AVIATION MAINTENANCE

www.avmain-mag.com

MRO, UPGRADES AND REFURBISHMENT ON COMMERCIAL, BUSINESS/GA AND MILITARY AIRCRAFT GLOBALLY

OUR 2011 REPAIR CENTER DIRECTORY

SEE BACK COVER

The Right Stuff

We profile a new breed of maintenance manager: James Prater, Airframe Services Manager at Duncan Aviation

February / March 2011

GLOBAL OUTLOOK FOR HELICOPTER MRO

FLIGHTSAFETY: IN THE VANGUARD OF TRAINING

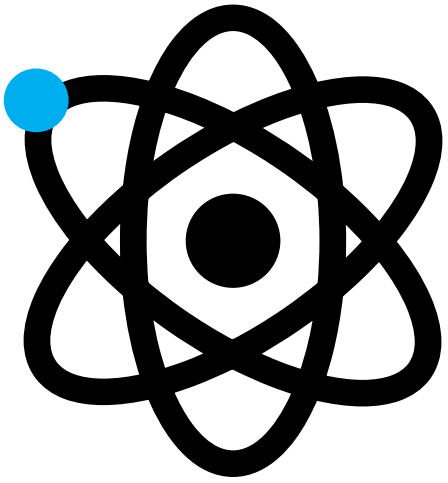
NEW MRO METHODS TACKLE RISING FUEL COSTS

Power

Power is something that Chromalloy puts back in the hands of our customers. As the world's leading independent provider of regulatory approved, gas-path coatings, repairs and replacement parts, we are a trusted alternative for our customers and healthy competition for the OEMs. It's the power of choice—the power to reduce your costs and extend the life of your gas turbine engines—and it's only from Chromalloy.

Power = Choice

Learn more at
chromalloy.com/icon



CHROMALLOY
Coatings / Repairs / Parts

AVIATION MAINTENANCE
www.avmain-mag.com

EDITORIAL
Editor-in-Chief and Online Publisher
John Persinos
301-385-7211, jpersinos@aerospace-media.com
European Contributing Editor
Thierry Dubois,
news@avmain-mag.com
Contributing Editors
James Careless
Kathryn Creedy
Ramon Lopez
Douglas Nelms
Tom Scarlett

ADVERTISING/BUSINESS
Publisher/Owner Adrian Broadbent,
+34 91 804 2577, abroadbent@aerospace-media.com
Sales Director (USA) Daniel Brindley,
+ 1 414 967 4997, dbrindley@avmain-mag.com
Sales Director (International) Jina Lawrence,
+44 (0) 20 8669 0838, jinalawrence@avmain-mag.com

DESIGN/PRODUCTION
Production Manager Henry Lindesay-Bethune,
production@aerospace-media.com
Production Splash Graphic Design
design@splash.eu.com

SUBSCRIPTIONS
maria@asi-mag.com

CLIENT SERVICES
Administration Maria Hernanz Reyes,
maria@asi-mag.com

LIST RENTAL
Statistics Jen Felling,
(203) 778 8700, j.felling@statlistics.com

REPRINTS
The YGS Group 1800 290 5460,
avmaintenance@theYGSgroup.com

US Publisher
Daniel Brindley
ASI Publications Ltd

US Publishing Office Address:
5590 N Diversey Blvd #209
Milwaukee
WI 53217

AEROSPACE & SECURITY MEDIA
www.aerospace-media.com

ASI publications ltd
www.aerospace-media.com

Aerospace & Security Media is a trading arm of ASI Publications Ltd

Calle Mar Mediterraneo 64,
Tres Cantos 28760, Madrid, SPAIN.
+34 91 804 2577 (T)
+44 (0) 20 8090 6211 (F)
www.avmain-mag.com or www.aerospace-media.com

UK Company registration no 5999781
UK VAT no GB919525796

Contents

February / March 2011 : vol 30 issue 1

COVER STORY

DEPARTMENTS

Aviation Maintenance (ISNN 1090-221X) is published bi-monthly by Aerospace & Security Media Ltd, 5590 N Diversey Blvd APT 209 Milwaukee, WI 53217. Application to mail at Periodicals postage paid at Milwaukee, WI and additional mailing offices. POSTMASTER send address changes to Aviation Maintenance 5590 N Diversey Blvd APT 209 Milwaukee, WI 53217. The editor welcomes articles, engineering and technical reports, new product information and other industry news. All editorial inquiries should be directed to Aviation Maintenance; Email: news@avmain-mag.com. Subscriptions: Free to qualified individuals involved in the aircraft maintenance industry. All other prepaid subscriptions, see www.avmain-mag.com.

Editor's Notebook

Buffett's Safe Investment

BY JOHN PERSINOS, EDITOR-IN-CHIEF

As massive amounts of snow fell (yet again) in my resident state of Rhode Island, I visited the FlightSafety International Learning Center in West Palm Beach, Florida. Firstly, I want to assure our accounting department that my trip to the balmy Treasure Coast was at FSI's invitation and it had nothing to do with the severe winter weather afflicting New England.

Rest assured, the sole purpose of my trip was to experience FlightSafety's latest training techniques for aviation mechanics. I came away not with a suntan, but with a deeper appreciation as to why the billionaire investor Warren Buffett purchased FSI in 1997. FlightSafety is a wholly owned and highly profitable subsidiary of Berkshire Hathaway, which is Buffett's conglomerate holding company based in Omaha, Nebraska.

Buffett is the world's third-richest man and a genius at spotting inherently valuable companies. In February, Buffett was awarded the Presidential Medal of Freedom by President Barack Obama, for a long history of philanthropy.

As Buffett — aka, "The Oracle of Omaha" — once said: "If you don't feel comfortable owning something for 10 years, then don't own it for 10 minutes." He has referred to FSI as the "runaway leader" in its field.

During the more than 13 years since Buffett bought FSI, demand for aviation-related training has exploded around the world, fueling FSI's strong, long-term growth. One of Berkshire Hathaway's most profitable holdings is FSI; in turn, one of FSI's fastest-growing services is MRO training.

FSI is the largest owner/operator of simulators in the world. Through its 42 learning centers in the United States, Europe and China, FSI trains over 65,000 pilots and maintenance technicians every year. To read about my visit, turn to page 20.

Giving a more personal dimension to the topic of mechanics is our cover story about a fresh breed of maintenance director: James Prater, Airframe Services Manager at Duncan Aviation. Coincidentally, Duncan also is based in Nebraska (specifically, Lincoln). It's the largest, family-owned MRO facility in the world.

Our profile of Prater, written by James Careless, reveals how a new generation of mechanics such as Prater think outside the box, to keep aircraft aloft (see page 16).

Within this issue you'll also find our "Repair Center Directory", an easy-to-use resource that our magazine compiles every year. This directory represents months of painstaking research and scrupulous fact-checking.

One of FlightSafety's fastest-growing services is MRO training.

Jim Careless also writes in this issue about supply chain management (see page 30). As MROs extend their operations to the farthest reaches of the globe, they face the challenge of managing increasingly attenuated supply chains. He unearths new supply chain management tactics that reduce costs and expedite the provision of the right part, to the right place.

On page 36, Kathryn Creedy analyzes MRO methods that save fuel. As the price of oil hovers at $100/bbl, the need for operators to reduce fuel costs is increasingly imperative. Kathryn writes that one way to save fuel is to adopt new technologies within the MRO process that make aircraft more aerodynamic and efficient.

It's important to keep these themes in mind, as the helicopter industry converges at Heli-Expo 2011 in Orlando, March 5-8. Doug Nelms wrote this issue's Global Outlook for Helicopter MRO (see page 24).

Doug surveys the major OEMs, suppliers and operators in the helicopter market, explaining what it all means for the MRO outfits that service them. He examines expected growth rates for rotorcraft in 2011 and, accordingly, the demand for rotorcraft MRO. He also looks at operator activity in regions around the world, in such niches as airborne law enforcement, emergency medical services, and corporate/VIP.

I plan to attend Heli-Expo this year. As the former editor-in-chief of *Rotor & Wing* magazine, I find the event to be something akin to a high school reunion. Funny how these trips always seem to propel me to the Sunshine State, but it's only a coincidence and it has nothing to do with my enthusiasm for water sports. I swear. AM

John Persinos is editor-in-chief of Aviation Maintenance and Online Publisher of the magazine's parent company, Aerospace & Security Media. You can reach him at 301-385-7211, or jpersinos@aerospace-media.com. John works out of his home office in Rhode Island, where the average winter temperature is 29 degrees Fahrenheit.

Our work... flies with you

Iberia Maintenance & Engineering is one of the greatest companies on MRO Services with an extensive experience on Iberia fleet and third party.

Our 4.000 experienced technicians and engineers, our competitive turn times, our knowledge and our personalized solutions for each workscope provide a recommendable MRO source based in customized maintenance programs according to your specific needs.

Iberia main facilities are located at Madrid-Barajas Airport. The extension of the maintenance complex is more than 220.000m², sited in two industrial areas on both sides of the airport.
The facilities are made up of:

- Seven hangars and general workshops with an automated wheel and brakes facility, sheet metal installations, composites, structural damages, galleys, interiors, painting, labelling and marking works, etc.
- Engine, engine associated accessories, APUs and thrust reverses shops with one engine test cell (120.000 Lb. thrust).
- Avionics and components shop
- Training school.

Our AOG services provides the most effective and flexible support on emergency services.

7 days / 24 hours AOG SERVICES

The engine repair center will assist you in the design of customized services to suit your specific requirements. Shops with specialized personnel and components equipment are available to perform the inspections, repair and test for more than 70.000 instruments, accessories, electronics, radio and electric components repaired annually.

Iberia Maintenance offers a wide range of aircraft, engine and component services on:

Engine	**Airframe**
RB211-535E4	A340-300/-600
CFM56-5A1/-5B/-5C4	A319, A320, A321
CFM56-7x	A310
CF34-3A1/-3B1	B757
JT8D-217/-219	B767
PEGASUS MK 150/-152/-157	B707
APUs	MD80´s
GTCP85-98DHF	C-130
GTPC36-300	P3 ORION
131-91	FALCON

Originally aimed at the civil maintenance market, Iberia Maintenance services have since been extended into the military arena, partly because the Spanish Army Forces need widen maintenance and operational solutions.

Full Support Services

Iberia Maintenance can also provide additional services including engineering for all maintenance areas, computerized systems, metrology, maintenance personnel training, NDT services, inventory management and exchange.

Iberia Maintenance position in Spain gives its customers a strategic situation in Europe as well as a low cost and timely alternative.

Put your fleet in our hands... the perfect place where our technicians and professionals can apply cutting-edge technology so **our work... flies with you.**

FOR FURTHER INFORMATION, PLEASE CONTACT:
IBERIA MAINTENANCE Commercial & Development Direction. Madrid - Barajas Airport, La Muñoza. 28042 Madrid, Spain.
Phone: +34 91 587 49 71 / Fax: +34 91 587 49 91. E-mail: maintenance@iberia.es
www.iberiamaintenance.com

Air India Signs OnPoint Solution Agreement for Its GE90 Engine Fleet

Air India Boeing 777

GE Aviation and India's national carrier Air India have signed a 20-year OnPointSM solution agreement that covers its GE90 engines. The value of the agreement is not being released.

Air India will expand its maintenance, repair and overhaul (MRO) capabilities at its Mumbai, India facility to include GE90 engine overhaul. The current schedule calls for the Mumbai facility to be certified for basic GE90 MRO by 2012. Eventually, Air India plans to build a new MRO facility in Nagpur, India, that will include GE90 testing capabilities.

As part of the OnPoint solution agreement, GE will provide Air India with comprehensive material support, training and assistance on overhaul workscoping. While Air India develops its GE90 MRO capabilities, GE will provide the airline with overhaul services at GE's MRO facilities to support the carrier's GE90 engine fleet.

Air India ordered 23 GE90-powered Boeing 777 aircraft in 2005 and currently operates 20 of these aircraft, with the remaining three aircraft to be delivered in the next few years.

Available OnPoint services include overhaul, on wing support, new and used serviceable parts, component repair, technology upgrades, engine leasing and diagnostics.

Pratt & Whitney to Provide PW1200G Engines on MRJ Order

Pratt & Whitney will provide exclusive power for 50 firm and up to 50 options for new Mitsubishi Regional Jet aircraft ordered by Trans States Holdings.

The agreement represents 100 firm PW1200G engines for the aircraft with 8 spare engines and options for up to 100 additional engines with deliveries scheduled to start in 2014. In addition, Trans States Holdings has signed an exclusive 12-year maintenance contract with Pratt & Whitney for these engines.

Each Mitsubishi Regional Jet aircraft is powered by two PurePower PW1200G engines with double digit reductions in fuel burn, environmental emissions, engine noise and operating costs when compared with today's engines.

Artist's Conception of the MRJ

Bell Helicopter Integrates MRO Operations

Bell Helicopter has completed the integration of six of its support, service and MRO subsidiaries, officially merging them into corporate parent Bell Helicopter Textron.

By combining its service organizations, Bell Helicopter has restructured operations to provide customers with a comprehensive support and MRO solution — making it easier for them to do business with the company and increasing efficiencies.

The operations affected by this activity are: Edwards & Associates, Inc and Aeronautical Accessories, Inc. (Piney Flats, Tenn.); Rotor Blades, Inc. (Broussard, La.); Acadian Composites (Lafayette, La.); Bell Aerospace Services, Inc. (Bedford, Texas); and US Helicopter (Ozark, Ala.). All six of these organizations were wholly owned subsidiaries of Bell Helicopter in 2010.

Bell Helicopter's combined customer support and service network has facilities in more than 13 geographical locations, employs more than 1,700 individuals and contributes more than one third of Bell Helicopter's annual revenue.

"Single European Sky" Spotlighted at Avionics & Defence Electronics Europe

The 2011 Avionics & Defence Electronics Europe Conference and Exhibition, held at the M.O.C. Centre in Munich, March 16-17, has sessions on Single European Sky avionics integration, helicopter avionics, electronic flight bags as well as defence electronics tracks covering trends in electronic warfare, COTS integration, thermal management and more.

Capt. Manfred Mueller, Head of Flight Safety at Lufthansa Airlines, and Vincent De Vroey, General Manager Technical and Operations of the Association of European Airlines, will lead the avionics keynote on March 16, at the Avionics & Defence Electronics Europe 2011 opening keynote session.

The keynote presentation from Lufthansa Airlines Capt Mueller will discuss the innovative avionics systems being deployed today in Lufthansa's aircraft and what Lufthansa is exploring for the cockpits of tomorrow. Click here for details: www.avionics-event.com

The conference also features workshops and masterclasses, which provide more in-depth technical content for avionics designers. Workshop coverage includes sessions on ARINC 661, integrated modular avionics, DO-178C certification, and security in airborne systems.

Emirates and Lufthansa Technik Sign Landing Gear Contract for A340-300

Emirates Airline has contracted Lufthansa Technik AG to overhaul the center landing gears of its Airbus A340-300 fleet. The two-year agreement includes services for eight aircraft.

Lufthansa Technik's landing gear business unit in Hamburg, Germany will be responsible for all necessary maintenance, repair and overhaul works on the A340-300 center landing gears.

Since 2005, Lufthansa Technik has provided landing gear services via its subsidiary Lufthansa Technik Landing Gear Services UK (formerly Hawker Pacific UK) for 21 of Emirates' Boeing 777-200, -200ER and -300 aircraft. The B777 service contract entails the exchange, overhaul and support for the landing gears which operate with different maximum take-off weights and runs until 2013.

An Emirates Airline A340-300

SR Technics and Airblue Sign Engine Contract

SR Technics has signed a seven-year contract with Airblue, Pakistan's second-largest and fastest-growing airline, and will provide maintenance services on CFM56 engines. The contract covers engine maintenance for Airbus A319 and A320 aircraft.

The services for the CFM56-5B engine types include overhaul, repair and engine on-wing condition monitoring. Meeting industry best-in-class standards, they will involve major disassembly as well as core performance restoration.

More than 130 companies around the world rely on the efficient engine services performed by SR Technics and enjoy 24-hour on-wing support 365 days a year.

