived. This niche is "a nice place to be in a tough environment," sums up Dave Kvasnicka, president of Aviation Component Solutions.

Not that it has been easy for PMA companies. The retirement of old B737s and MD80s removed a lot of PMA-rich platforms and increased the volume of competitive replacement components. Retirements are a double whammy, Kvasnicka says. "You've got a simultaneous decrease in demand and increase in competitive supply." OEMs are also throwing up new roadblocks. PMA'ers have to act on opportunities quickly if they want to stay in business.

The PMA market was up 4 percent in 2010 from 2009, growing from $353 million to $367 million, according to AeroStrategy. Penetration of overall material consumption, now at 2.4 percent, is expected to reach 3.4 percent by 2015 for a value of $665 million, the market analyst says. AeroStrategy attributes PMA growth to slight growth in the underlying MRO market and cost cutting at the major airlines.

*PMA parts run the gamut from interior piece parts like seats and tray tables to high pressure turbine blades.*



The PMA business is most closely related to the cost of oil, adds Andy Shields, Wencor's vice president of PMA. As oil prices increase, internal hurdles for savings at the airlines decrease, which allows more widespread use of PMA, he explains. Above a certain threshold, however, the price of oil would depress the market. If oil reaches a price of more than $110 per barrel, for example, the 5-year compound annual growth rate would dwindle to a mere 9 percent, according to AeroStrategy. High fuel costs also raise airline operating costs, accelerating aircraft retirements.

## Geographic Expansion

Although PMA parts are most commonly found in the Americas, and secondly in what AeroStrategy calls EMEA (Europe, Middle East and Africa), these parts are also gaining traction in Asia.

The recent U.S. European Union (EU) bilateral aviation safety agreement (BASA) has primarily raised the comfort level in Europe with existing policy. Whether because of the BASA or simply cost pressures, AFI KLM is said to be "seriously considering" PMA.

China, interestingly, is receptive. Meeting with the head of the Chinese certification service, Jason Dickstein, president of the U.S.-based Modification and Replacement Parts Association (MARPA), "expected to sell him [on PMA], but he was selling me on it." He attributes this openness to Chinese cultural perceptions. In China "property is something you can hold, whereas intellectual property is only regulated by contract." The Civil Aviation Administration of China (CAAC) has been issuing its own PMA approvals to Chinese manufacturers, and so far has approved more than 400 articles, according to Dickstein.

Still Asia is not all smooth sailing. HEICO has been making steady progress there, says Pat Markham, the company's vice president of technical services. But Asia is challenging because there is no single, unified regulator, and there are younger regulators and new carriers. But with the 2008 downturn and the credit crunch, saving money has become important to these carriers.

## Vigilance Required

Nevertheless PMA companies cannot afford complacency. OEMs have opened a new line of attack, and peripheral threats could flare up at any time. *Aviation Maintenance*, for example, is hearing from many quarters about the growing trend of restrictive agreements for use or access to instructions for continued airworthiness (ICA) or component maintenance manuals (CMMs).

According to a letter to FAA from MARPA—published on the MARPA Web site—some type certificate (TC) holders have begun to place restrictions on ICAs and revisions, including via licensing agreements. Dickstein says he has been told that "these restrictions specify that the licensee may not use the ICAs to perform maintenance…on type certificated products that contain PMA parts or FAA-DER-approved (independent) repairs."

The problem is that PMA and repair approval applicants are "encouraged" to use the TC holder's ICAs whenever possible to avoid inconsistency and confusion in the industry, Dickstein explains. If a repair station has to promise not to use PMA in order to get the necessary information, this not only violates FAA policy but also could impact safety and increase confusion in the maintenance industry, Dickstein says. Dickstein is also concerned about the use of subscriptions to CMMs and other technical information to exclude PMA. In a recent blog he refers to Goodrich-Messier, Inc.'s Aircraft Wheel and Brake technical publications Web site, which, he says, requires subscribers to consent to the following agreement in order to access information: "All subscribers to the Goodrich-Messier, Inc. publications library must agree…" to install "only Goodrich-Messier, Inc.-authorized parts… during maintenance and overhaul." This type of agreement puts a repair station in a no-win situation because it must have the CMM in order to work but has to submit to exclusivity demands in order to get it.

OEMs are becoming more creative in the attempting to reduce the use of PMA, Markham agrees. A few OEMs are approaching customers with licensing


agreements that prohibit the use of PMA and DER repairs as a condition to receive the required maintenance instructions, he says.

The OEMs are somewhat disingenuous, as well, since they use PMA parts, too. Every year OEMs buy a small number of Wencor's PMA parts, says Keith Coleman, president of Wencor unit, Dixie Aerospace. These "customers"—including companies like Honeywell and Raytheon—are probably compensating for material shortages, he says. "The point is that they recognize that these are FAA-approved parts."

In a response to AM, FAA's Aircraft Certification Office did not comment on the legality of restrictive agreements. Officials stated that "PMA holders may [emphasis added] show and state that the maintenance instructions for the corresponding parts from the type certificate still apply. If the ICA from the design approval holder is not applicable, the PMA holders must provide a supplemental ICA."