CFM56 engine

Lufthansa Technik to Support Air New Zealand Rotable Components

Lufthansa Technik will provide a Total Component Support agreement (TCS) for a selected number of components for Air New Zealand. The contract is for components utilized on the New Zealand national carrier's Boeing 777-200 and 777-300 aircraft. The signing of the contract signifies the first time that Air New Zealand has engaged the services of Lufthansa Technik.

about people

Gulfstream Adds Perez as Field Service Rep

Gulfstream Aerospace Corp. added **Jorge L. Perez** to its staff of 30 field service representatives (FSRs) based in the United States. From his home base in Orlando, Perez responds to the needs of Gulfstream customers in central and north Florida. He reports to Bill Fuger, manager, Field Service Operations, United States and Latin America.

Since 2006, Perez has been a contract FSR for Gulfstream, providing support to international customers in Hong Kong, United Arab Emirates, Turkey and Azerbaijan. He also provided assistance to U.S. government-operated Gulfstream aircraft in Hawaii and Washington, D.C.

Perez's 20-year aviation career includes positions as a Gulfstream technician in Savannah, a line maintenance supervisor for Jet Aviation in Palm Beach, Fla., and the chief of maintenance for a Florida-based Gulfstream operator. He was also a helicopter crew chief in the U.S. Army.

Perez holds an airframe and power plant (A&P) license from the Federal Aviation Administration (FAA). He is fluent in Spanish and earned an associate's degree in professional aeronautics from Embry-Riddle Aeronautical University.

PAS Names Orzel as COO

PAS Technologies Inc. has hired **Dennis J. Orzel** to the newly created position of Chief Operating Officer. Orzel will report to Phil Milazzo, President and CEO. He will be located in the company's headquarters based in North Kansas City, Missouri.

Mr. Orzel will have responsibility for day-to-day operations of the company's seven facilities across three countries focused on the aerospace, defense, industrial gas turbine, and high-performance oilfield markets. These responsibilities include overseeing the plant operating functions, environmental health and safety, quality systems, engineering, procurement, logistics, new product development platforms, and lean initiatives.

Orzel joins PAS Technologies from Triumph Aerostructures Vought Integrated Programs Division where he served most recently as President. Orzel joined Vought Aircraft Industries in August 2006 as Vice

about people

President of Manufacturing Operations where he championed Lean Manufacturing and Six Sigma as core strategies in driving operational improvements.

Prior to joining Vought, Orzel served as Vice President for Operations and Distribution for the Transportation Division of Exide Technologies Corporation, where he was responsible for production planning, manufacturing, distribution, transportation and logistics. At Exide, he led efforts to restructure the operational footprint, reduce finished goods inventory and increase plant productivity through the utilizations of lean tools and methodologies.

With more than 30 years of business operations experience, Orzel spent the majority of his career with Pratt & Whitney. During this time he held many positions with increasing responsibilities, including General Manager of the Turbine Module Center. Prior to that, he served as Plant Manager for the Pratt & Whitney North Haven Facility where the plant's success was chronicled in James P. Womack's best-selling book, *Lean Thinking*.

Mr. Orzel earned a bachelor's degree in biology and chemistry from Central Connecticut State University. He also completed the Executive Education Program from the Darden School of Management.

Avtrade Announces Management Restructure

After 21 years service with Avtrade, **Tim Large** has retired from his role as Director, Sales & Technical.

In response to business growth and Tim's semi-retirement, the company management team has been restructured.

Nathan Kent was appointed as Director of Sales & Marketing. Nathan has 17 years aviation experience with leading industry companies and a background in engineering and sales. He joined Avtrade six years ago and has held managerial roles in Marketing, Sales and Contract Support, including two years as part of the Senior Management Team.

Tracy Keegan was appointed as Director of Contract Management, with overall responsibility for all Avtrade Group contracts and leasing. Continuing a successful 16-year career at Avtrade, including management and with significant knowledge of sales, contracts and leasing, Tracy was promoted from her current position of Senior Manager – Leasing.

Tom Lane was appointed as Director of Asset Management. During 15 years at Avtrade, Tom has held managerial positions in sales and

Thomas Cook Selects CFM56-5B to Power New A321s

Thomas Cook Group announced that it has selected the CFM56-5B engine to power 12 Airbus A321 aircraft scheduled for delivery in 2014. The engine order is valued at more than $200 million U.S. at list price.

In addition to the firm aircraft order, Thomas Cook Group also plans to lease CFM56-5B-powered A320 family aircraft from operating lessors.

All of Thomas Cook's new CFM56-5B engines will incorporate an engine performance improvement package. The modifications will reduce engine fuel consumption by 0.5 percent and lower maintenance costs by 1 percent.

The CFM56-5B PIP is currently undergoing flight tests at Airbus and is schedule for certification in the second quarter 2011. Airline entry into service is planned for the third quarter 2011. The engine will maintain the same noise signature as the current production engine. These engines also meet current International Civil Aviation Organisation (ICAO) Committee of Aviation Environmental Protection standards (CAEP /6) requirements.

CFM56-5B engines are a product of CFM International, a 50/50 joint company between Snecma (Safran group) and GE. CFM, the world's leading supplier of commercial aircraft engines, has delivered more than 21,600 engines to date. The CFM56-5B engine powers every model of the Airbus A320 family and has been chosen to power approximately 55 percent of all A320 aircraft in service or on order.

The A321

United Rotorcraft Awarded STC for AS350


Eurocopter AS350

United Rotorcraft Solutions (URS) was awarded a FAA Supplemental Type Certificate (STC) for their Lead Acid Battery Maintainer for the Eurocopter AS350 series helicopters.

Designed specifically for Air Medical and Airborne Law Enforcement, the maintainer increases battery life and can be left on without harming the battery. The system has the provisions for shore power with an enunciator light in the instrument panel that illuminates when shore power is connected

It adds less than 5 pounds and provides de-sulfating of the battery and has reverse polarity protection, short circuit protection and over voltage protection, soft start and stop. No in-rush of current protects the battery.

The maintainer is FCC Class B EMI interface compliant and is safe for FADEC. The benefits of the URS battery maintainer are automatic switch-mode battery charger; input: 115VAC, output: 24V/DC; 2Amp constant current; automatic cut-off; and true float.

United Rotorcraft Solutions provides aircraft completions and refurbishment services, systems integration, maintenance, component overhaul, customized interior installations and unsurpassed exterior finishing, servicing all segments of the helicopter industry.

DP Seals Invests in Major New Production Facility

DP Seals, a UK-based supplier of precision custom rubber seals and mouldings, has invested significantly in a new production facility for its aerospace business sector. The £150,000 investment, including a new 2,500 square foot unit equipped with two new large presses, will enable the AS 9100-accredited company both to increase production volumes and respond more quickly to demand for larger mouldings.

To support its growing aerospace business, DP Seals became one of the select few global AS 9100-accredited custom rubber moulding companies in 2009. Creating its new aerospace facility allows the company to focus on the stringent requirements of this demanding quality management standard and on its recent BAE Systems accreditation.

YOUR ENGINE IS OUR PRIORITY.

As the only U.S.-based independent CF6-50 heavy maintenance, test and overhaul center, the team at Kelly Aviation Center stands ready to make your engine our priority, delivering expertise and facilities unparalleled in the industry. Kelly Aviation Center features vast state-of-the-art MRO and test facilities that enable a quick response customized to your specific needs. From quote through delivery, Kelly Aviation Center will deliver your engine quickly, reliably and affordably – every time.

+1 210.827.5275 | www.kellyaviationcenter.com

KELLY AVIATION CENTER
a Lockheed Martin affiliate

about people

marketing, including Senior Manager. With extensive experience in purchasing and sales, he will be responsible for all Inventory investment and management for the Avtrade Group.

Chris Christou was appointed as Director of Finance, responsible for financial management of the Avtrade Group. Chris, a qualified accountant with substantial financial knowledge and expertise, joined Avtrade in 2008 as Financial Controller. He brings to the role a wide range of experience gained during a 25-year career in finance.

CIRCOR Selects Sisneros as Group Director of Continuous Improvement

CIRCOR Aerospace Products Group has appointed **Anthony Sisneros** as the Director of Continuous Improvement for the CIRCOR Aerospace Products Group.

Sisneros brings extensive industry and continuous improvement experience to this role and will report to CIRCOR Aerospace Group Vice President Christopher Celtruda. He will also represent the aerospace group on the CIRCOR International Council for Continuous Improvement and Operational Excellence.

Sisneros will have full responsibility for CIRCOR Aerospace implementation of Lean, Six Sigma and overall change management across the North American, Asian, European and North African aerospace businesses. He will oversee site level staff and change initiatives, drive the annual Strategy Deployment process and be actively engaged in the development and execution of group strategy and change efforts.

In his career, Sisneros has spent over 20 years with Goodrich, Eclipse Aviation and General Electric. He brings extensive experience in change, Lean, manufacturing and business leadership, resulting from his career assignments in Manufacturing Engineering, Manufacturing Project Management, and Operations Leadership.

Sisneros joins CIRCOR from Goodrich Corporation, where he was the Director of Operations for a $75 million aerospace engine component manufacturing division. Previously, he was the Director of Manufacturing Technical Services at Eclipse Aviation and held roles at General Electric as the Customer Service Manager at GE Albuquerque and a lengthy international assignment as the GE / SNECMA Manufacturing Coordinator in Villeroche, FRANCE.

Sisneros earned a Bachelor of Science in Mechanical Engineering and Masters in

Hartzell Propeller Introduces New Prop for Piper Aztec

Hartzell Propeller Inc. has developed a new 2-bladed Top Prop propeller conversion kit for Piper PA-23-250 Aztec twin-engine aircraft.

The new 77-inch diameter propeller uses blade-mounted counter-weights to provide redundant assistance to the propeller pitch control and feathering system versus the original configuration that relies heavily on an air pressure charge for these functions.

Hartzell's swept-tip Scimitar "blended airfoil" blade design used in this conversion provides an increase in cruise speed of two to three knots as well as a noise reduction of almost 2 dB(a).

The new propellers are available for Piper Aztec PA-23-250 C to F models, serial numbers 27-2505 through to 27-8154030, installed with Lycoming IO-540-C4B5 or TIO-540-C1A engines. They replace Hartzell's 2-blade aluminum non-counter-weighted propeller models normally installed on these aircraft.

Hartzell's New 2-Bladed Scimitar Top Props for Piper Aztec Aircraft

Banyan Receives Industry First STC Approval

The FAA issued STC ST03901AT to the Banyan Avionics team based at Fort Lauderdale Executive Airport (FXE) for the Thrane and Thrane AVIATOR 200 Wireless Local Area Network (WLAN) system for the Cessna 500, 550, S550, 552, 560, and 560XL aircraft.

The AVIATOR 200 turns aircraft into a hot spot and enables pilots and passengers to use Wi-Fi enabled PDA devices including Blackberry, iPhone and iPads to access a multitude of applications, such as email, Internet browsing, smart phone connectivity, and voice communications.

Banyan's avionics department is certified as both an FAA and EASA repair station and has also earned repair station designations for Argentina, Brazil, Bermuda and Venezuela.

Pratt & Whitney Purchases Patented Technology for EcoPower Engine Wash

Pratt & Whitney closed on an agreement with Gas Turbine Efficiency to purchase the assets of the company's aviation business, which provides patented technology for Pratt & Whitney's EcoPower engine wash service.

Pratt & Whitney had exclusive rights to use Gas Turbine Efficiency's technology to wash aircraft engines since it launched its EcoPower engine wash service in 2004. With this agreement, Pratt & Whitney will own the intellectual property for the technology as well as other assets associated with Gas Turbine Efficiency's aviation business.

Pratt & Whitney's patented EcoPower engine wash system significantly reduces consumption of fuel, eliminating three pounds of carbon dioxide emissions for every pound of fuel saved, while also decreasing engine gas temperature, thus increasing the amount of time an engine can stay on wing.

Flybe Acquires FlightSafety Simulators

FlightSafety International has been selected by Flybe to provide full flight simulators for the Bombardier Q400 and Embraer E-Jet 170/190 aircraft.

The simulators will be located at the new Flybe Training Academy located at the Exeter International Airport in the United Kingdom. The Bombardier Q400 simulator is scheduled to be installed in the spring of 2011. FlightSafety will provide Flybe with Embraer E-Jet 170/190 training services at its facilities in Amsterdam and at the Paris Le Bourget airport until the new simulator is installed in early 2012.

Flybe and FlightSafety have also entered into a cooperative marketing agreement that will provide other Bombardier Q400 and Embraer E-Jet 170/190 aircraft operators in the region with the opportunity to purchase surplus simulator hours at the Flybe Training Academy.

The simulators will be equipped with FlightSafety's VITAL X Visual System and electric motion and control loading technology. The new Flybe Training Academy facility is scheduled to open in the spring of 2011. It will offer a wide range of Pilot, Technical, Cabin Crew, Customer Service and Aviation Support courses to airlines across the world, as well as a range of non-aviation training to other individuals and organizations.

The facility will include a flight simulator complex, Cabin Door trainers, 25 purpose-built classrooms and an integrated Apprentice workshop that will allow Flybe to offer an increased range of training to third party customers. Flybe is Europe's largest regional airline and the UK's Number One Domestic carrier.

FlightSafety International is the world's premier professional aviation training company and supplier of flight simulators, visual systems and displays to commercial, government and military organizations. The company provides more than a million hours of training each year to pilots, technicians and other aviation professionals from 154 countries and independent territories (see article, page 20).

about people

Business Administration (MBA) degrees from the University of New Mexico.

Dunlop Appoints Hancock as Technical Director

Birmingham-based Dunlop Aircraft Tyres, the world's only specialist aircraft tire company, has appointed **Marcus Hancock** as technical director.

Marcus has 21 years' experience in the tire industry and joins Dunlop from Cooper Tire & Rubber Company Europe, where he was general manager for the company's European Technical Centre with responsibility for overseeing all product development for the region.

Over recent months, Dunlop has expanded its product range with new radial and bias tires for a number of commercial aeroplanes, including the ATR42 and ATR72 regional turboprops as well as the CRJ1000 Next Gen regional jet.

about people

Jean-Paul Ebanga Named New CFM President

Jean-Paul Ebanga has assumed the role of president and chief executive officer of CFM International.

CFM International (CFM), the 50/50 joint company between Snecma (Safran group) and General Electric Company, is headquartered in West Chester, Ohio, near Cincinnati. The two parent companies have extended the 36-year-old partnership agreement to the year 2040.

Mr. Ebanga is replacing Eric Bachelet, who had served as CFM president and CEO since September 2005. Mr. Bachelet has accepted the position of Safran executive vice president of Research and Technology.

Mr. Ebanga joined Snecma in 1988 after leaving Royal Philips. His assignments at Snecma have included leadership positions in electronics, systems and aircraft engine.

In 2001, Mr. Ebanga was named vice president and general manager of Snecma Control Systems. He was subsequently appointed vice president of Snecma's Commercial Engine Division.

Most recently, Mr. Ebanga served as chairman and CEO of PowerJet, a joint company between Snecma and Saturn (Russia). He had held that position since 2007.

Mr. Ebanga is a graduate of the ENSEM Graduate School of Engineering in France

CFM has delivered a total of more than 21,600 CFM56 engines to date, making it one of the most successful aircraft engine suppliers in history. Through December 2010, the company had received firm orders for a total of 27,500 engines.

CIRCOR Selects Florsch as Human Resources Director

CIRCOR Aerospace Products Group has appointed **Michele Florsch** as the Director of Human Resources for the CIRCOR Aerospace France group of businesses.

Michele brings 20 years of experience in Human Resource leadership roles from the Building Industry in France, Germany and Eastern Europe. She will report to CIRCOR Aerospace France General Manager Gilles Genété.

Air New Zealand Expands Boeing 777 Component Program

Boeing, Air France Industries KLM Engineering & Maintenance and Air New Zealand signed an agreement to expand the airline's use of the 777 Component Services Program (CSP), offered jointly by Boeing and Air France Industries KLM Engineering & Maintenance.

After gaining experience with the CSP on its 777-200ER fleet, Air New Zealand is expanding the support for common parts to cover its fleet of 777-300ERs. These parts will be added to the existing 777 CSP agreement. The airline accepted the first of its five 777-300ERs in December 2010.

The program allows airlines to outsource the cost and logistical challenge of keeping important parts on hand. It significantly reduces the airline's up-front investment in spare parts and offers a reliable supply of critical parts. They also benefit by receiving a working component more quickly, rather than having to wait for a completed repair that could ground an airplane.

Thirteen 777 customer airlines participate in the CSP, with a total of 135 aircraft currently operating under the program. The 777 CSP program is offered jointly by Boeing and AFI KLM E&M, who also offer a similar program for Next-Generation 737 models.

Air New Zealand Boeing 777

Martinair Contracts MD-11 Component Support with AFI KLM E&M

Air France Industries (AFI) KLM E&M and Martinair closed a component and brake support agreement for 5 years, covering the Dutch carrier's seven MD-11F freighter aircraft.

AFI KLM E&M recently expanded its repair capability on components for this aircraft type. With this new agreement, which includes the positioning of spares at Amsterdam Airport Schiphol, Martinair can now boost the operational performance of its aircraft and rationalize its logistics chain.

The proximity of the stock of components to Martinair's Amsterdam operational base will also allow the carrier to significantly reduce its costs relative to supplies of spare parts.

A wholly-owned subsidiary of the AFI KLM group, Martinair is a Dutch airline that operates leisure and cargo flights, serving over 50 destinations worldwide from its hub at Amsterdam Airport Schiphol. Air France Industries and KLM Engineering & Maintenance, which joined forces following the Air France KLM merger, are multi-product MRO providers with a joint workforce of over 14,000. AFI KLM E&M supports more than 1,230 aircraft operated by 150 major international airlines.

MD-11 Freighter

URS Delivers Upgraded Bell Helicopters

Dallas Police Bell 206B3

United Rotorcraft Solutions (URS) delivered upgraded Bell 206B3's helicopters to the City of Dallas, TX Police Department.

The upgrades, made possible by a federal grant that was recently awarded to the police department, included BMS digital video microwave system, upgrade of existing L-3 Wescam camera systems and auto-tracking, Avalex digital video recorder upgrades, and AFS engine inlet barrier filters.

URS also installed the downlink equipment for the ground and mobile units and provided training for these systems. The installation of the downlink systems now provide the Dallas PD real-time images to command staff, enhancing efficiency and effectiveness of critical incident management operations.

Tailwind Airlines Signs Contract for B737-400 with Turkish Technic

Turkish Technic signed a "C Check" maintenance services agreement on the Boeing B737-400 with Tailwind Airlines. Maintenance will be conducted at Turkish Technic's facilities in Istanbul, Turkey.

Turkish Technic, an association of Turkish Airlines group companies, is the leading maintenance center in its region, providing technical services for Airframe, Engine, APU and components for a wide range of airlines from Europe, Middle East, CIS, Northern Africa and Turkey, out of its base in Istanbul. It employs a highly qualified and well-trained workforce of 3,000 personnel.

Tailwind Airlnes, based in Istanbul, operates five B737-400 aircraft in its fleet, with full charter and ACMI services to its business partners.

Tailwind's Boeing 737-400

Air Contractors Signs With Sabena technics to Support its ATR Fleet

Air Contractors Limited, the Irish Cargo Operator based in Dublin, has renewed for a period of five years its component full support contract with Sabena technics, a leading independent MRO player, specializing in civil and military aircraft maintenance.

Through this contract, Sabena technics will support Air Contractors' fleet of 16 ATRs (6 ATR 42s and 10 ATR 72s), which undertake cargo operations in Europe. Sabena technics will support Air Contractors via its Integrated services division, dedicated to full support contracts.

Since 2005, Sabena technics has been servicing Air Contractors' ATR fleet from its Dinard site. Services under the renewed contract include component repair and overhaul and pool access.

about people

Michele joins CIRCOR from Meadwestvaco Group, where she was the Director of Human Resources France. Previously, she was the Human Resources Manager EUROPE at Saint-Gobain Abrasive in Paris (High Performance Materials Industry) and at Raab Karcher Baustoffe Gmbh in Frankfurt, the HR Director Group for Germany and East Europe in Building Materials Distribution.

Michele has earned a Master's Degree in Law from the Robert Schumann University in Strasbourg (France). She has also been published in the *International Law Review*, and is certified as an NLP Practitioner and NLP Masters in neurolinguistic programming.

Chromalloy Announces Costa as New RS DER

Chromalloy announced that Claudio Costa, Director of Engineering, has received special delegation from the Federal Aviation Administration (FAA) as a Repair Specification Designated Engineering Representative (RS DER).

Costa reached an important milestone of achievement in successfully meeting all FAA requirements and completing the rigorous RS DER process. The RS DER delegation allows him to approve multiple-use repairs for gas turbine engines, and other key activities.

RS DER-appointed experts have special designation from the FAA to approval serial number specific major repair data, non serial number specific major repair data, and to manage RS approvals.

After a one-year candidacy period, during which Costa demonstrated expertise and ability to the FAA, he received DER appointment from the FAA in 2008. Since that time he has approved more than 40 repairs.

As an FAA-appointed DER for Chromalloy, Costa can approve certain major repairs and major alterations on behalf of the FAA, using technical data submitted by Chromalloy. The company has 13 DER appointed experts and now with Costa's recent additional appointment, has 10 Chromalloy FAA RS DERs who received the FAA expanded authorization.

DER experts ensure the proper evaluation of technical data developed by staff, certify compliance with the FAA guidelines and regulations, and perform compliance tests and inspections.

Costa is based at the company's San Antonio repair and service center. The facility is a FAA-certificated component repair station specializing in turbine engine modules, cases, frames, combustors, disks, shafts and hubs.

Sikorsky and Tata Agree to Make Components in India

The S-92

Sikorsky Aircraft Corp. and Tata Advanced Systems Limited (TASL) signed an agreement creating a joint venture that will manufacture aerospace components for Sikorsky in India, including components for Sikorsky S-92 helicopter cabins.

The joint venture agreement builds upon a long-term contract signed in June 2009 for TASL to assemble S-92 helicopter cabins. Both the joint venture agreement and the cabin assembly contract stem from a Memorandum of Understanding previously signed by the companies to explore the creation of aerospace operations in India.

The cabin assembly contract has led to ongoing construction in Hyderabad, in the state of Andhra Pradesh, where TASL will assemble S-92 helicopter cabins. The new joint venture will be positioned to manufacture components for other aerospace OEMs, as well as detailed parts for the S-92 helicopter cabin.

Northrop Grumman Partners With U.S. Navy to Advance Rotorcraft Development

Northrop Grumman Corporation has partnered with the U.S. Naval Aviation Center for Rotorcraft Advancement (NACRA) to provide its Digital Avionics Suite technology for retrofitting NACRA's UH-1N helicopter as an avionics test bed for future rotary wing hardware and software developments.

Northrop Grumman is supplying NACRA with a stand-alone Digital Avionics Suite and integration support for installing the system in the back of a UH-1N helicopter that has been retired from active service by the U.S. Navy. The Digital Avionics Suite is half of the system currently installed on the AH-1Z helicopter, and will allow test integration with minimal changes to the systems avionics or the aircraft.

The Digital Avionics Suite aboard the retrofitted UH-1N helicopter will include a Northrop Grumman mission computer that allows for easy system upgrades as new technology is developed. Once installation is complete, NACRA will utilize the retrofitted helicopter as an avionics test bed to develop and test new rotorcraft mission hardware and software.

Based at Patuxent River, Md., NACRA was mandated by the U.S. Department of Defense in 2005 and is charged with addressing and improving communication and coordination across the U.S. Navy and Marine Corps rotorcraft community.

NACRA cross-platform initiatives include a common program roadmapping process and cross-platform leveraged efforts, addressing condition-based maintenance and operations in degraded visual environments.

Vector Opens New PT6A Facility in South Africa

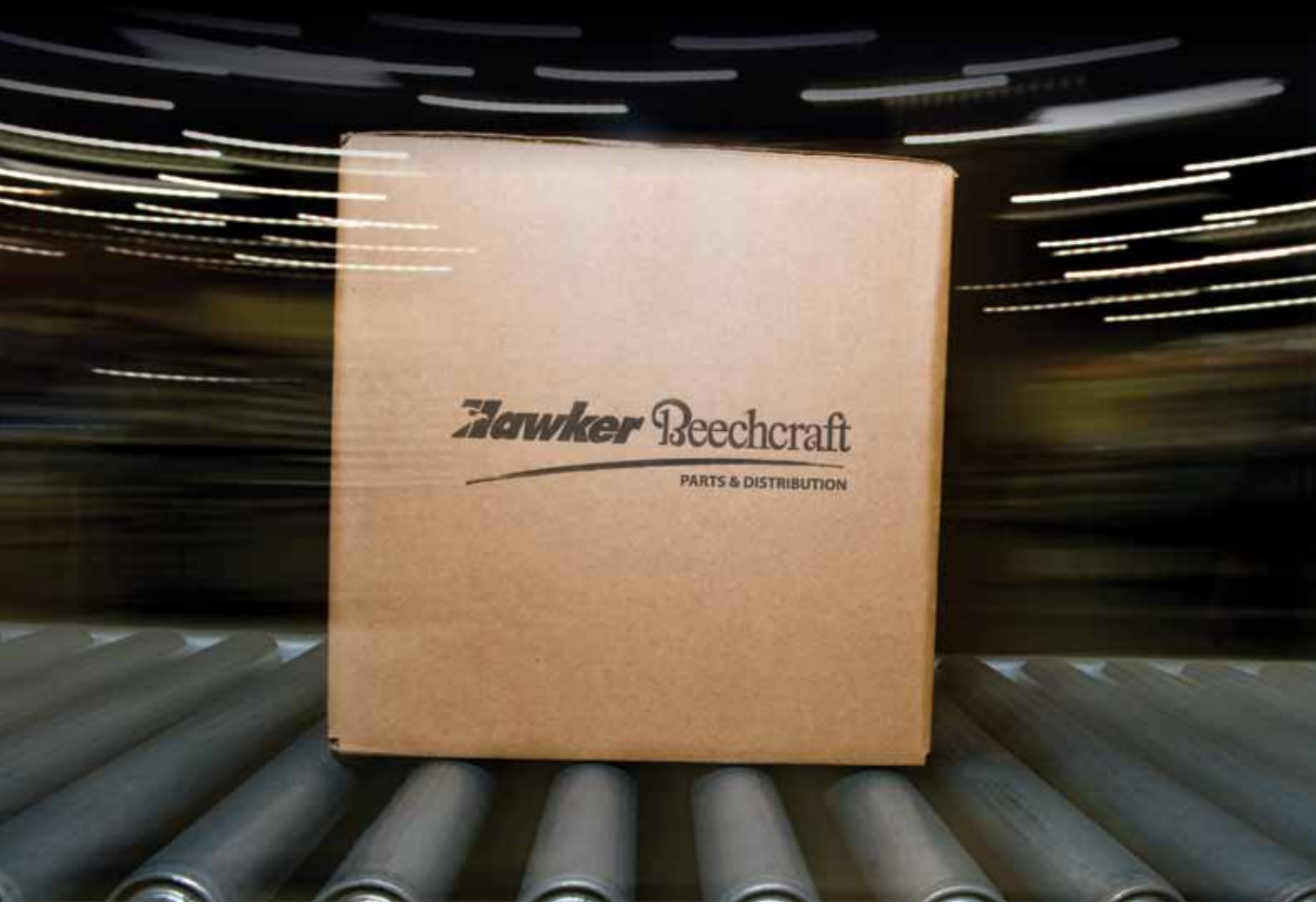
Vector Aerospace has opened a new engine repair, overhaul and test facility in Lanseria, South Africa. The company's expansion into the South African marketplace has been a key component in the company's customer service growth strategy.

Vector's new engine facility will offer operators throughout the region field service and engine repairs on the Pratt & Whitney Canada (P&WC) PT6A, JT15D and PW100 engine series, as well as complete overhaul and test capability for the PT6A engine.

The move reflects the increasing growth opportunities in regions such as Africa, where many leading MRO firms are opening new facilities and outsourcing work. South Africa, in particular, is emerging as a competitor to more mature MRO markets, such as Western Europe. Vector's new facility is located at Hanger 25, Lanseria International Airport, Lanseria.

Intelligence is compiled and written by our editorial staff. If you have any story ideas, press releases or hot tips for this section, please go to our magazine's web site and post them here: **www.avmain-mag.com/cat/press-releases.**
Our staff will review all submissions.

WE'RE NOT JUST HAWKER AND BEECHCRAFT PARTS



FACTORY PARTS AND MORE...

Hawker Beechcraft operators know we have one of the largest inventory levels in the world. But now, we've expanded our extensive selection to include consumable parts for Gulfstream, Cessna, Bombardier, Piper and more. That means you can forget about multiple orders and get back in the air faster than with any other source.

Whether your fleet requires igniters, filters, tires or batteries, you can count on us to deliver all the consumable parts you need. We're available 24/7 with same-day domestic shipping and access to over $500 million of competitively-priced parts inventory worldwide. So rest assured, we've got you covered.

hawkerbeechcraft.com/parts • 888.727.4344 • +1.316.676.3300

GLOBAL CUSTOMER SUPPORT

SupportPLUS™
PARTS & DISTRIBUTION
HAWKER BEECHCRAFT SERVICES
TECHNICAL SUPPORT & PUBLICATIONS

Hawker Beechcraft

JAMES PRATER,

THE DRUMMING DOM

If you're looking for James Prater on a Sunday morning, follow your ears. The pounding pulse of rock 'n' roll drums will lead you to a Calvary Community Church in Lincoln, Nebraska.

"I try to bring a solid rock influence to our music there," Prater says. "As a drummer, I'm a big fan of Metallica and Rush, as well as Christian rock bands like The Newsboys, Casting Crowns, and Mercy Me."

Most other days, you can find James Prater at Duncan Aviation, serving as Airframe Services Manager. "I really see maintenance management as my niche," he tells *Aviation Maintenance* magazine. "Being a mechanic myself, I understand the technical aspects of the work we do. At the same time, I can speak the language of

A Duncan maintenance hangar

Directing an aviation maintenance department is a demanding job, especially as rapid technological change continues to transform the MRO world. We throw the spotlight on a mechanic who epitomizes the new breed of manager.

BY JAMES CARELESS

upper management. This allows me to bridge the gap between two very different worlds. Mechanics tend to think in terms of what's wrong and how to fix it, while managers prefer to focus on what's right and build on it."

Prater has been at Duncan Aviation since 2000, when he started as a Level 2 mechanic on the shop floor. "I grew up with aviation," he says. "My father was always fascinated with airplanes. He kept trying to get his pilot's certificate. He'd take lessons until the money ran out, then pick up it again when he could afford to."

James Prater's father never did get his pilot's certificate. But the time he and his son spent at airports paid off. "I got interested in flying after spending so much time around airplanes, and I always did have a knack for fixing mechanical things," Prater says. "So when it came time to go to college in 1989, I enrolled in LeTourneau University in Longview, Texas. LeTourneau is a private interdenominational Christian college that offers both pilot and aviation maintenance training. Going there allowed me to be qualified in both areas of aviation."

After graduating in 1994, James Prater stayed on at LeTourneau as a flight instructor. Two years later, he changed roles and became the university's assistant director of maintenance. "I'd done a lot of work on our Pipers when I was a student, helping out on major projects during Christmas break and over the summers," Prater says. "It was a busy schedule, because the Pipers and then the Cessnas that replaced them had to be serviced at night so that they could be flown during the day."

In 2000, James Prater left Longview, Texas for a job at Duncan Aviation in Lincoln. "It was a career move and a family move," he says. "I decided to focus my career on aviation maintenance rather than flight, because I didn't want to put my family through a pilot's week-long absences. Working in the shop meant I could come home every night and be there for my wife and kids. That matters to me."

Duncan Aviation attracted him for a few reasons. "First, there was the money," Prater says. "It was better than what a private college could offer, and with a growing family, I needed that. Second, I liked Duncan Aviation as a company. I liked the fact that it was family-owned, that it was a reasonable size, and that they promote from within. At this point in my life I was thinking about my career over the long haul, and Duncan just made sense."