## Lessor Issues

Nor are lessor issues completely dormant. Lessors are concerned about the residual value and transferability of their assets at the end of the lease period. This is becoming less of an issue, however, because FAA has "done a good job at putting in BASAs in virtually every major airline market in the world," says David Doll, president of Doll Consulting. The wording, particularly in the later BASAs, "has been very specific to authorize PMA."

Another line of thought is that lessors—who aren't necessarily aircraft component experts—don't know exactly what they're doing when they try to exclude PMA. To begin with, most PMA approvals are held by OEMs, maintains Sarah MacLeod, executive director of the Aeronautical Repair Station Association (ARSA). So if lessors are drawing up agreements that exclude PMAs, they are shooting themselves in the foot. Moreover, "OE is a business term," not a regulatory concept.

The lessor issue may be more a matter of agreements being made by people who don't understand the industry, Markham agrees. Airlines really have more power than they think they do, he says. He advises carriers to go back and talk to their lessor, read the contract, and say they'd like to use specified PMA parts that are noncritical, consumable items. Explain to the lessor that if these parts failed they would not cause an uncontained failure. "Minor parts do not affect the value or operability" of the airplane.

Lessors are not as firm on the issue as people think, Markham says. Along with other PMA'ers HEICO is trying to educate the lessees and answer the lessors' questions about the safety and reliability of the PMA parts and the engineering that went into them. "Since 90 percent of what we do is not [critical or life-limited], we're heading toward a 90 percent solution," he says.

Dickstein worked with the Aircraft Fleet Recycling Association on the residual value question. "Most PMAs are expendable parts that are not saved when you part out an aircraft," he says. "When we went through the list of things that are typically PMA'd on aircraft being parted out today—like A320s—we were able to show that they are not losing any value at all, regardless of the residual value of the PMA parts."

## Engines

The biggest PMA issue in the future, in terms of OEM strategy, is the effort to completely block out these parts from the engine aftermarket, Doll says. On next-generation engines, the OEMs are "busy tying everything up with patents." And by closely holding the maintenance organizations, the OEMs either do the maintenance work themselves or have it done through a license from them, he says.

Propulsion was always the leader for PMA, Doll points out. But once they have a monopoly position to sell parts, the OEMs can literally give the engine away.

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business is profitable because of the high volumes.

Interior PMAs are on the rise, as airlines realize they have a choice, Markham says. HEICO has piece parts for galley, seat, lavatory and cockpit areas—high wear-and-tear items, he says.

Other PMA'ers are active in auxiliary power units (APUs) and engine accessories. Timken, for example, has 50 to 80 PMA approvals in the APU arena, says Larry Shiembob, general manager of aerospace MRO for Timken Aftermarket Solutions.

*Chong Yi, president of the joint venture between Chromalloy, Lufthansa Technik and United Airlines*

Timken is in the interesting position of being a PMA company, an independent subsystem manufacturer, a DER repair supplier and an OEM supplier. It makes a lot of bearings for OEMS, to OEM specifications, but also develops PMAs for some of those parts. To develop PMA replacement parts for OEM bearings, Timken's aftermarket unit has to go and buy the Timken bearings on the market and then reverse engineer them, Shiembob says.

Timken has also invested during the downturn. It added an engine overhaul shop, two engine test cells and invested in additional PMAs and DER repairs.

## Interiors

As the engine aftermarket is the scene of constant struggle, interiors are becoming an attractive field for both airlines and PMA companies. Wencor obviously sees interiors as a good niche. This year it acquired MEI Interiors, a manufacturer of aircraft interiors for seat OEMs, a repair facility and a PMA parts manufacturer. Wencor unit Dixie Aerospace this year also purchased AAR's PMA product line, including some popular interior components.

There's a huge focus on interiors now due to airline consolidation and consequent standardization as well as modification programs, Coleman says. "Customers see a lot of low-hanging fruit for cost savings in interiors." Even though the unit dollar spend is a lot higher on engine parts, the interior

## Competition on Quality

Historically, PMA was probably driven by service and availability, and price was secondary, Shiembob says. Now obviously price counts, but there are other advantages to aftermarket parts, he says, such as the opportunity to improve the original part.

Timken changed the material on the Rolls-Royce 250 replacement engine nozzles and compressor wheels, for example, so that they last much longer. This was such an improvement that years later the OEM changed its design to imitate Timken's, Shiembob recalls.

While some PMA companies focus on specific areas, Aviation Component Solutions takes the opposite tack, spreading its offerings through about 18 different ATA (Air Transport Association) chapters, Kvasnicka says. This platform diversification lessens exposure to aircraft retirements and

OEM competitive reactions.

Dixie Aerospace provides other examples of product improvements. Through the MEI acquisition Dixie now offers tray tables, based on a foam technology, that are stronger, lighter and cheaper than the OEM's product. The AAR deal also yielded a more reliable toilet seat. The PMA seat closes slowly through the use of dampeners, Coleman explains. The OEM model tends to slam down, and is susceptible to cracking hinges and broken tabs, he explains.

## Engine PMAs

Despite the aversion of engine OEMs to PMAs in their aftermarkets, non-OEM replacement parts are here to stay. BELAC, which designs and manufactures PMA high-pressure turbine blades, was formed in 1998 in response to airlines' demand for better pricing, says Chong Yi, president of the joint venture between Chromalloy, Lufthansa Technik and United Airlines. OEMs have been known to raise their prices by up to 6 percent a year, he says.