Duncan's Origins in Omaha

Duncan Aviation's history started in 1956, when Donald Duncan purchased a minority stake in

Lang Aviation in Omaha, Nebraska. A few years later, Duncan bought the rest of the shares and renamed the company "Duncan Beechcraft". Eventually the company opened a facility in Lincoln, selling the Omaha shop to the Strategic Air Command.

Today, Duncan Aviation is headed by Duncan's grandson, Todd Duncan. The company has a 440,000 square foot facility in Lincoln, a 325,000 square foot facility in Battle Creek, Michigan, and a 15,000 square foot maintenance hangar in Provo, Utah. The company also operates more than 20 satellite avionics and eight Rapid Response locations in the U.S.

About 2,000 people work for Duncan Aviation. The Lincoln facility where Prater works offers factory-authorized service on Bombardier Challengers (300 and 600 series) and Learjets; Cessna Citation (500/550/560/650/680 models); all models of Dassault Falcon jets; Embraer Legacys and Phenoms (100 and 300); and all Hawker jets. Duncan also performs sales and service for Gulfstream and Astra/Westwind aircraft, plus selected engines made by General Electric, Honeywell, Pratt & Whitney, and Williams Rolls Royce.

Prater spends considerable time on the shop floor. He considers himself an adherent of "leadership by walking around".

"Our company is organized around specialties," says James Prater. "For instance, I run the 170-person airframe department, while engines are handled by someone else. Within my department, I have teams of people who focus on specific aircraft and particular systems. The idea is that when someone hires us to work on their Falcon, the work will be done by professionals who spend 85-90 percent of their time working on this specific aircraft make. This builds expertise and familiarity with the technology, and provides our customers with a better product."

Duncan Aviation also speeds up the MRO process by making sure that certain people are dedicated to supplying the right tools and parts to the A&Ps on the floor.

"Rather than walking half a mile to get a component, an A&P can just order it electronically and have it delivered to them," Prater says. "This saves us time, which saves the customer money. It also improves inventory management, since part and tool distribution is centrally controlled."

JAMES PRATER: VITAL STATISTICS

Date of birth:	09/18/1970
Place of birth:	Port-au-Prince, Haiti. (His parents were Christian missionaries)
Current residence:	Lincoln, Nebraska
Wife:	Patti Prater; they met in Prescott, AZ. High school sweetheart and wife of 18 years.
Children:	Two daughters. Kayla 13 (viola and percussion); McKenna 9 (swimmer).
College degree:	Bachelor of Science Aviation Technology (includes A&P and flight through CFI).
Hobbies:	Drumming, hiking, camping, water sports, remodeling/handyman work. He has played the drums since he was 14.
Most memorable drum gig:	Christmas with Calvary (live band for a Christmas drama production). "Memorable because of the variety of musical styles in our 10 song set, and because of the precision demanded to present a professional performance."
Most memorable repair job:	Structural welding repair to the truss structure empennage of a Citabria model 7GCAA. "Not too many get the opportunity to weld an airplane back together."

Rising Up The Ranks

James Prater has worked up to where he is today, rising from a Level 2 mechanic to a Level 3, then serving as the shop's maintenance scheduler and assistant manager. He became airframe manager in 2006. Because of this career arc, he has developed a well-informed view not only of what goes on at Duncan, but the best ways to get it done.

"My philosophy of management is to take care of the people you have — educate and develop them — and in turn they will take care of the business for you," he says. "As well, I am a big believer in 'leadership by walking around'. I am out on the shop floor as much as possible, seeing what is being done and doing what I can to direct, advise and help my people. I also try to get to know them personally, and express my appreciation for all the things they do right. This matters to employees; I know that it always mattered to me."

That said, Prater is keenly aware that he is now a manager, not a mechanic. "Being in an office means you lose a bit of the knack you had for getting things fixed," he observes. "This is why my people are so important to me. They are now the front line of our expertise. I'm here to deploy their knowledge, but they are the ones who make the difference."

Looking ahead, Prater's ambition is to keep moving up the corporate ladder at Duncan Aviation. "I'd like to go into senior management," he confides. "I think with my experience and my ability to bridge the mechanic/management gap, I could bring some real benefits to this company."

He also wants to enhance Duncan's efforts in balancing the customer's desire for the fastest, most inexpensive repairs with the company's standards of safety and reliability. "It is possible to do things better without compromising standards — having parts and tools delivered to the work site is one such solution," he says. "But there are other solutions still waiting to be discovered that can advance this balance further, and I want to be a part of finding them."

Meanwhile, he remains a well-rounded person with passions outside of aviation. "I'd also like to spend some more time on my drums," he says. "I really enjoy playing in church, especially because my daughter — who plays viola and percussion — is now up there with me. Christian rock 'n' roll is great stuff. And if I can work in a few Metallica riffs into Sunday morning, so much the better!" AM

James Careless is a contributing editor: jamesc@tjtdesign.com

MRO TRAINING: THE FUTURE IS NOW

As the global aviation industry clamors for more proficient mechanics, one company continues to set the standard: FlightSafety International (FSI). Our editor visited FSI, to witness the company's latest training techniques.

BY JOHN PERSINOS,
REPORTING FROM WEST PALM BEACH, FLORIDA

A bumper sticker on the wall of a repair room at the FlightSafety International Learning Center conveys it all: "The Future is Composites".

Fred Banke, FSI's Director of Maintenance Training, notices that I'm peering at the bumper sticker and he chuckles. "You know when that thing went up on the wall? Way back in 1988. Look how far composites have come since then. Now, Boeing and Airbus are making whole fuselages out of composites. That's our job: to get ready for the future."

FSI has been in the vanguard of flight and MRO training since it was founded in 1951. I recently visited FSI's operation in Florida, to experience its latest methods to train mechanics. If you want to see the future of mechanic training, come to these sprawling facilities in West Palm Beach.

One of the biggest trends that FSI is taking into account is the increasing pervasiveness of composites — and the pressing need to keep mechanics up to speed on their repair. When it comes to composites, Banke knows what he's talking about. He doubles as FSI's Composite Program Manager.

Left: *FSI's interactive Ground Flight Simulator (GFS).*
Above: *FSI's composite repair room*

He started working on composites in 1968, repairing radomes in the Gulf of Tonkin while serving with the U.S. Navy during the Vietnam War. He also serves as a composite consultant for NASA.

Banke notes that one of the biggest challenges in FSI's training is keeping mechanics knowledgeable about MRO techniques for composites. "There's a huge knowledge gap," he lamented.

The sweeping transition to composites is profoundly affecting the MRO sector; it's up to places such as FSI to help mechanics keep pace. Worldwide aerospace composites manufacturing is a roughly $10 billion-a-year industry. InterFlight Global, an aerospace consulting firm based in Miami, reports that the aerospace composite market is on track to reach $50 billion annually by 2018.

Broadly defined, composite materials represent the combination of inherently dissimilar materials, usually involving carbon, to form a strengthened combination. Composites offer significant performance benefits, including reduced overall weight, improved fuel burn, and better resistance against damage.

A significant benefit of composites is the ability to create complex one-piece shapes with multiple compound curves, while maintaining a very smooth aerodynamic surface, with no rivet heads or seams. Lack of corrosion is another advantage, leading to reductions in maintenance costs, especially in transport category aircraft as they age. FSI teaches advanced

An S-76 helicopter used for training mechanics

courses in composite repair — it's the Harvard graduate school, if you will, for these space-age materials.

Futuristic Cockpits, Old School Mechanics

An additional challenge at FSI is the urgent need to train mechanics in the increasingly sophisticated art of avionics repair.

Todd Johnson, S-92 Avionics/Electrical Instructor, said that many older generation mechanics don't want anything to do with digital cockpits. "We're dragging them into these classes, kicking and screaming," he says. "Some mechanics find the digitization of the cockpit to be intimidating. But once they get into it, they usually discover that they like it."

Johnson says that mechanics these days are racing to catch-up with fast-moving avionics technology. The trend toward glass cockpits is forcing them to grapple with complex electronics that seem alien to a previous generation accustomed to gauges.

FSI helps them get acclimated by putting them into Ground Flight Simulators (GFS), which allow mechanics to throw switches, see schematics and get a feel for how today's complex avionics work. FSI also uses an interactive training technique it calls "Matrix", which integrates students with their own computer terminals and on-screen presentations.

GSF makes it possible for mechanics to trouble-shoot avionics systems, which is valuable training because, as Banke puts it, "electrical engineers aren't always available" to assist mechanics on repair jobs.

Perhaps most importantly, FSI keeps functioning aircraft on the premises, which enables mechanics to roll up their sleeves and actually work on the real thing. "Being able to work on aircraft is important," Johnson says. "It's better than just sitting in a classroom."

FSI is the exclusive training partner with Sikorsky; it is the helicopter manufacturer's only OEM-approved trainer. As such, Sikorsky keeps FSI supplied with real working helicopters for training purposes. That's a pricey investment, but then again, it's in Sikorsky's enlightened self-interest to make sure the mechanics of the world can properly fix its multi-million-dollar helicopters. "Working on the real thing is better than pushing theory, theory, theory all day," Banke says.

For FSI, a big part of the "real world" is lots of red tape. Michelle Griffin, S-76 Maintenance Instructor and Maintenance Department Quality Coordinator, reveals that FSI must continually stay on top of demands from the world's regulatory bodies. "A constant flow of audits comes through here," Griffin says. "These countries are always auditing FlightSafety."

The bewildering amount of bureaucratic hurdles, she says, keeps FlightSafety on its toes. Whether it's the FAA, the European Aviation Safety Agency (EASA), Transport Canada, the Australian Civil Aviation Safety Authority (CASA), or any of a host of other oversight agencies, FlightSafety must comply with their particular rules.

"The regulations don't just change every year," Johnson says. "They change month by month. We not only need to comply with the rules as they now exist, but we must also anticipate how they will change." He adds, though, that the regulatory scrutiny is a good thing. "It's an effective reality check," he says. "It keeps us rigorous."

A Mix of Students

FSI receives a diverse mix of students from around the world. Moreover, delegations of foreign visitors, from OEMs and regulatory

bodies, are common sights. Johnson observes that as an instructor, one of his biggest challenges is the language barrier. "Not all of our students can speak English, which can be frustrating," he says. "And not every customer is willing to hire a translator."

Banke emphasizes that the explosive growth of aviation in certain regional hot spots — notably China, Brazil and Asia — is fueling demand for FSI's services. The fact is, FSI is the "gold standard" when it comes to aviator and mechanic training. And demand for its high-quality services shows now signs of abating.

FSI is the largest owner/operator of simulators in the world. Through its 42 learning centers in the United States, Europe and China, FSI annually trains over 65,000 pilots and maintenance technicians.

Roughly 1,500 mechanics are trained at FSI's West Palm Beach facility every year. "When I started here in 1986, we had five MRO instructors on staff," Banke points out. "Today, we have 20, including myself."

Banke also notes that the push for fuel-efficient engines has made powerplants all the more complicated, which in turn propels the need for more intensive mechanic training for engines.

During my guided tour of the Florida facility, Banke points to a Pratt & Whitney engine bolted onto a viewing stand, with its guts exposed. Surrounding the engine are laptops and a flat-screen television, creating a cocoon of interactive training for students. It all obviates the need for paper manuals, which are increasingly becoming obsolete.

Starting in September 2010, FSI took on the role of global maintenance training provider for Pratt & Whitney Canada (P&WC), both for P&WC's customers and employees. Under the agreement, FlightSafety manages daily training operations, develops and produces courseware material and provides learning management system capabilities, while P&WC oversees the global customer-training program.

FSI allowed me to sit in a maintenance class. Aside from me, the only occupants of the classroom were five students and one earnest, middle-aged instructor sporting a gray ponytail. For a more intensive learning experience, the company keeps all class sizes to 10 or fewer students.

I also flew in an S-70 flight simulator, the realism of which was astounding. The same realism is evident in FSI's GFS mechanic-training consoles. Advanced computer graphic technology pioneered by Hollywood and video games is making its way into FSI's training machines, culminating in 3-D "virtual reality" teaching environments.

Through its simulators and a multitude of other ways, FlightSafety International is using tomorrow's technology, today. AM

John Persinos is editor-in-chief of the magazine: jpersinos@aerospace-media.com

PHI's Bell 407 taking off

HELICOPTER MRO ACHIEVES VERTICAL LIFT

Increased growth and the tackling of deferred maintenance are in the cards for the helicopter market in 2011

BY DOUGLAS NELMS

The global helicopter market appears to be coming out of a two-year hiatus. That's a relief for the beleaguered rotorcraft-related MRO sector. However, pockets of concern continue to linger. With an eye towards Heli-Expo 2011, here's a look at the prospects of both the civil and military sectors in the coming year.

First, the good news. After getting knocked on its heels by the 2008-09 recession, the civil helicopter market appears to be riding the economic recovery to slow but steady growth. That said, it still has a ways to go, before returning to the boom years between 2003 and 2008, when the industry's Compounded Annual Growth Rate (CAGR) reached 17.5 percent.

According to an OAG/AeroStrategy study, 2011 is expected to see last year's worldwide fleet of 25,308 active civil helicopters growing slightly, but increasing to more than 29,000 by 2015. The largest fleet will be in the United States, with Latin American showing the most growth with a CAGR of 4.6 percent.

Richard Aboulafia, vice president of analysis for the Teal Group, said that assuming a still weak economy through this year, real growth in the civil market will start in 2012, and reach its 2008 peak by 2015.

As for the introduction of new helicopters into the fleet, Aboulafia said that a total production of 15,459 aircraft worth $174.6 billion is expected between last year and 2019. That includes 8,917 helicopters for the civil market, worth $42.9 billion, plus 6,542 helicopters worth $131.7 billion for the military.

Based on the entry of new aircraft into the fleet and the need for operators to catch up on maintenance that was reduced or delayed during the recent downturn, the helicopter MRO market is expected to grow at a somewhat faster rate.

The bad news depends on whether you're an operator paying for the maintenance or an MRO outfit providing it. Last year, the combined civil/military helicopter market required $5.34 billion in maintenance, with that figure expected to grow to just over $6 billion next year, then to about $7.2 billion in 2015 and to over $8 billion by 2020.

Michael Howard, a consultant with AeroStrategy, an aviation management consulting group, said that North America, with 35 percent of the fleet in 2010, accounted for 32 percent of that $5.34 billion in MRO work. Africa was the smallest, with 5 percent of both the fleet and MRO efforts.

Howard said that there should be a fairly rapid growth rate in MRO work this year and next as operators who had deferred maintenance, particularly engine overhauls, return to flying pre-2009 levels. The growth in MRO requirements "will be getting back to the pre-2008 levels toward the end of this year, and then that growth will kind of moderate toward the middle of the decade toward a more reasonable growth path."

The biggest decline in flying during the recession was in the corporate, air taxi and charter industries where there was discretionary flying, Howard said. Corporate flying will lag for a bit longer, although there is still flying in that area. "Companies are healthier now than they were two years ago when there was a big push to reduce that sort of spending," he said.

The air medical sector is showing growth and will continue, although not as strong as in recent years. On the federal, state and local government side, budgets have been cut, particularly at the local level. "But that said, some of the federal government stuff, such as border patrol or drug interdiction is still pretty strong. The mind set for helicopters, particularly for Homeland Defense, is also strong," Howard said.

The oil and gas industry also is expected to be strong, with the uncertainty of deep-water drilling in the Gulf of Mexico being replaced by new areas of exploration such as Brazil.

The upshot: over the near term — the next five to 10 years — there will be moderate growth in the helicopter fleet and helicopter operations, resulting in a growing need for helicopter maintenance.

HAI "HUMS" a New Tune

The real crux of the matter is the increasing emphasis on costs. The economy may not be as bad as it was…but it still ain't great.

One way of reducing MRO costs is not so much reducing the "parts and labor" aspects of maintenance, but by reducing the requirement for maintenance.