BELAC has nine unique turbine blade PMAs, he says. The company hit the 50-thousandth-blade milestone earlier this year. It is doing well in these troubled times, enjoying double-digit revenue growth in 2010 over 2009.

Thirty-eight airlines worldwide install and operate BELAC blades, Yi says. It is the only independent high-pressure turbine blade PMA manufacturer. The company has been selling to European carriers long before the recent bilateral with the EU. Lufthansa Technik, for example, has been installing BELAC parts on Lufthansa as well as third-party engines.

In addition, BELAC blades are repairable. Company data shows that BELAC blades have significantly higher repair yields than OEM blades, meaning operators can more often repair used BELAC blades rather than scrapping and buying new during maintenance, according to the company. AM


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# NOT QUITE A PROP, NOT QUITE A JET:

## *The Different World of Turboprop Engine Maintenance*

BY JAMES CARELESS

With their mix of propeller and jet engine technologies, turboprop engines are a breed of their own. By using jet engine-style gas turbines to drive their propellers, turboprop engines deliver highly reliable performance and are more fuel-efficient than jets. This is why turboprop engines can be found on many commuter airliners, such as the ATR-72, Bombardier Q400, and Fokker F27. Turboprops are also being used in aircraft as large as the Airbus A400M four engine military transport, and as small as the Cessna Caravan with its single Pratt & Whitney PT6 engine.

For MROs, turboprops represent a market opportunity. But companies without experience in this engine sector would be wise to do their homework first, because the turboprop requires its own special approach.

### What Makes Turboprops Different for MROs

The turboprop engine can trace its roots back to 1930, when the British engineer Frank Whittle patented the turboprop design. The first working model was the Jendrassik Cs-1. Designed by Hungarian engineer György Jendrassik in 1939, the Cs-1 was tested in 1940 but experienced problems reaching its design horsepower.

Rolls-Royce went on to develope the RB50 turboprop engine. A pair of RB50s was fitted to a Gloster Meteor, for what is believed to have been the first-ever turboprop-powered flight on October 20, 1945. Turboprops were subsequently used on the Vickers Viscount airliner, and the venerable Hercules C-130 transport aircraft.

Honeywell got into the turboprop market when it merged with Allied-Signal in 1999. As part of the deal, Honeywell began producing the Garrett AiResearch TPE331 turboprop. Developed in 1961 by Garrett AiResearch (which eventually became part of Allied Signal), the TPE331 has been used in the Cessna Skymaster, Piper Cheyenne 400 and Short SC.7 Skyvan.

Pratt & Whitney Canada's famous PT6A was the company's first entry into the turboprop arena. Ranging in power from 500 shp

to more than 2,000 shp, PT6A engines are currently used by more than 6,500 operators in more than 170 countries. More than 36,000 PT6A engines have been built since this turboprop entered service in the 1960s. PT6As can be found on Beechcraft 1900s and King Airs; Bombardier Twin Otters and Dash 7s; plus a range of Embraers, Piaggos, Pilatus, Piper, and Shorts airframes.

Collectively, there is a universe of turboprop engines in use today. But despite the differences between all of these platforms, the basic turboprop design remains constant in all of its applications—and the unique demands it puts on MROs.

"The turboprop contains an output shaft and delivers power, as opposed to jet thrust," explains Maria Mandato, External and Marketing Communications advisor at Pratt & Whitney Canada. "Most shop interventions require a post-maintenance test-run to verify the engine power output. Because of this, the MRO provider requires access to a test-cell fitted with a dynamometer suitable for the power range and the engine output shaft speed."

When it comes to performance measurement, one size does not fit all. A different dynamometer is needed for each specific engine family of turboprop. "The dynamometer also needs to be precisely calibrated," Mandato says. "This often means that a different engine test-cell is required for each engine family, which can be a significant investment for MRO providers." In contrast, turbofan engines do not require a dynamometer. Hence a single turbofan test-cell can be designed to accommodate several engine models.

That's not all. "Turboprops tend to have more special tooling than our turbofan and turboshaft engines," says Mike Bevans, Honeywell's director of technical sales. "They also have unique control systems requirements such as prop governors ... our turboprops have hydromechanical control systems which are more demanding to rig and adjust, and more challenging to conduct training for technicians who work on them around the world."

Clearly, turboprop servicing is a specialized skill in itself; one that requires the right components and knowledge base to do the job properly. This is why MROs interested in this sector would be wise to strike up relationships with turboprop OEMS such as Honeywell, P&WC and Rolls Royce. Not only do such relationships build the necessary knowledge base, but ties to turboprop OEMs can also open opportunities for joint projects and service affiliations.

## Serving These Needs

As turboprop OEMs, both Honeywell Aerospace and Pratt & Whitney Canada (P&WC) provide extensive MRO support on a global basis. The numbers explain why: "We have shipped 13,000 engines in our TPE331 family over the past 40 years," says Honeywell's Bevans. "We actively support those engines worldwide."