The Helicopter Association International (HAI) holds its annual helicopter convention, Heli-Expo 2011, in Orlando, March 5-8. A major initiative of HAI this year will be working with the FAA on a grant that looks at the whole issue of how helicopters are maintained. This particularly involves the bases for significantly extending parts TBOs, or moving from maintenance based on flight hours or cycles to on-condition maintenance, according to Harold Summers, HAI director, flight operations and technical services.

The foundation of the initiative is using Health and Usage Monitoring Systems (HUMS) to determine the stress levels on helicopter components. Summers said that rather than focusing on the Health part of HUMS, which shows what parts require maintenance, it focuses on the Usage part, showing how the aircraft is actually being used and what loads are going into it.

"Using that data, which you can translate to the amount of fatigue going into the parts, you can extend the life of a part. It's just an overhaul cycle, but it extends the retirement life of the part," he said.

Summers noted that several years ago, an FAA/NASA funded trial on HUMS was conducted in the Gulf of Mexico with full HUMS mounted in a Bell 412. The trial was later extended to Atlanta during the 1996 summer Olympics held in that city. This provided data from both long-haul and short-haul flights.

"From the usage portion, the FAA developed an advisory circular on how to read usage," Summers said. "However, that advisory circular, and the procedures in it, have not been validated. So the rotorcraft directorate out of Fort Worth has funded a program through the FAA Technical Center in Atlantic City to validate the HUMS usage."

One finding from the trial in the Gulf was that pilots could extend the life of the swashplate support by 60 percent, simply by reducing approach speeds to the rigs by five to 10 knots. Because of the summer heat, the pilots were flying to the rigs at high altitudes where it was cool, then dropping down fast. "On approach they were bumping against VNE. When you do that, the loads turn up fast," Summers said. "The question was whether we could increase the other parts by 100 to 200 percent."

HAI became involved in the validation program after the FAA Tech Center approached the association and asked if they would participate, "which we happily said we would do."

As part of the validation program, FAA also is working with the U.S. Army at Huntsville, Ala. and Lakehurst, N.J., and with Sikorsky. "They have equipped a Black Hawk with a HUMS that the Technical Center has, and are going to be doing scripted flights with that," he said.

Summers said that while HUMS has become a major part of the civilian fleet ever since it became mandatory in North Sea operations, "it was done for the safety side of the equation, the Health side, not the Usage side."

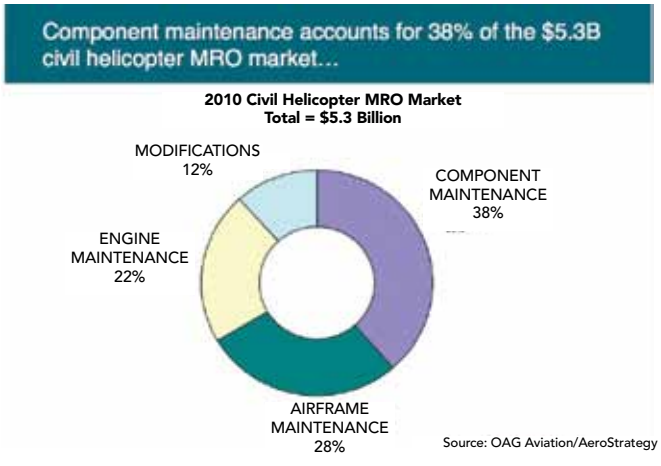
Sikorsky said that it has already started being able to establish on-condition requirements as a result of tracking the Usage part of HUMS.

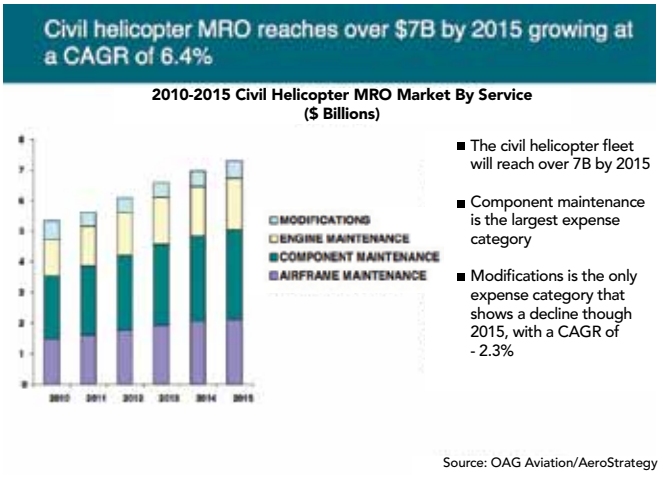
Peter Cutler, director, Sikorsky Aerospace Services (SAS) analytics and technology, said that all commercial Sikorsky helicopters are now delivered with HUMS, and that it has been standard on the S-92 since the first aircraft went out in 2004.

Packaged Products/Total Solutions

This does not mean the "parts and labor" side of MRO efforts is being ignored. With maintenance being a major item in the "expenditures" column of the spread sheet, and the "revenue" side being minimal, operators are looking for ways to reduce the outflow. This includes hanging on to legacy aircraft while demanding — and receiving — cost reduction on their maintenance needs while still striving to maintain required safety standards.

"We believe that more than ever operators will be incentivized to save money wherever they can," said Lee Benson, CEO and President of Able Aerospace Services, a major international MRO provider. "If their mission profile can be met by legacy or older aircraft through lower maintenance solutions as opposed to buying a new aircraft, they are going to do that."





The air medical market is showing growth, propelling the need to tackle the deferred maintenance of its helicopter fleet.

He noted that new helicopter prices are increasing, "and if the older aircraft can meet the mission profile at a much lower cost, it is going to significantly limit the number of new aircraft that are going to be sold."

Both operators and maintenance providers will have to find value driven solutions "that lowers costs overall, to think out of the box."

As a result of the economic need to hang on to legacy helicopters, operators will be reducing their own in-house maintenance shops and looking at MRO providers who can provide complete, whole package solutions, he said. When maintenance is done in-house, it is being paid for whether the operator needs it or not, "so they will be shifting to people who will provide it and only cost the operator money when it is provided."

When the MRO requirements are outsourced, it will be to total maintenance solution providers with value driven maintenance solutions. "This includes spares and the availability of repairs," he said.

Benson cited the example of Louisiana-based helicopter operator Petroleum Helicopters Inc. (PHI), with whom Able is developing a maintenance solution package. "We saved them over $1 million in 2010 because of the maintenance solutions we have," he said. "So now what we are doing in partnership with PHI is going through virtually every thing they are doing on the maintenance side and coming up with a package that will save them significantly more money in 2011 and going forward."

A major portion of the cost savings package is the use of PMA parts, he said. "We believe more and more people are accepting more and more PMA parts and repair parts as safe because they absolutely are, and the record of safety speaks for itself," he said.

Benson noted that when the FAA approves an aircraft that will fly in civil airspace, it is typically approved as a single unit. However, he added, "when FAA looks at PMA parts or repaired parts that maintenance providers put together, they are approving these components on an individual basis. So in our view, the safety factor is much higher and better with PMA and repairs."

There also are significant savings in the use of repaired parts rather than just replacing OEM parts. While providers world-wide may be able to handle standard overhauls using OEM parts, many only have limited capability to do repairs.

"What we are finding is that even though the labor costs are much lower in other countries for doing this kind of work, the work still comes back to Able because we develop repairs that can save components for a fraction of the cost," he said. "One example is a transmission case that costs $38,000. We fix them on the average for about $4,000, developing repairs in a very safe fashion that has been approved by the FAA."

Another example, he said, was development of the lead/lag bearings connecting the blade to the hub on the Bell 407. These are bearings that had only been available from the OEM. "We are now PMA'ing that part, and PHI said that over the next 24 months, they anticipate saving over $500,000 for that one part," he said.

Part of the savings comes not only from the part being cheaper, but also by increasing the TBO of the part. The bearings currently need to be replaced every 1,200 hours, while the rotor hub itself only needs to be replaced every 2,500 hours.

"By PMAing those bearings, not only is it going to be cheaper, but we think that we will be able to extend the service life," he said. "We're hoping that we can extend the service life so that the bearings won't need to be replaced until 2,500 hours along with the rest of the hub."

Robert Desrosiers, director of materials for PHI, said his company "has a number of initiatives to cut costs across the board," including increasing its focus on competitive bidding through RFPs and targeting companies such as Able "on specific items that are fast moving and expensive through the OEMs."

PHI currently has bases extending from Texas to Alabama, moving as many as 10,000 passengers a month out of some of those bases. It is preparing to move to new markets outside the United States, considering the impact of the recent oil spill in the Gulf on deep water drilling. While restrictions on deep water drilling were recently eased, companies such as PHI that are primarily based in the U.S. are expanding their international operations, looking at rapidly growing markets such as Brazil, Asia/Australia and off the coast of Africa.

"That is going to have an impact on logistics maintenance in the helicopter industry," Desrosiers said. With the increased MRO capacity available because of the downturn in the economy, PHI will be "going out and pushing for more competitive bids for the maintenance work."

Needless to say, the OEMs are not just standing around letting the independent MRO providers scrape the cream off the top. For one thing, the OEMs dropped their prices during the recession and slowed their spares lines to maintain market share. Nonetheless, "you're going to see that come back pretty strong as the OEMs see an increased demand for spare parts," said Howard.

The OEMs also are developing programs designed to keep them competitive in providing MRO services.

Danny Maldonado, senior vice president, customer support and chief services officer for Bell Helicopter Textron, said that Bell has several initiatives aimed at reducing maintenance costs for their customers.

He noted that Bell has kept its prices minimal because "we understand where the market place is today." Along with that, Bell started a program last year that reduced direct maintenance costs on the 407 by removing some of the fatigue life on several components on the aircraft. This allowed a cost reduction of an average 15 percent on a per hour basis.

Now Bell is "looking at all of our different models where we can do that. That's one of our main focuses. Reducing the costs of maintenance like we did on the 407 is going to be a key focus for this year and next year as we look at other models," he said.

Other action includes introduction of a new upgrade kit for the Bell 206L1 and L3 to modify them, converting them to the L4. "What that does for the customer is to standardize the spares, the training and the maintenance so that it helps them lower their costs and they can continue to fly not just the legacy fleets, but new products," Maldonado said.

Bell has established a legacy support team aimed at focusing on the legacy fleet by sourcing differently, finding new ways to support the products and improving the life of the components.

Safety Sense

While the need to cut costs is a major issue within the helicopter maintenance industry, it's also a concern of the helicopter safety community, according to Keith Johnson, safety program manger for the Airborne Law Enforcement Association. He also chairs the International Helicopter Safety Team (IHST) Safety Management Committee.

"When money is tight, the two things that always get cut first, or at least rolled back a little, are maintenance and training," Johnson said. "These are discretionary things where they can actually save hard dollars. Unfortunately, that is being penny wise and pound foolish, because eventually that comes back to haunt you."

The biggest problem is lack of oversight, he said. While there are very specific FAA maintenance guidelines that are published for each aircraft type, the vast majority of helicopter operations are done under Part 91, general aviation. "There is nobody there to ensure the operators are actually complying with those guidelines," he said.

Unlike Part 121 or Part 135 operations, there is no specific monitoring of Part 91 operators' maintenance procedures. "Unless there is an accident, FAA doesn't get involved with the operator at all. Obviously, the FAA has struggled with that for many years, but they are not really in any position to resolve it," Johnson said.

The Military Sector: Still Strong

The rotorcraft military market has remained strong, and is expected to get stronger over the next four to five years. This is primarily because of the activities in Iraq and Afghanistan, which are "very rotary wing centric types of operations. They are flying their helicopters probably to over-capacity," Howard said. "If you look at a lot of suppliers who are involved in those markets, they've seen their business remain strong or grow in the military market."

A Teal Group World Rotorcraft Overview, published in August 2010, showed the military market climbing into the $150 billion range by 2013-2015, then dropping slightly to just over $120 billion in 2017. Aboulafia said the military market will "hit a new high plateau by 2013," with the drivers being aging, worn-out fleets and "the great importance of force mobility for almost every conceivable military mission."

The total rotorcraft market was dominated by military helicopters in 2010. Military transport helicopters accounted for 42.8 percent of the business worth $5.9 billion, compared to only 23.8 percent for civil rotorcraft. Scout/Attack helicopters were third, with 13.1 percent worth $1.8 billion.

However, there is a certain amount of uncertainty in what the military calls "sustainability", which means keeping the aircraft flying and training mechanics. For the U.S. military, outsourcing of MRO work on military aircraft currently was about 27 percent of the $38 billion spent on sustainment, according to an AeroStrategy study conducted in September 2010. For the past decade, "the pendulum has been swinging toward outsourcing," the report said. However, "prompted by tightening budgets and pressure to reduce maintenance expenses, DoD is reconsidering its approach to military aircraft sustainment."

The report also noted that the United Kingdom has the highest level of MRO outsourcing for military aircraft at 100 percent, followed by Greece at 97 percent and Germany with 72 percent.

In 2009, global military forces spent a total of $85 billion on sustainability for both fixed and rotary wing aircraft. Of that $85 billion, field maintenance accounted for 32 percent, airframe MRO was 15 percent, component MRO was 12 percent and engine MRO was 10 percent.

The U.S. military's $38 billion accounted for 47 percent of that $85 billion, followed by Europe with 24 percent, Asia/Pacific with 17 percent, Middle East with 10 percent and Latin America with 2 percent.

The $85 billion spent on "sustainability" compares to only about $30 billion spent on procurement. It is this "tooth and tail" ratio that is causing governments to look at ways to get sustainment spending more in line with procurement spending, with "tooth" being the assets and "tail" being the sustainment.

In a May 8, 2010 speech, Secretary of Defense Robert Gates stated that the rapid rate of spending for the military is over, that the "gusher [of defense spending] has been turned off and will stay off for a good period of time." Gates said he was "directing the military services to take a hard, unsparing look at how they operate," with the goal being "to cut our overhead costs and to transfer those savings to force structure and modernization within the programmed budget."

The "Big Five" OEMs of military rotorcraft — AgustaWestland, Bell, Boeing, Eurocopter and Sikorsky — are paying attention to this new mandate on their military customer and using lessons learned on the civil side to cut costs to the military. Other smaller but nonetheless very significant OEMs, such as MD Helicopters and Kaman, are paying attention as well. (This list does not include Eastern European and Russian OEMs.)

As on the civil side, major steps in cutting those costs include moving from hours-flown to on-condition maintenance, or extension of service lives for parts, as well as having the parts where they are needed.

"For the military, it's up-tempo, it's speed, and how we fix the product very quickly and get it back in the air," said Bell's Maldonado. "It helps lower costs and helps lower their personnel. They fly different missions from different locations around the world, so having our people on the ground with them makes a big difference. What [the helicopter OEMs] might have been doing in the past may not be where they are going in the future." AM

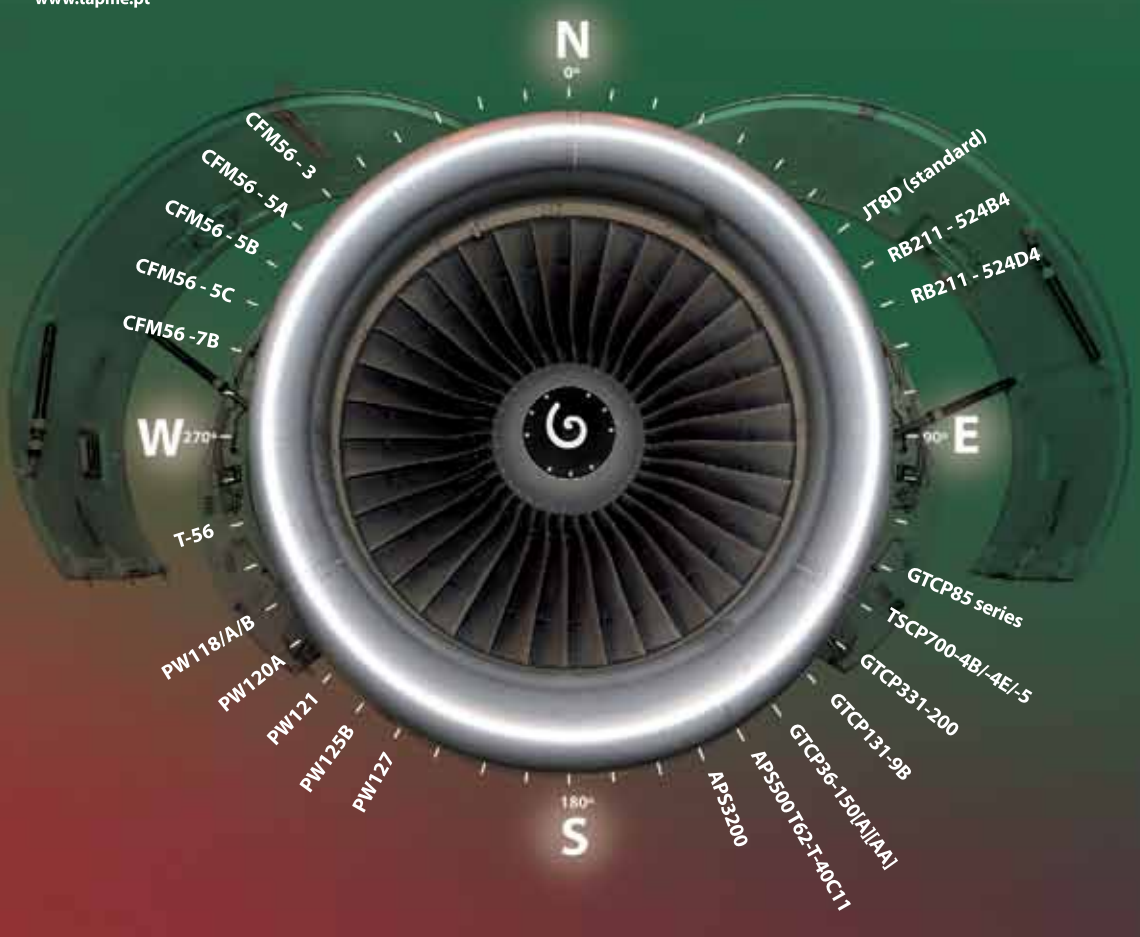
Douglas Nelms is a contributing editor. He's also a U.S. Army veteran and high-time helicopter pilot: dwnelms@msn.com

TAP MAINTENANCE & ENGINEERING

Oriented to Excellence in Engine and APU Maintenance.

TAP Maintenance & Engineering has kept its course for more than 40 years, building up experience in commercial and military aircraft engine maintenance and APUs. The Company incorporates two Overhaul Centers and highly qualified Technicians with a remarkable background in operating, troubleshooting and repairing several types of engines. With an Overhaul Engine Center located in Lisbon, Portugal, and a Turbo-prop Engine and APU Center in Porto Alegre, Brazil, the Company provides its Customers with a full list of tailored services and on site field teams.

FOR MORE INFORMATION ABOUT OUR SERVICES:
marketing.me@tap.pt
www.tapme.pt



Fluor

Pictured: an AFI KLM E&M warehouse. The Air France/KLM merger expedited the consolidation and enhancement of the two airlines' supply chains.

GLOBAL REACH

WE LIVE IN AN AGE OF EVER-LENGTHENING SUPPLY CHAINS, AS MROS EXTEND THEIR OPERATIONS TO THE FARTHEST REACHES OF THE GLOBE.

BY JAMES CARELESS

As with any chain, supply lines are only as good as their weakest links. That's why MROs are stepping up efforts to effectively manage and bolster these systems from end to end. Their goal: to ensure efficient, cost-effective and reliable parts provision throughout their service networks — and to minimize the chance of any link breaking. Here's how they're doing it.

Define Demand

The basis of any effective management system is planning, and good planning is borne of solid market intelligence and analysis.

"The starting point is to define demand," says Felix Ammann, SVP of procurement and material services with SR Technics. "This comes out of historical data and a review of the planned and required overhaul and maintenance programs for customers and our inventory parts."

An accurate and comprehensive "demand definition" drives the plan. When it comes to supply chain requirements, "we need to look at the availability of either

parts, or materials to repair a part," Ammann says. "This is ordered through procurement and then, once received, it goes to the respective shop. In the case of additional inventory, this may be delivered to our line stations or the main hubs for the airlines we service, depending on the need in that location." In either instance, it's the demand that drives the plan that keeps the supply chain managed and running.

Derive Effective Systems from the Plan

There is strategy, and then there are tactics. Strategy defines the broad goals; tactics define the specific actions that will bring the goals within reach.

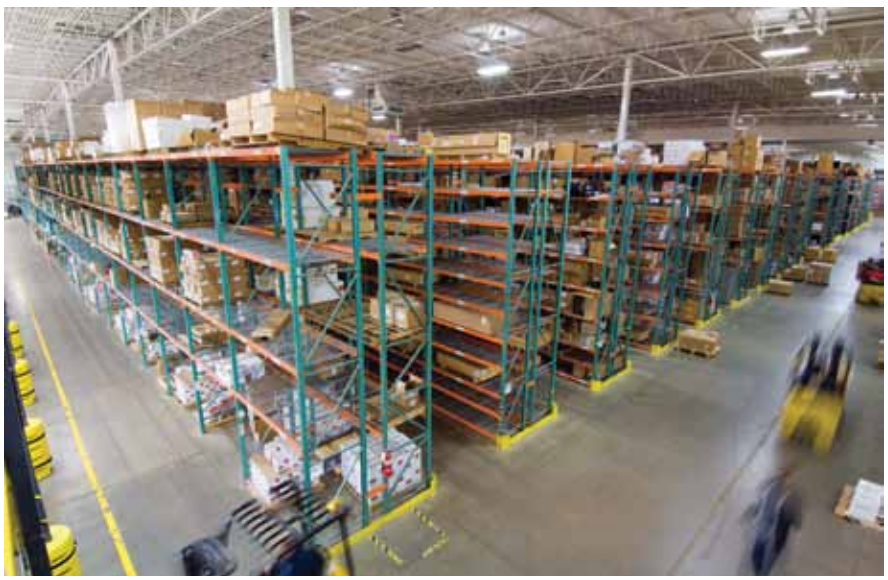
In the MRO supply chain, the plan is the strategy, and the systems derived from it are the tactics. The more completely the tactics translate the plan's strategy into action, the more successful the supply chain will be.

Not surprisingly, leading MROs focus on devising comprehensive supply chain systems. At StandardAero, for instance, "We utilize a variety of systems throughout our business to ensure we have the right parts and the right time in each of our shops," says StandardAero COO Jack Lawless. "Based upon our specific business, we may utilize consignment systems all the way up to advanced planning and inventory optimization software to get parts on order 12 to 18 months in advance of our need date in some of the more complex parts of our business."

Jet Aviation employs an integrated Enterprise Resource Planning (ERP) system to manage its supply chain, says Arne Guzzoni, Jet Aviation St. Louis' VP of supply chain management. Jet Aviation's ERP includes "a requestor for material functionality which, thanks to earliest state date planning activities, ensures that upfront material orders are preloaded with the 'request to dock' date enabling supply chain critical planning, picking and dispatch time," he says.

Greenwich AeroGroup is following a similar course. "We have now completed the deployment of a common ERP platform in all three of our MROs that allow us to have an overall view of availability from a parts perspective," says Walter W. Johns, the company's parts and logistics manager (Western Aircraft). "Integrated maintenance and inventory management platforms allow our operations across the country to better know their customers' demand, understand their needs and anticipate and plan for future supply requests."

Another option for MROs is to outsource supply chain management



Aviall, a Boeing subsidiary, is one of the top global distributors of commercial and aftermarket aircraft components. It is a pioneer in developing efficient supply chains, as reflected by this high-tech storage facility.

At SR Technics, the MRO supply chain plan is driven by an accurate and comprehensive understanding of the demand for parts and components.

to a third-party firm such as CEVA Logistics. "We offer a full range of services to support not just transportation, but the entire supply chain," says Mike Stephens, the company's director of aerospace. "We also perform a variety of services for our aviation clients, including material receipt, kitting, inspection, and transportation. And we do this on a 24/7 basis reinforced by a money-back guarantee. Quite frankly, we do whatever it takes to get parts to our clients."

Keep Improving the Processes

Whether an MRO manages its own supply chain or outsources it to another company, one thing is certain: Processes must be reviewed and improved on a constant basis.

At Aviall, "We continually analyze our processes in critical areas to identify opportunities to improve efficiency and effectiveness," says Ed Dolanski, Aviall's EVP and COO. "We are exploring different technological solutions, both within Aviall and with our suppliers and customers, to enable additional step function improvements. We are also enhancing our industry leading forecasting techniques to more accurately predict customer demand while reducing variability."

Air France Industries and KLM Engineering & Maintenance (AFI KLM E&M) took advantage of the Air France/KLM merger to consolidate and enhance the two airlines' supply chains. These resulting improvements include access to "the cargo resources of the group," says Emmanuel Lazaroo, AFI KLM E&M's business development manager for component services.

Consolidation has also given AFI KLM E&M increased buying power with suppliers: "New contracts and renewals [are being] formulated for the benefit of both," he says, "taking advantage of the best agreements obtained by each company."

Lufthansa Technik is improving its supply chain management through information technology (IT). "We are doing whatever we can to extend IT integration internally and with our suppliers, using electronic ordering, billing and inventory tracking," says Jörg Asbrand, the company's director of corporate purchasing. "This includes using RFID [Radio Frequency Identification] tags within the supply chain to track and control components on an end-to-end basis."

IT also is driving supply chain enhancements at SR Technics. "We have set up Matrix, an SAP-based application that enables customers to place requests for inventory directly," says Felix Ammann. "This application offers greater automation and increased transparency on availability to our customers. Then there is our eProcurement initiative. This provides an automated ordering and tracking functionality, allowing us to automatically place orders on stock, when levels fall to a certain level within our inventory."

Finally, Ship It AOG is improving its supply chain processes by contacting suppliers and sharing each other's Best Practices. This low-cost knowledge-based approach results in "virtually no waste across the network and above-industry levels of customer satisfaction," says COO Ray Goyco. "This coordination of linked resources across all or part of a supply chain has eliminated or reduced repair, manufacturing and logistical bottlenecks."

Tackling the Parts Shortage

There are many challenges facing MRO supply chains today. The one that has people talking is the growing shortage of aircraft parts.

"The problem is that the aviation industry has rebounded from the recession, in terms of overall activity," says Lufthansa Technik's Jörg Asbrand. "The OEMs who reduced their outputs to cope with the recession are not able to keep up with current demand. Until they get their own production up to speed, there will be a growing gap between parts supply and demand."

Aviall's Ed Dolanski agrees. "As the economy has stabilized and demand is trending toward historical levels, it has been very challenging for the OEMs to increase capacity quickly enough to meet the increase," he says.

Unfortunately, "we are often not the first in line when critical components are allocated," says StandardAero's Jack Lawless. To cope with this problem, Aviall has "placed orders farther into the future with our OEMs to allow them more time to manage the orders, as well as get better pricing due to the volume."

Look to the Future

So far, we have covered the importance of having a detailed supply chain plan (strategy) and effective processes (tactics). We have also seen how smart MROs are constantly monitoring and improving their supply chain processes, to get the best performance from their systems.

Collectively, these elements can deliver a more efficient, reliable and cost-effective MRO supply chain. But to stay this way — and to get even better — those in charge must look to the future and keep their supply chain plans and processes up-to-date.

"Strategizing the business plan and delivering meaningful results for growth and profit is our goal," says Greenwich AeroGroup's Walter W. Johns. "More work in documenting processes and sharing technology across our network for a common standards approach is being done this year, and the results will allow for plug-and-play in future expansions and operations."

StandardAero is also taking a forward-looking approach. In the months ahead, "We will continue to roll out our advanced planning system throughout the rest of the business so we can better forecast and optimize our inventory," Lawless says. "We will implement a renewed focus on Operations Excellence throughout each of our business units to ensure we have the optimal replenishment strategy and inventory level to ensure high velocity of our WIP [work in progress] in each of our shops. We will also implement a Transportation Management System to help us better manage and control our freight costs."

As with Lufthansa Technik, AFI KLM E&M is pushing ahead with IT improvements. "To complete our already existing on-line request systems, we have developed an integrated AFI KLM E&M solution to provide our customers with a single Web portal to place their requests and follow their orders in real time," Lazaroo says.

"Improving freight costs via streamlined part requesting and consolidation provides positive impacts to both the customer and Jet Aviation," says Arne Guzzoni of Jet Aviation St. Louis. "And doing as much planning and pre-kitting as we can prior to aircraft arrival is imperative too. Optimizing our planning processes in turn enables us to pre-kit where possible, again providing efficiency improvements to each project."

SR Technics has set a number of goals to be achieved within the next 12-15 months. They include continuing to set challenging targets on end-to-end processes; optimizing further inventory turns to 4.5;

For complex operations, StandardAero utilizes consignment systems to get parts on order up to 18 months in advance of their "need date".

further improving automation with advanced technology; and installing more point-to-point logistics and reducing transport costs globally.

"In 2011, our focus is on realizing a scalable global materials operations solution, which amongst other things, will provide us with global visibility of our parts and materials flow, which in turn will improve availability to our customers," says Felix Ammann. "To reduce wing-to-shelf times we need to monitor and track the movement of every part. At present the majority of this tracking is done manually on our computerized inventory systems. However, over the next few months we will be moving to greater use of bar codes and over the longer term we are also considering the use of radio-frequency identification, especially for engines and high value components."

Meanwhile, "Aviall remains in a continuous improvement mode, so we will not stop making adjustments to our existing business and investments in new facilities and technologies for years to come," concludes Ed Dolanski. "This continuous improvement and 'learning' culture prevails at all levels of Aviall as we search for systems, processes and tools from this and other industries that bring value to our customers and suppliers."

The Big Picture

Based on what leading MROs have told us, successful supply chain management requires a comprehensive, end-to-end approach; one that goes from the highest strategic levels to the most specific tactics. There is no room for short cuts or compartmentalization. The details need to be sweated at every part of the process.

Information flow also is vital to successful supply chain management. The system needs to be transparent and easily monitored, so that problems can be spotted quickly and resolved swiftly. The implementation of IT-based ordering and tracking processes can help this information flow, as well as provide managers and customers with a clear view of what's happening at all times.

Most importantly, effective supply chain management in an ever-extending MRO world requires flexibility plus a willingness to innovate and adapt. The market in which MROs operate is changing, and the supply chains that support these MROs need to change with it. Only through adaptability can supply chains stay strong, even as more and more links are added. AM

James Careless is a contributing editor: jamesc@tjtdesign.com

Choose MRO software that works as hard as you.

ILS SCM Management Software was designed with MROs in mind. Now instead of using multiple programs, you can manage all your daily operations with one system – a system that can integrate directly with the largest aviation marketplace in the world, ILSmart.

Each component of our software can be used separately, but together they maximize your efficiency.

- MRO Management Software This program covers all aspects of repair tracking. Manage labor, manuals, material issues, external repairs and more. You get complete visibility of the costs and schedule of every job.
- Inventory Management Software With material forecasting and integration with ILSmart, you can stock the inventory you require – no more and no less.
- Procurement Management Software Create a central solution for your buying needs and enjoy real-time procurement visibility.
- Sales Management Software This component allows you to manage your sales and advertise your services to over 22,000 subscribers worldwide on ILSmart.

Two Convenient Options:

On-Site – Host the software on your server.

On-Demand – Let ILS host your software in a secure, cloud environment that you can access from anywhere in the world.

Don't wait! Contact us today.

Inventory Locator Service,® LLC
1-901-794-5000 (Worldwide) • 1-800-233-3414 (North America)
marketing@ILSmart.com • www.ILSmart.com

ILS Supply Chain Solutions

Fuel Savings: More Than Just Winglets

As the price of oil hits stratospheric levels, it's increasingly incumbent on the MRO sector to assist aviation's efforts in reducing fuel consumption. Here's how the maintenance world is stepping up to the plate.

BY KATHRYN B. CREEDY

Airlines everywhere are facing another fuel crisis this year, after a 33 percent climb in the cost of jet fuel in the past several months. While many airlines such as JetBlue and Southwest are responding with the acquisition of more fuel-efficient aircraft, others such as Delta are relying on older MD-90s, making fuel conservation techniques of paramount importance to keeping costs in check.