Pratt & Whitney Canada is equally committed to turboprop support. "Our MRO network, which includes several independently owned shops appointed by P&WC, consist of over 14 R&O facilities providing services on our PW100 series

engines," says Mandato. "Similarly, our network includes 17 facilities offering MRO services for our PT6A and turboshaft engines. These facilities are located throughout the world consistent with the fleet geographical distribution."


## The Challenges of Turboprop Support

We have already seen how the unique nature of turboprops requires OEMs/MROs to install equipment specifically tailored to this engine's needs. This is why entering the turboprop market is not a casual decision. It takes substantial investment in technology, facilities and personnel to do the job right.

Fortunately, MRO technology has advanced in the turboprop sector. In fact, "We have seen big improvements in technology that applies to maintenance activities," says Bevans. Advances include everything from stereo borescopes and ground-based trending algorithms to on-line access to maintenance programs and "our 24/7 tech contact center connectivity with engineering and service support," he tells *Aviation Maintenance*. Honeywell has also advanced the state-of-the-art for turboprop maintenance by applying digital engine control (DEEC) technology to the task; supplemented by on-board trending and fault detection on engines in service.

Ironically, the success of turboprops in the Asia Pacific region, India, South America, and the Middle East is stressing MROs' ability to serve all of these aircraft. At P&WC, "one of our challenges will be to continue to develop our MRO network to serve these growing markets," says Mandato. The company has already taken steps to deal with this issue. "Our Singapore MRO facility is already well established to serve our PW100 operators in the Asia-Pacific region. Last year we also expanded our MRO capability in Brazil."

As new turboprop service centers pop up globally, qualified technicians have to be found to staff them. Given pay scales in the industry and the aging of its skills base, finding good help can be a real problem. "We understand some service centers have had challenges in areas with high costs of living, which means techs have to commute considerable distances from surrounding areas," Bevans says. "And overall there is a significant demographic shift as a large number of long-time techs begin to retire out of the industry."

## A Bright Future

In general, the challenges facing the turboprop MRO industry are borne out of this engine platform's proven success and global popularity. This is why Honeywell Aerospace and P&WC are generally happy to be dealing with the challenges they have at hand. It is certainly preferable to trying to cope with slow sales and insufficient demand.

"We are seeing a return to historical norms of flight hours, spares orders and training academy enrollments," says Mike Bevans. This bodes well for the turboprop OEM and MRO sectors. This said, "We have seen some challenges in the industry with supply chain issues as the commercial and general aviation fleets as some suppliers who scaled back in the recession have struggled to ramp up to meet production demand," she notes.

For its part, Pratt & Whitney Canada is bullish about the future—and making tangible investments to capitalize on the opportunities the company foresees.

"We see a number of opportunities in expanding our service offering in emerging markets such as Asia-Pacific, China, India, Middle East and South


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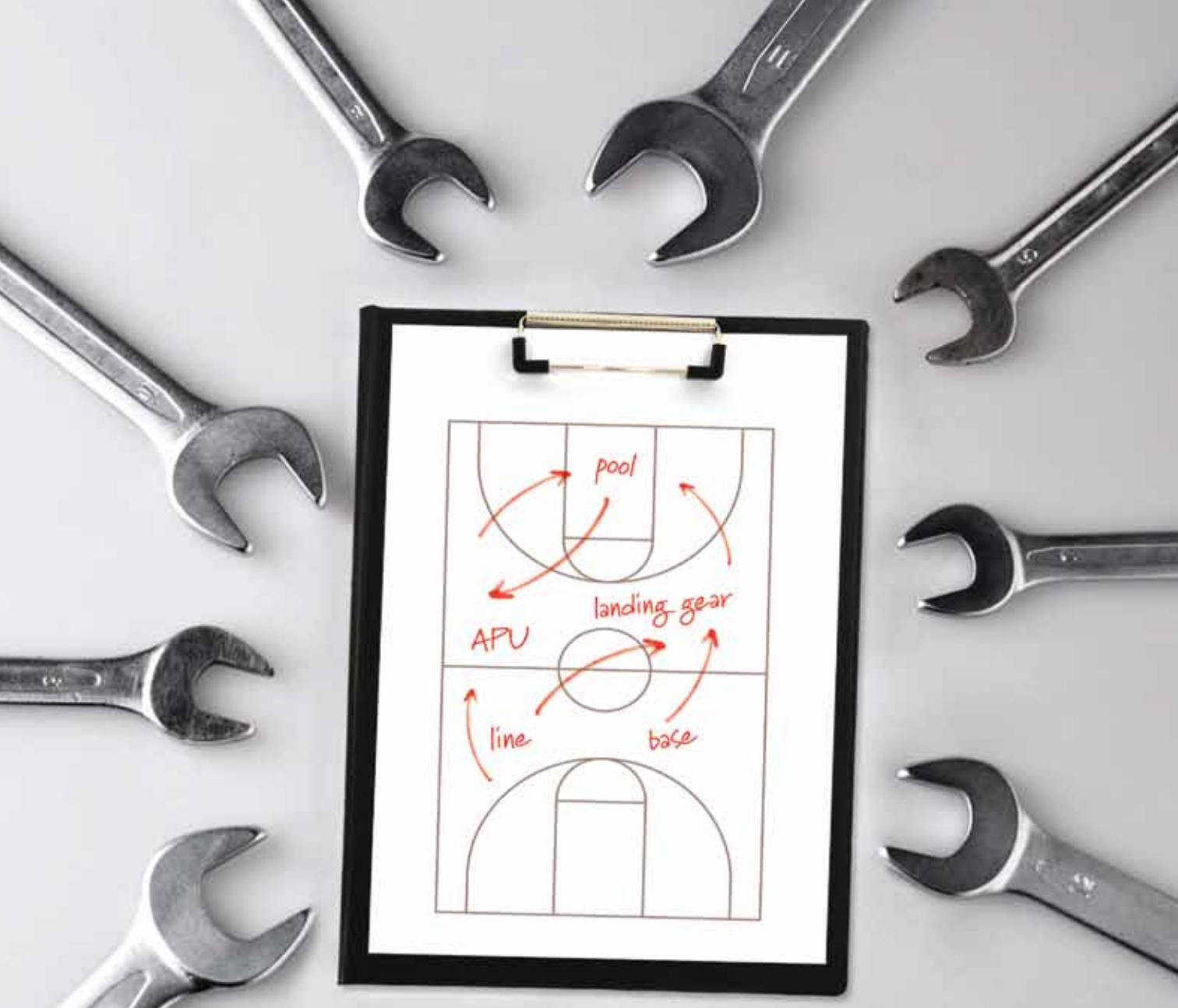