During the last few years, airlines have done a masterful job of reining in costs. The numbers speak for themselves. Cost per available seat mile (CASM) last year rose between 0.2 percent at American to 11.4 percent at AirTran, while CASM without fuel as a factor was between flat at Delta and up to 5.9 percent at JetBlue. As impressive as this is, Delta alone is facing a $1 billion increase in fuel costs in 2011, which threatens its efforts for sustainable profitability.

Oil rose beyond $100 per barrel in February; recent unrest in the Middle East does not help matters. Every dollar increase per barrel drives an increase of between $415 million and $475 million in annual expenses, while every penny increase per gallon means increased annual expenses of between $175 million and $200 million. While U.S. airlines have transformed themselves to make money at $97/bbl and revenue increases have far outpaced cost increases, there remains little room for complacency.

Managements have a few arrows in their quivers to address the increased costs, including another round of capacity cuts as well as fare increases. However, nothing works like dropping fuel consumption, despite complex fuel hedging strategies, as evidenced by the comments during 2010 earnings calls.

Delta has already pulled the trigger on what is probably the first of many capacity cuts this year. Airlines have not only been successfully raising fares but are adding fuel surcharges, which United CEO Jeff Smisek sees as a much easier sell than fare hikes because everyone knows the impact of fuel increases.

Nonetheless, the aviation industry must do more to reduce fuel consumption and that is where MRO centers, such as Lufthansa Technik and Delta TechOps, come in. The MRO sector can help in a variety of ways, as explained below. What's more, clever after-market companies, such as Axiam, are devising ways to rebuild components that not only achieve greater fuel savings and emissions, but also reduce maintenance costs by keeping engines on the wing longer. These efforts, many of which seem small, grow large in the aggregate.

Engine Cleaning

Of course, the first reaction to saving fuel is engine cleaning, according to AeroStrategy's David Stewart, who indicates that most engine manufacturers are offering power washing. Pratt & Whitney took the lead on introducing on-wing, at-the-gate cleaning years ago and the method has gained widespread acceptance worldwide.

"Besides winglets, the main thing is engine wash which was introduced partly as a safety measure and partly to keep the engine lighter," Stewart said. "In addition to the engine makers, MROs such as Lufthansa Technik are developing such products. Besides engine overhaul, it's all about engine wash. Apart from winglets, it's all about the engine."

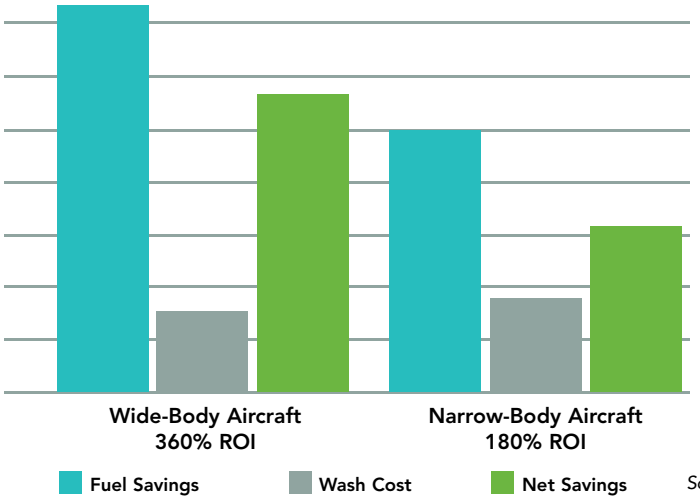
Many performance advantages are gained by engine washing. P&W's EcoPower engine wash promises efficiencies in both low- and high-pressure compressors, providing for lower turbine temperatures up to 15-degrees C for exhaust gas temperatures and longer revenue service time. It also provides up to 1.2 percent improvement in thrust-specific fuel consumption and a corresponding reduction in CO^2 — equal to CO^2 absorption of 250 acres

Aviation Finds Itself Over a Barrel

Jet Fuel 2010	Consumption		Expense	Avg. Paid Price (U.S. DOT)		Avg. Market Price (U.S. EIA)*			
	Gallons (bils)	% Chg. Yr/Yr	$ USD (bils)	¢/Gal.	% Chg. Yr/Yr	NYH	USG	LA	¢/Gal.
Jan	1.354	(3.1)	2.979	220.0	25.2	209.7	205.2	208.0	207.6
Feb	1.220	(4.2)	2.640	216.4	17.3	202.4	198.9	202.4	201.2
Mar	1.433	(0.6)	3.158	220.4	33.3	215.9	210.8	214.0	213.6
Apr	1.388	(2.2)	3.195	230.3	32.2	226.5	224.3	229.8	226.9
May	1.470	2.2	3.426	233.1	34.7	210.3	206.3	211.9	209.5
Jun	1.506	0.1	3.346	222.1	18.5	210.4	205.8	216.1	210.8
Jul	1.583	(0.4)	3.505	221.4	16.5	206.0	201.9	212.1	206.7
Aug	1.562	4.4	3.484	223.1	10.6	210.9	208.3	213.3	210.8
Sep	1.436	5.7	3.155	219.7	9.4	215.7	211.6	218.6	215.3
Oct	1.467	4.7	3.399	231.7	15.9	227.7	225.0	236.1	229.6
Nov	1.400	6.9	3.145	224.6	5.5	235.0	232.0	240.7	235.9
Dec						250.7	245.3	256.1	250.7
Total	15.820	1.3	$35.434	224.0	19.4	218.7	215.0	222.2	218.6

**EIA=Energy Information Administration; NYH=New York Harbor; USG=U.S. Gulf Coast; LA=Los Angeles*

EcoPower's Economic Advantage (typical operation)



Source: Pratt & Whitney

of rain forest. The company expects the process to wring out savings of three pounds of carbon emissions for every pound of fuel saved.

In 2009, EcoPower earned Frost & Sullivan's MRO product innovation, and the consulting firm indicated that it set the standard for such technology by revolutionizing the entire approach toward engine washing. Aerospace analyst Nathan Smith cited EcoPower's cost effectiveness, reduction in fuel consumption and environmental contributions as a milestone in the MRO industry.

The EcoPower engine wash system, offered through the Pratt & Whitney Global Service Partners network, uses a closed-loop system with pure, atomized water to wash aircraft engines, avoiding potential contaminant runoff.

Similarly, Lufthansa Technik is offering what it calls a revolution in engine cleaning, with Cyclean Engine Wash, which uses technology developed by the company.

"Engine washes have been an issue for some time now," explained Lufthansa Technik Head of Environmental Management Ralf Wunderlich. "Dust, pollen, sand, salt, chemicals, hydrocarbons and insects pollute an engine over the course of time, thereby reducing its performance. But as the engine must continue to produce the same performance, it is exposed to greater stress and wears out sooner. It consumes more kerosene and its exhaust gases are also hotter. After cleaning, an engine runs better again."

Until recently, aircraft engines were fully flooded with water in the process of cleaning. Including drying, this took up to five hours — too long to consistently carry out the engine washes required, explained Wunderlich, who added that Cyclean streamlines the process to less than one hour, for a better fit with airline operations. It also makes regularly scheduled washes more feasible. P&W's process also takes about an hour.

In the Lufthansa process, a rotating nozzle injects water directly into the dirty compressor, so that only 180 to 200 litres are needed per cleaning. Lufthansa Technik currently uses water alone but is investigating the addition of detergents. Beyond this, the company is currently evaluating the options for recycling the polluted water, something already done with P&W's EcoPower engine cleaning.

Lufthansa Technik promises that its process delivers a 0.5 percent reduction in kerosene consumption. On a short-haul aircraft, with 5,000 tons of annual fuel consumption, emissions are also lowered by 79 tons. A long-haul aircraft saves about 790 tons of CO^2.

This new technology gives Lufthansa the potential to cut its kerosene consumption by up to 25,000 tons a year, depending on the fleet. This is equal to avoiding 75,000 tons of CO^2 emissions. The silver lining is longer life spans and declining maintenance costs.

Lufthansa Technik is taking the Cyclean engine wash a step further.

A Delta airliner under maintenance in a Delta TechOps hangar

It is working now on a refinement using dry ice for even more thorough turbine cleaning, for even lower fuel consumption. The project promises to cut back on kerosene consumption and emissions by optimizing the compressor index. To achieve this, it is developing a 3-D flow simulation that encompasses all possible actions to develop the best combination of actions for a given engine.

Lufthansa is one of several airlines to emphasize component repair, to reduce parts acquisition costs. Its engine overhauls include the Advanced Recontouring Process (ARP), which focuses on compressor blades because they are exposed to more stresses that limit lifespan.

The company developed a computer-controlled, automatic grinding process using a laser beam to examine the blade and then restore it to optimized aerodynamic form. Lufthansa Technik says the restored blade works better than new ones. Compressor blade life is extended by 25 per cent. Kerosene consumption and emissions on Lufthansa's 747 and A340 fleets save 5,500 tons of CO^2 with the procedure.

Cleaning the Aircraft

In addition to cleaning and optimizing the engine, Lufthansa Technik is currently developing aerodynamic measures to keep the aircraft air flow as clean as possible. The MRO's Weight & Balance Engineering ensures the Lufthansa fleet saves 38,000 tons of CO^2 annually.

"For example, we have designed calculation methods to place containers, palettes and loose freight in an optimum manner aboard aircraft," says Wunderlich. "Using Optimized Load Planning, an aircraft is given its ideal center of gravity, which in turn reduces its air resistance."

The company's interior work includes reducing seat weights by about 1-2 kilos per seat, which saves 6,300 tons of kerosene and 20,000 tons of CO^2 annually.

Meanwhile, its exterior work includes smoothing all uneven surface areas on the aircraft shell, with particular focus on wing-to-fuselage areas. It also checks and adjusts control surfaces such as landing flaps and inboard spoilers, improving performance by reducing vortices.

Delta TechOps: Pioneer with Winglets

Delta TechOps is both airline and MRO, according to Fleet Engineering General Manager Jim Ganopulos, who works both sides of the house.

"Delta saved 28 million to 32 million gallons in 2010 from our overall fuel cost factors team initiatives program," he said. "We also save 7-8 million gallons on programs outside of winglets which are identified as key MRO fuel strategies."

At the $2.60/gallon for jet fuel cited in February, that comes to a market value of approximately $100-105 million, the vast majority of which is against winglet initiatives. Ganopulos explained that the company has a fuel council in which everyone must contribute fuel savings initiatives. These range from what he oversees to within Technical Operations, to Operational Control tinkering, to creative flight planning.

"TechOps has 10-12 different initiatives for either fuel savings or mission performance," he said. "Delta is very focused on fuel and it uses that expertise in its MRO business. Key to this is aircraft performance monitoring and engine control monitoring, for specific air range improvements. We calculate the SAR, which is the same as miles per gallon for a car in order to identify planes that are operating outside the peer group. We take the lessons learned and offer those services to other airlines and have been quite successful."

"The idea is to maintain engines at their optimum and if we see a shift in performance we notify the airline there is excessive fuel burn," continued Ganopulos. "Our flight operations performance engineering also identifies aircraft performing below par, which signals a need for maintenance. Everything within maintenance is rigged properly to ensure, for instance, that a flight control is not floating or faired inefficiently. There are also all sorts of checks we can do when we are alerted that an aircraft is not performing at optimum."

Delta has been doing winglets since long before they gained general industry acceptance, installing them on 727s in the 1990s when jet fuel was a mere 50 cents per gallon.

"They never got a lot of traction then and technically were difficult to support," he said, adding they involve more than just slapping them on the end of the wing. "They come with a lot of tangible requirements and the modification is close to 1,600-2,000 man hours. We now have 145 sets installed on Delta's overall fleet and in the future we are aiming for nearly 300. That gives us four to five percent fuel savings based on the type of equipment and mission stage length. We are very invested in deploying winglets with the fuel savings they give. The net savings are substantial."

Ganopulos took *Aviation Maintenance* magazine through the complex procedures to support today's winglet

installations, which include substantial increases in maintenance program man-hour requirements, to avionics flight management computers upgrades as well as adding flight control load relief systems to equipped aircraft. All this means the savings must be pretty substantial to warrant a 2,000 man-hour job and the ongoing continued airworthiness maintenance requirements.

"When Delta got into winglets, we were actually looking for increased range to go into markets we could otherwise not serve," he said. "We wanted our 757s to be able to go deeper into Europe and South America. We began realizing the fuel strategy and developed a blended strategy incorporating both fuel and mission capabilities."

He then turned to the many other initiatives Delta TechOps has incorporated into fuel savings programs, both for Delta and its other airline customers.

"We offer an aircraft performance improvement program package on the 777 which changes the aileron profile," he said. "We also do weight monitoring especially for potable water, tailoring it to the mission requirements and have gone a step further by removing redundant tanks from 767s and 777s. We also ensure the optimum aerodynamics by checking leading edge aerodynamic seals of all the primary flight controls to ensure we have as clean an aircraft as possible."

Delta TechOps also has played around with paint coatings, but found it not very feasible owing to the reapplication requirements. "Some claim a 1 percent performance improvement," he said.

Delta TechOps also does engine washing for customers, including Hawaiian, and takes full advantage of any performance improvements from airfoil and coatings changes in the compressor. In addition to washes, it also does component restoration on any components sensitive to fuel burn.

Achieving Engine Perfection

That's where Axiam comes in. Everyone knows engine monitoring is maintenance 101 for not only fuel savings but extending engine life, as indicated by Lufthansa Technik. Axiam takes it a step further, by providing tooling and software to ensure optimum engine core rebuilding. Delta TechOps has been an Axiam customer since the late 1990s.

"Competition among engine shops has intensified in the past decade as engine manufacturers have increased their presence," explained Axiam President & CEO Donald W. Lohin, describing painfully familiar problems. "Operators became more demanding, and the economic cycle has induced the need for greater productivity. Each shop can choose either to continue to build the engine core to runout limits as per the engine manual or, to adapt state-of-the-art technology to achieve straight, optimal builds for each set of parts. A shop can gain a competitive advantage by delivering quality engines at reduced cost by adopting Axiam's assembly optimization processes."

Building to runout limits contributes to high turn time, rebuilds, test cell rejects, high parts costs, high spares usage, assembly process inconsistency, excessive vibration, excessive engine wear, low EGT margins, rapid EGT

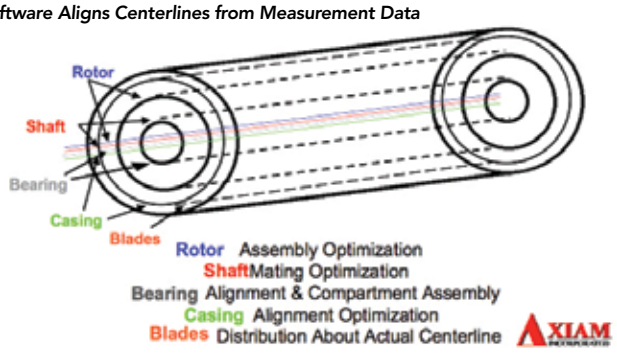
margin deterioration, bearing failure, oil leakage, blade and shaft rubbing, engine surge, and excessive fuel consumption.

Consequently, its proprietary engine core assembly processes not only provide an opportunity for more efficiency but one that produces more profitability for the aggressively competitive engine shop. "The cost savings for operators from improved SFC, EGT margins, vibration and wing time is especially desirable," he said.

"We provide tools for engine overhaul shops, engine manufacturers and the airlines themselves for the assembly of engine cores," Lohin said of the system used by American Airlines, United Services, Pratt & Whitney, Solar Turbines, Siemens, Tinker AFB, NASA, and Navair. "Most importantly, the tooling and software aligns the engine's dynamic structure to the casing so they are built to a common centerline as designed."

Axiam's tooling, measurement gauges, software and assembly procedures give a shop direct control over assembly

Software Aligns Centerlines from Measurement Data



process variables, according to company material, consistently resulting in repeatable, straight and optimal builds on the first pass. Axiam's unique assembly processes build the engine core (all rotors, shaft mating, bearings/seals, casing, and optimized blade distribution) so that the turbine's dynamic and static structures are aligned about the actual centerline of rotation. As a result, the shop can better manage blade-tip gaps.