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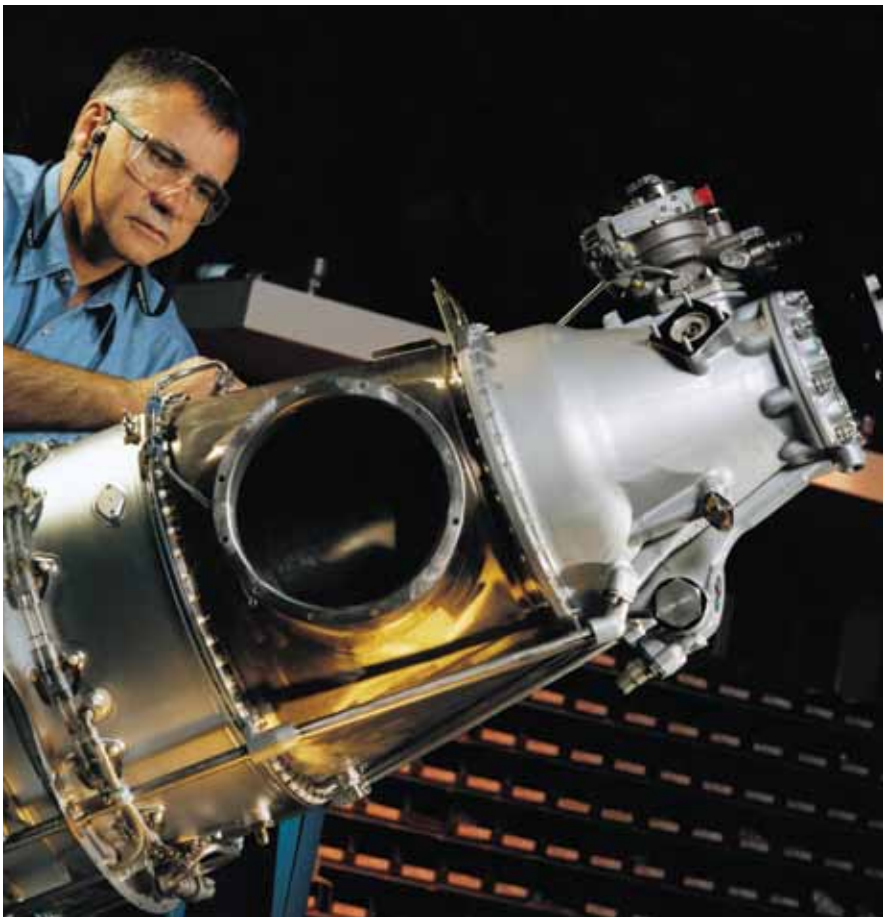
America," says Maria Mandato. "In addition to MRO facilities, we are continuously expanding the reach of our Mobile Repair Teams (MRT) to have MRT services available in all regions of the world for all our engine models. Our focus will be to expand our MRT capability in these emerging markets and to develop capability for our new engine models as they enter service."

Mindful of the aviation industry's focus on the bottom line, P&WC is launching Cost Optimization Programs in support of the PT6A turboprop engine. "Operators will have the opportunity to refresh their hot-sections with a significant rebate and enhance engine reliability as their engines age—while at the same time helping create a less-costly maintenance event," Mandato says.

As global aviation gets back on its feet, the turboprop MRO sector is poised to benefit from its return to health. This, plus the fact that turboprops are a cost-effective alternative to jet engines for short-haul commuter routes, makes this technology a preferred choice for airlines worldwide—especially in a global industry battered by rising fuel costs. That's a fact that is good news for turboprop OEMs and MROs. AM



GUEST OPINION COLUMN

BY JASON DICKSTEIN

# TRACEABILITY: NOT A U.S. REQUIREMENT, BUT CERTAINLY A GOOD IDEA

What U.S. regulations requires traceability for aircraft parts? This is a question that I hear on a regular basis. The answer is simple, yet it is frequently unexpected: there is no FAA regulation that requires traceability.

The corollary to this is that there is no U.S. regulation that specifies what forms of traceability are acceptable. If traceability is not require, then the form of traceability cannot be regulated.

Many readers will be wondering at this stage in the column, "so what is the big deal about traceability?" The answer is that traceability is one tool, but not the only tool, to help establish airworthiness.

When a person installs a part into an aircraft with a U.S. airworthiness certificate, that person is obliged (under Part 43 of the FAA's regulations) to ensure that the work performed (including the part being installed) will return the aircraft to an appropriate condition. There are two conditions deemed appropriate: (1) at least equal to its original type certificated condition or (2) any other properly altered condition (any altered condition that is approved by or acceptable to the FAA).

Because of the FAA's robust design and production approval system, one strategy for demonstrating airworthiness of an aircraft part is to show that it was produced under FAA design and production approval. This demonstrates that the part was airworthy at the time it left the production approval holder's quality system; all the installer needs to do is (1) confirm that the design and production approval remains valid (e.g. there is no airworthiness directive applicable that prevents use of the part), and (2) confirm that the part has not suffered damage or degradation (potentially changing its physical characteristics so that its airworthiness is not longer assured).

Documentation recommendations from the FAA can be found in advisory circulars, Chief Counsel's opinion letters, and other FAA guidance. The FAA's guidance makes it clear that new parts may be accompanied by a variety of traceability documents to verify their source, like:

- shipping tickets or invoices from the manufacturer
- manufacturer's certificate of conformance
- evidence of direct ship authorization
- FAA 8130-3 tag or acceptable comparable foreign tag

The FAA's guidance also specifies that in the absence of identifying documentation, the markings required by Part 45 may also suffice to identify the origin of the part. This would include "PMA" markings and "TSOA" markings.

The FAA has established preferred traceability standards for parts obtained through distributors (the standards are published in AC 00-56, the Voluntary Industry Distributor Accreditation Program). These standards are not supported by any regulation so they are not enforceable, but reliance on this sort of documentation has become an industry norm.

Where there is no documentation and no part markings, then this does not mean that the part is unairworthy. Instead, it means that the airworthiness of the part must be established using some other mechanism. This typically means a three step process:

1. Identify the airworthiness characteristics of the part. These characteristics may be required by regulation or they may be design requirements. Form, fit and function are at the root of this analysis but for more complex parts there are typically other features that need to be identified.

2. Develop a series of tests and inspections that will prove whether or not the part meets each of the airworthiness characteristics identified in step one. In some cases, the overhaul tests and inspections published by the manufacturer may provide guidance in identifying the appropriate tests and inspections. The tests must be sufficiently robust to demonstrate whether the part meets the requirements of its approved design and is in a condition for safe operation.

3. Perform each of the identified tests and inspections, and analyze the results to ascertain whether the part meets the appropriate airworthiness characteristic and standards that are relevant to its intended use.

If this process confirms that the part meets its approved design and is in a condition for safe operation, then it may be installed as an airworthy part.

Obviously, this test-and-analysis method of identifying airworthiness is inefficient for most purposes. That is why documentation or other evidence showing that the part was originally produced by a production approval holder is so valuable. In order to obtain a FAA design approval, the manufacturer had to demonstrate airworthiness to the FAA and in order to obtain a production approval the manufacturer had to demonstrate that the quality system would produce parts that met the standards of the approved design. The net result is that when the installer relies on traceability to a manufacturer, what is really happening is that the installer is relying on the FAA's prior design-and-production approval findings related to the approved manufacturer.

Even though traceability is not legally required, there are good reasons to rely on adequate traceability to support the installer's airworthiness findings. AM

BY DALE FORTON

# PRESSURE

DALE FORTON has worked in aviation for more than 32 years and as a licensed A&P Technician has been an active PAMA member for more than 26 of those years. For the past seven years he has served on the PAMA Board of Directors as vice chairman of the Board of Directors, Great Lakes Regional Director, Membership Committee Chairman, Governance Committee Chairman, and Strategic Planning Committee Chairman. Formerly a director of maintenance for 135,145, and 147 operations, he has also held positions as service manager, parts manager, technician, and director of product support. Dale has owned his own businesses as well.

As I was put under a time crunch for this article I remembered back to many different situations I encountered which caused pressure on others and myself.

I believe these, and many others, occur on a regular basis in our industry and need to be addressed in any type of fatigue regulation. The first is the stress you are under as a new A&P on the shop floor. You are assigned a job and another more experienced A&P to work with. In actuality their experience is not much more than yours, as they have been working with their license only about three to five years.

You were trained in school to go to the manuals and then proceed with the job. Your peer says "never mind that I have done this plenty of times, let me show you how it is done. Besides we have to get this done quickly." All your training from school says WRONG! But the peer pressure and new job makes you say ok, this guy must know what he is doing.