Engine average improvements to pre-Axiam performance as observed in shops and test cell data include: improved assembly times (up to 60 percent); improved EGT margins (30-50 percent); reduced vibration (35-80 percent); a 0.55-3.0 percent improvement in specific fuel consumption; reduced spare parts replacement; elimination of test cell rejects due to vibration; improved engine quality; and, longer time on wing (10 percent).

Lohin indicated that in recent work with a large European airline, a project originally designed to improve and maintain engine exhaust gas temperatures has been so successful that the airline is now requiring an engine shop to which it outsources another engine model to use the Axiam system. He explained that one particularly difficult engine had been through five engine shops before being successfully tackled by the Axiam assembly process.

"When we got the engine core to our lab, we found distorted parts that were out of specification which no one else had caught," he said. "We called for specific machining instructions to repair the parts and what was a problem engine is now built straight. We expect that to work to our benefit and we are looking for other airlines who want to improve fuel consumption, EGT margins, pollution or vibration to do the same thing. The Axiam assembly process can achieve engine performance they otherwise couldn't achieve."

Taking Out Variables

"We identify the variables in the assembly process and change the process 5-10 percent to control for those variables getting assembly process consistency," Lohin said. "These changes are enough to make the process repeatable and allow the shop to have optimal build for each set of parts. Repeatability means you will always get the same optimal build results from the same parts and always on the first attempt. You no longer have to rely on the skill level of the individual maintenance technician which can vary a great deal."

"The airlines are not the only winners," Lohin said. "The technology provides a nice productivity opportunity for engine shops and airlines alike. Shops can now predict with more certainty how long it will take to build an engine core. Shop bottlenecks in the assembly are a thing of the past. A great deal of time is saved in the assembly area, balancing and test cell. United Services is a recent customer for the Pratt & Whitney PW2037 engine and it estimated a $1 million annual cost savings in test cell fuel consumed owing to reduced trim time using the Axiam assembly processes."

Airframers Consider Next Steps

Airbus and Boeing right now are tinkering with new equipment designed to achieve higher fuel efficiency and better operating costs. Bombardier is offering its own solution in the CSeries and Embraer is planning to react to Boeing's plans.

Meanwhile, the Russians and Chinese are developing their own solutions, all of which are possibilities according to Delta's latest aircraft request for proposal. While Airbus has introduced the A320neo, Boeing has been too pre-occupied with its 787 problems to offer a solution, except to say it prefers tweaking current products while awaiting the next step function that won't come until the next decade.

That means, of course, that MROs and clever innovators such as Axiam and Chromalloy will become that much more critical to achieving fuel efficiency (see Tool Crib, page 43).

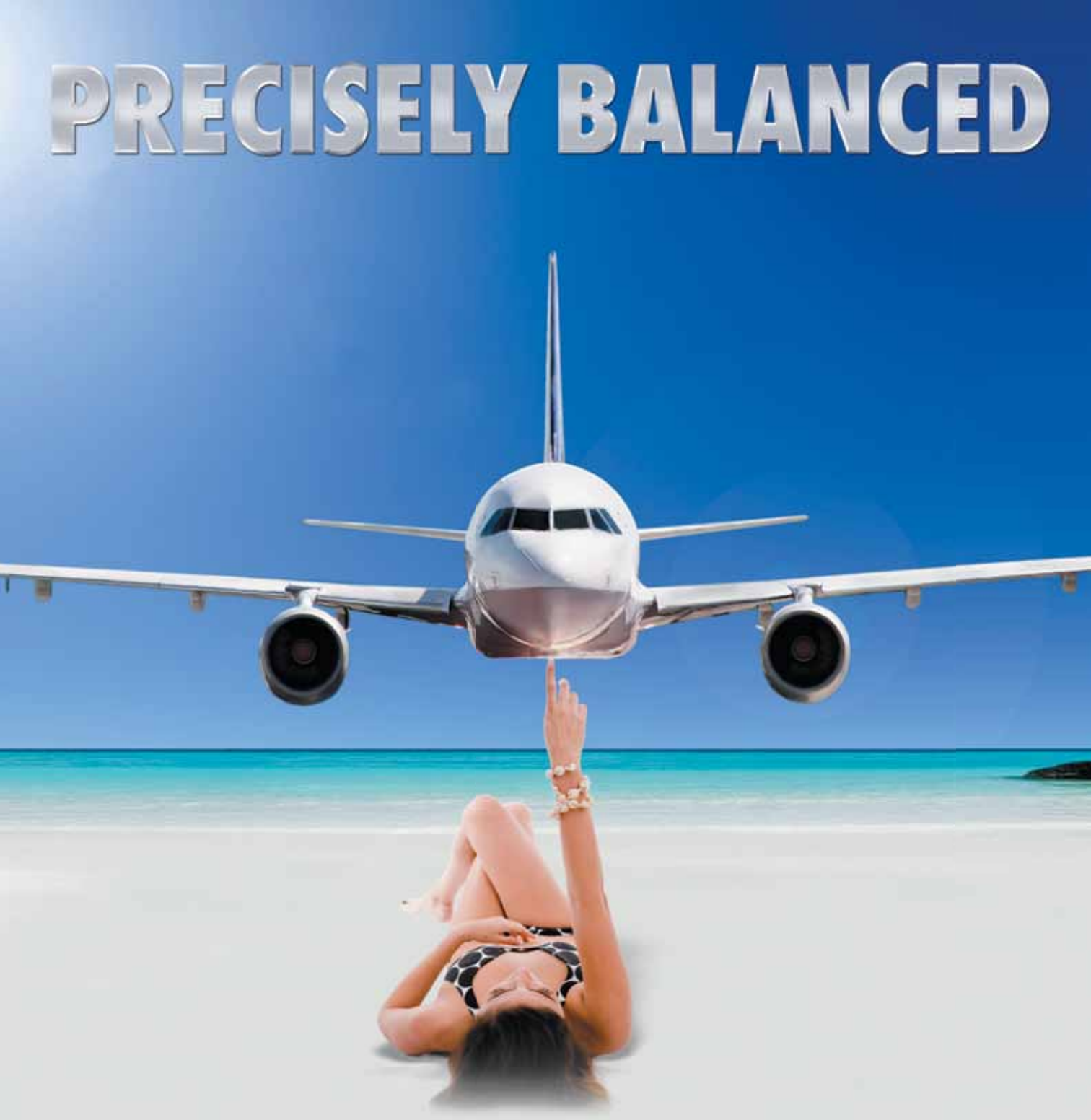
Lufthansa Technik is already looking to the future with its Digital Cabin Model, a virtual reality cabin that offers the possibility of examining an individual component digitally to ensure a perfect fit before it is manufactured. This innovation would cut down on redundant manufacturing steps.

Lufthansa Technik also is working on a modular VIP/First Class seating concept called CompoSEAT, which uses high-performance composite fiber to lower weight considerably. Ultimately, it wants to apply the same technology to business and economy seating.

The company is also tinkering with fuel cell research. It is working with the German Aerospace Center (DLR) on two projects, testing the option of using fuel cells in real-world conditions.

Clearly, while there is much MROs can do right now to help airlines save fuel, there is more to come. AM

Kathryn Creedy is a contributing editor: kcreedy@gmail.com



• AVAILABLE • RELIABLE • AFFORDABLE

ACS PMA PARTS

26451 Curtiss Wright Parkway, Suite 106
Richmond Heights, OH 44143
440-295-6590 • 440-295-6594 FAX
www.acs-parts.com

ACS
AVIATION COMPONENT SOLUTIONS
DELIVERING THE DIFFERENCE

CLASSIFIED

INTERESTED IN ADVERTISING?
CONTACT US

Sales Director
(USA)
Daniel Brindley
+ 1 414 967 4997
dbrindley@avmain-mag.com

Sales Director
(International)
Jina Lawrence
+44 (0) 20 8669 0838
jinalawrence@avmain-mag.com

TOOL CRIB

Chromalloy Announces New Thermal Barrier Coating

Chromalloy announced that its new thermal barrier coating enhances the performance of gas turbine engines.

The RT-35 Low K coating was patented by Chromalloy in 2006 and certified by the Federal Aviation Administration (FAA) in 2010 for use on the PW4000 second stage high pressure turbine blade after a series of tests confirming its low thermal conductivity, high thermal cycle durability and other attributes. The coating is currently in use by a commercial airline in Asia.

The RT-35 Low K coating provides a layer of insulation to the base metal component and underlying bond coating surface of a turbine blade from the extreme heat of the combustion gases during engine during operation. The coating provides 50 percent lower thermal conductivity, allowing engines to perform at higher temperatures.

Engines produce greater thrust when operating at higher temperature — and they can operate on the same amount of fuel as powerplants that operate at lower temperatures. Consequently, Chromalloy's RT-35 Low K coating is a critical driver for the engine to deliver greater fuel efficiency to the operator.

In addition, the RT-35 Low K coating increases the oxidation and corrosion resistance of the underlying bond coating as it is cooler and thus extends the life of the engine components, another cost saving for the operator.

Spika Develops Universal Maintenance Stand

Spika has developed the Alpha Series Universal Maintenance Stand. Narrower than the company's UMS line, the Alpha offers highly versatile variable-pitch stair modules, capable of as much as 36" height adjustability. Stair modules can be used as independent work stands, or coupled to Alpha work decks by means of Spika's tool-free, pin-free Click-Lok attachment system.

The all-aluminum stands can be designed to utilize manual screw jacks, hydraulic cylinders, or electric AC or DC actuators to raise and lower the systems. The unique design of the systems allows both stair landings and workdecks to raise precisely vertically for safe and efficient operation, while work decks may be ordered with or without extendable extruded plank sliders for ideal contour conformity. Get more details at http://spikawelding.com/alpha.htm or by calling 888-915-5678.

Spectronics Introduces New Ultrasonic Diagnostic Tool

Spectronics has introduced the Spectroline Marksman ultrasonic diagnostic tool, a highly accurate instrument that converts and amplifies inaudible ultrasonic sound into audible "natural" sound.

Now, aviation technicians can more easily hear sounds that signify problems such as compressed air, vacuum, pneumatic and other pressurized leaks. It's also used to check for electrical discharge due to insulation breakdown, carbon tracking and arcing.

The Marksman uses a two-tiered process to ensure accurate diagnosis. First, the receiver unit converts inaudible sound into audible sound using a process known as heterodyning. Then, the receiver's Sound Signal Technology fine-tunes the audible sound into the natural sound emitted by the defect itself. A 10-bar LED display indicates the intensity of incoming signals.

The MDE-1000 Marksman Master Kit comes with a receiver, full-sized headphones, two probes, and an ultrasonic emitter that allows technicians to test for faulty seals, gaskets and weather stripping in doors, windows, ductwork and other non-pressurized enclosures.

When attached to the receiver, the 12-inch hollow probe accentuates air sounds, while the solid contact probe accentuates sounds of worn or grinding gears. Standard 9-volt alkaline batteries are included for both the receiver and the emitter. All components are packed in a sturdy storage case with foam insert. For details, go to www.spectroline.com.

Davis Instruments Releases New Catalog

Davis Instruments has introduced its new Fluke, Fluke Calibration, and Tektronix Catalog. Davis Instruments is one of the world's leading sources of test, measurement, control, and calibration instruments.

The company's new 72-page catalog highlights a range of electrical, calibration, temperature, humidity/air quality, and electronic instruments. You can request a free catalog by calling 800-358-5525, or go to www.davis.com/8261.

Sherwin-Williams Offers New Wash Primer

Meeting SAE's Aerospace Material Specification 3095 (AMS 3095), Sherwin-Williams Aerospace Coatings now offers a two-component Wash Primer (CM0484646) designed for pretreatment of aluminum and provides an alternative pre-treatment option to chemical chromates like Alodine and/or Anodized.

When used in combination with Sherwin-Williams Aerospace Urethane Primer (CM0486606) or Chrome Hazard Free Urethane Primer (CM0486707), it makes for a significant and economical alternative system to other aluminum pre-treatments and is environmentally sound.

Designed to fight corrosion and for use in aerospace paint systems where chemical resistance and high flexibility are necessary, the new wash primer can be applied using conventional air spray, HVLP, Graco electrostatic air spray or assisted airless. Call 1-888-888-5593 or visit www.swaerospace.com.

Incorporate

AVIATION MAINTENANCE
— www.avmain-mag.com —

into Your 2011 Marketing Plans

Are you gearing up for springtime promotions?

Sending out 2011 catalogs and brochures?

Looking to drive traffic to your website or to an upcoming event?

Want to generate more sales leads & visibility?

Reach subscribers to Aviation Maintenance consisting of aircraft maintenance directors, managers and technicians with major and regional airlines, corporate and business aircraft operations, government and military fleets, FAA-licensed repair stations and fixed base operations, along with parts distributors and other aviation service companies.

Don't delay, call today for more details.

20,261	U.S. Subscribers	$170/M
15,322	Telemarketing	+$65/M
9,209	International Subscribers	$280/M
842	Canadian Subscribers	$1,200/F
29,654	Email Addresses	$290/M
	+ Deployment Fee	+$120/M

For postal information, contact:
Jennifer Felling
email: j.felling@statlistics.com
phone: (203) 778-8700, ext. 138

For email information, contact:
Turker Hassan
email: t.hassan@statlistics.com
phone: (203) 778-8700, ext. 144

STATLISTICS

List Management • List Brokerage • Email Marketing Services

69 Kenosia Avenue • Danbury, CT 06810
P: (203) 778-8700 • F: (203) 778-4839 • **www.statlistics.com**

Tyco Unveils New Cold-Applied Splice

A new cold-applied splice from Tyco Electronics (TE) provides both wire termination and environmental sealing in a single step. Sealing is provided without the need for adhesives, tapes, grommets or other methods traditionally used in aerospace and defense applications. Because no heat is needed, the splice can be applied in potentially hazardous places, such as in fueled aircraft.

The one-piece construction not only simplifies use, it allows a compact space-saving profile. The immersible splice prevents water from entering even under permanent pressure or weight.

The splice uses a non-flowing gel to provide excellent sealing without mess. The metal splice is tin-plated copper with a transparent polyvinylidene fluoride sleeve and color-coded thermoplastic end caps.

The splices are available in three color-coded sizes for 26 AWG to 12 AWG wire with silver or copper-plate conductors. They are rated for operation from -65°C to +150°C. They meet the requirements of SAE-AMS-DTL-23053/8 for insulation sleeve and the current draft of SAE-AS81824/12 (modified for 150°C) crimp splices. Call 800-522-6752 or email to product.info@tycoelectronics.com.

BirdXPellers Predator Drone System Enhances Aviation Safety

An exploding bird and wildlife population has made pest control a key issue. Environmental and financial concerns mandate effective solutions. Chemical and inhumane solutions once deemed appropriate are no longer acceptable. Pest birds cause billions of dollars of property damage and cleanup. Moreover, they're a health hazard, carrying as many as 60 diseases.

BirdXPellers Predator Drone helps keep the environment clean and disease-free. Moving birds on safely and humanely is a major industry. Animal behavior modification has been studied for years; this system is proven and patented.

The remote-control units carry electronic sonic devices and miniature speakers that play the sounds of bird predators and birds in distress. Pest creatures always react most strongly and instinctively when they perceive a threat in multiple sensory channels. When the pest birds hear and see the drone swooping down on them, they flee en masse. For details: 800-662-5021 or trunita@bird-x.com.

Stopping Power Across The Globe

Our work is certified by the FAA, EASA and CAAC, which means that regardless of where our customers are located, they can experience our quick turn-times, personalized customer service and high quality work performed by technicians with over 60 years of combined experience.

- Miami, FL
- Oklahoma City, OK
- Indianapolis, IN
- Kuala Lumpur, Malaysia

Contact us today to learn more about lower costs and faster turnaround times from AAR.

AAR®
Wheel & Brake Services

AAR Wheel & Brake Services — 9270 N.W. 100th Street — Medley, FL 33178 — USA — Tel: 305.883.1511 — www.aarcorp.com/wheel&brake