The next example comes from when you are that technician assigned a newbie to work with. You have made it in the industry where you have even passed your IA exam. The first thing the newbie says is "shouldn't we look at the manuals?" But you know you have done this job many times over your short career and exude confidence that you can show him how to do it. You have learned that you need to work fast to keep your productivity numbers up and rechecking the manual will only slow you down. Along with the fact you have to let the new guy do the job while you watch. The clock is ticking so you feel the pressure. You do not stop to think that maybe, just maybe, the procedure was revised by the manufacture and you should double check the manual. You know you should have.

You have now moved to a supervisory position. Your shop floor is full of technicians that you are to keep productive all day. You have several aircraft that are in various states of repair. All of which have deadlines. You need to keep the aircraft operators updated as to the status of their maintenance and most of all the delivery time! It has been a good day so far. In the late afternoon your Chief Inspector comes to you with the bad news. As he was completing the logs on the aircraft you had assigned one of your good techs and the new guy.

The inspector had found a new procedure was not completed in the repair. It was updated in the manual last week and a service letter was released to notify operators of this change. Now the job must be redone, as disassembly is required to complete the new procedure. Your good day just went bad. You are now in a scramble to get an aircraft out the door on time in an airworthy condition.

Now you must communicate this to many people. You must tell the technicians to get with the inspector and perform the job done correctly. Next you need to notify the operator his aircraft may not be release on time as expected. And you need to tell him why. Knowing this can be taken many ways depending on the operator. Some may say OK, stuff happens, glad you caught it. Others may say, I thought you knew what you were doing?

Another response may be total outrage because the aircraft will not be out on time so the blame is put entirely on your shoulders. Now you must go tell the director of maintenance to keep him in the loop as to what is going on with this issue. Mad operator, questionable technicians, lower productivity will all enter his mind.

All of these and more may occur in your environment. Do we recognize this pressure when we make decisions? Think about it. Be Safe, be Professional! AM

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# INNOVATIVE SOLUTIONS FACILITATE UPPER-LEVEL COMPONENT MAINTENANCE

BY KATIE SPIKA

Powerplants, hydraulic systems, rotors, flaps and countless other components on fixed and rotor wing aircraft require extensive inspection and maintenance, but are out of reach from ground level. While aircraft designers often incorporate small steps into the body of the aircraft itself for ascending to upper areas, these are far from ideal when it comes to safely and efficiently servicing the aircraft. If the maintainer is required to carry parts or tooling to these areas, toeholds are of little use. The likelihood of dropping or damaging a part or tool during ascension, knocking them off when balancing on top of the aircraft, or worse yet, falling from these upper levels, is great. Any of these possibilities equate to lost time, additional expense and personal injury.

OSHA, a division of the U. S. Department of Labor, is responsible for defining minimum requirements that must be met in industry to reduce or prevent injuries on the job. "Occupational fatalities caused by falls remain a serious public health problem. The U. S. Department of Labor (DOL) lists falls as one of the leading causes of traumatic occupational death, accounting for eight percent of all occupational fatalities from trauma," says the OSHA website.

While facility managers' first concern is for the safety of their workers, there can also be significant financial costs associated with fines levied by safety regulators when operations fail to provide safe and adequate work zones. In March of this year, OSHA released a list of the "most punished offences." Not surprisingly, fall protection dominated the top five:

1. Faulty scaffolding
2. Inadequate fall protection
3. Failure to communicate hazards
4. Misuse of or faulty ladders
5. Inadequate respiratory protection

Additionally, the report goes on to list "inadequate fall protection" as the offense resulting in the heaviest fines. Penalties exceeding $100,000 are not uncommon.

## Aviation maintenance

When working on aircraft, maintainers typically use one of three systems to minimize risks of falling. The first is the use of personal fall arrest systems. These systems typically consist of a full-body harness, an anchor system, and a connecting lanyard and safely stop a person who is falling. They require custom fitted equipment, training and frequent maintenance, but they allow for a degree of flexibility, require no floor space and usually have lower initial costs.

A second option, fall restraint systems, offers increased safety over fall arrest systems by preventing people from ever reaching a fall hazard. These systems utilize a harness and a lanyard tied off at a set length from an anchor. Fall restraint systems allow less flexibility and still require

extensive training, customization and maintenance. Both of these tether-type systems require anchor points, either on the aircraft itself or on overhead structures, and considerably limit the mobility of the worker. Overhead obstacles, such as rotor blades, reduce the practicality of these systems, as workers are not allowed to disconnect the tether from their harness to pass under the obstacles.

A third option is the use of mobile work platforms, which utilize guardrail systems to prevent a person from reaching a fall hazard. These work stands and decks are considered the safest option for upper-level access and they require little-to-no training and less frequent maintenance. Storage of the work stands can be a drawback. However, advantages include the ability to carry parts, tools and manuals to the upper regions, as most systems employ stairs to ascend the platform. This also allows workers to move efficiently to and from the work zone without having to disconnect from a safety device. Additionally, work decks provide unrestricted areas to move about and provide protection against falling to the ground when walking on the aircraft itself, creating a perimeter "safe zone."

## Evolution brings improvements

When specialized aviation maintenance stands were first introduced many left a lot to be desired. They had limited flexibility and adjustability; some were manufactured from heavy steel that rusted, while the lighter aluminum versions were under-engineered to provide the strength and durability to traverse hangar door tracks or rough surfaces without breaking. Many failed to meet the minimum

requirements set forth by OSHA, and most were time consuming to assemble and often failed to provide access to critical areas. Fortunately, the designs and construction of aviation work stands have evolved, resulting in platforms that are more efficient, effective and easy to work with, while assuring compliance with military and civilian safety regulations. Today's user-friendly aviation stands are engineered to not only provide a safe work zone but to also facilitate efficiency, reducing overall process times and accidental component damage.

## Phase systems vs. point-access stands

Maintenance stands generally fall into two categories: aircraft-specific phase maintenance systems, which are designed to interface flawlessly with one specific type of aircraft, and multipurpose "point-access" stands, which are versatile enough to be used on many different sizes and types of aircraft at multiple maintenance zones. Most stands offer height adjustability, with ranges of 12", 24", or more. Typically constructed out of lightweight, corrosion-resistant aluminum, deck and stair modules can be easily moved by one or two workers, and are designed to quickly connect together and position.

Phase systems, normally used for extensive, long-term maintenance operations, offer multiple modules that fully encompass the aircraft, providing a means of accessing the entire upper level, or multiple levels, while allowing ground-level access beneath the system. As these are designed to fit specific aircraft, they are more limited for the general maintenance provider, but invaluable to those providing extensive overhaul or refurbishment. Many decks are equipped with extending deck sections (sliders) that allow the work surface to conform to the contours of the aircraft and accommodate protrusions, while eliminating openings that could allow workers to fall.

Multipurpose, or universal maintenance stands, can be extremely versatile. The same 8'-to-12' long deck may be capable of providing ideal access to a tail rotor, jet engine or wing flap. Often, if used in pairs with "cross-over rails" connecting fore and aft, universal stands can provide complete access and safety compliance for rotor and upper deck operations. These stands set in place in minutes and can reduce overall maintenance time significantly. This means more hours in the air and less out of service, and equates to greater profitability for the maintenance provider.

## Designs based on maintainer feedback

Spika Welding and Manufacturing of Lewistown, MT is one company that is gaining recognition for its innovative solutions in the field of aviation maintenance equipment. "We have been working with aviation maintainers and technicians since 2006 to develop solutions based on the needs of the users," said Tom Spika, president of the company. "Using their feedback, we have introduced features that really promote operational efficiency in the hangar. For example, our pneumatic slider-locking system allows maintainers to position sliders and lock them into place simultaneously with the flip of a switch, which is a big time-saver over the old designs. We've developed a method of snapping the modules together that eliminates having to line up pins and holes, which trims time and simplifies assembly as well." Spika believes by working closely with those who use the equipment daily, the company is able to respond with better, more effective designs and features, such as the type of material used for the work surface. "Mechanics were telling us that the up-punched sheet metal used for many older stands ripped their pants when they knelt or sat on it, not to mention the fact it was like a cheese grater to run your hand over. We found that we could provide an extruded aluminum surface that was far easier on clothing and skin, while still maintaining adequate traction for safety. Not only that, it doesn't flex and spring like the single layer sheet metal."

Spika notes that they are focused on designing their platforms to make the maintainer's job easier, while assuring compliance with current OSHA requirements. Monte Obert, one of the design engineers at Spika, notes that there are many factors that must be considered when engineering a work stand. "We have to design to meet numerous OSHA regulations that define the requirements for scaffolding, work stands, working surfaces, and stairs, to name a few."

According to Obert, those include:

- Engineering the work stand to support 4x the rated working load, with a minimum working load rating of 25 lbs per square foot of deck (OSHA 1921.a)
- Maintaining a minimum ratio of 4:1 for height of deck to width of base(OSHA 1921.a.3)
- Providing 4" toe boards to prevent tools and parts being accidently knocked off (OSHA 1910-29.a.3)
- Maintaining all stair angles between 40° and 60° (OSHA 1926.451)
- Utilizing casters rated at least 4x the working load (OSHA 1910-29.a.4).

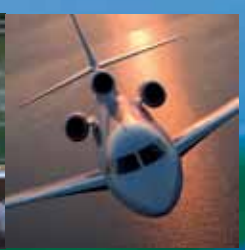
Spika agrees that it is imperative that the manufacturer of the work platforms be knowledgeable on the design requirements. "We see a number of platforms in use in the aviation industry that would never pass an OSHA inspection," Spika says. "Not only that, they can give a false sense of security to the workers. No one can afford the cost of a preventable injury. Our goal is to help facilities prevent that in a way they can see is easily cost-justifiable to management."

# Whatever it Takes

Pilot Larry Erd, Falcon 7X Captain, lands at London Luton, with an inboard slat fault alert. He quickly checks the aircraft system and then confirms he is AOG – and his next flight is on the following day.

He calls Dassault's Technical Center in Paris and gets Insy Houang – Customer Service Engineer and an on duty 7X specialist. Together they access the aircraft on-board Central Maintenance Computer to identify the fault code.

Insy coordinates assistance and parts shipment via Eurostar, from Paris-Le Bourget to Luton. Go Team technicians from Dassault's Luton Satellite install a new flight control PCB the next morning and Larry e-mails back later to Dassault Falcon: *"The airplane performs really well and Customer Service is doing an incredible job too."*



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