

MRO

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Parted out Aircraft teardowns

Industry Interview
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MRO

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Opinion

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Competition.. or demand?

Our cover story on the aircraft tear down and part-out generated considerable interest from the key players in parts redistribution and asset trading - True Aero being one of them. The company's president Stratton Borchers presented some interesting points regarding engine tear downs.

While we can all cite the load factor statistics, growing global demand for air travel, and the emerging middle class in the Asia-Pacific region, Brochers said he did not believe the growing competition within the engine tear down business is related to higher demand for parts, but more so to the fundamentals of competition. Higher returns attract investment which increases competition as more companies are drawn to the space. There are barriers to entry in this market; high working capital requirements, technical knowledge, key relationships etc... but investors

chasing returns are willing to overcome those hurdles to deploy capital. Wall Street has discovered the value in aircraft leasing, mid-end of life leasing and are continuing to work down the value chain to tear downs.

There is potential for higher yields in a fragmented, opaque market and engine tear downs provide an outlet to deploy larger amounts of capital for 24-36 months, coincidentally the same average life for many investment funds, that generates positive cash flow in a matter of months, not years, along with the potential to surpass expected investment hurdles instead of a static return (if the scrap gods allow it).

Very interesting points raised, indeed.

Keith Mwanalushi
Editor



New part-out companies need to build sustainable businesses.
Photo: Keith Mwanalushi

Contents

MRO and Production News	4
Finance News	10
Other News	11
Cover story: Parted planes.	12
Industry Opinion: The smart factory.	16
Industry Interview: Graham Grose, Global Industry Director of Aerospace and Defence at IFS	18
Growing services	19
People on the Move	21
Information Technology.	21

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Cayman Airways signs component support contract with AFI KLM E&M
Photo: Cayman Airways

Cayman Airways joins AFI KLM E&M 737 component service program

The Cayman Islands flag-carrier has signed a contract covering full component support for a Boeing 737-800 that joined its fleet in December. The aircraft was supported by AFI KLM E&M with its previous operator. The agreement comes under the AFI KLM E&M Boeing Component Services Program. The program, launched in 2005, guarantees customers total control over their activities, with technical experience, logistics and fast-track 24/7 access to inventory pools. Cayman Airways is a welcome addition to a diverse list of operators worldwide supported by AFI KLM E&M, which has a strong local technical presence in the Americas and Caribbean region with Barfield, a 100%-owned subsidiary based in Miami.

AFI KLM E&M deploys dedicated A350 components support platform in China

Following the launch in 2013 of AFI KLM E&M Components Chinait's components repair workshop in Shanghai, AFI KLM E&M has now deployed a logistics center under the same roof in order to support the A350's future operators throughout China and the region. As of now, several dozen orders for the new-generation Airbus wide-body plane have been placed in China by leading Chinese carriers. The development of this new capability, including a regional components pool, reflects AFI KLM E&M's aim to propose high-end, competitive Component Support on the China market. Embedded in the AFI KLM E&M Components China facility, the logistics platform will include a warehouse for storing A350 components and manage intra-China

shipments to provide proximity and fast-track responses to the requirement of serviceable spares for A350 operators. With its storage procedures compliant with Chinese requirements, the platform will also rely on the air freight capacity provided by AIR FRANCE KLM, and logistics partners on domestic and international flights serving Shanghai and major Chinese hubs. This service center will work as the bridgehead of the AFI KLM E&M A350 network in China, allowing further deployment of logistics solutions at the A350 operators' doorstep. The service center is fully integrated with the existing support network including service centers in Singapore, Kuala Lumpur and Ho Chi Minh City.

Boeing launches new Nacelle and Flight-Control Surface Exchange Program

Boeing has launched a new Nacelle and Flight-Control Surface Exchange Program. It provides airlines with an integrated and economical repair and overhaul solution, while building on Boeing's successful history of exchange programs. Under the program, customers can exchange nacelle and flight-control surface parts that need repair or overhaul from a certified pool that Boeing maintains throughout its global network. This eliminates the need for customers to contract, schedule, manage and own, or lease, these parts. Parts distributed through the program represent all Boeing models and are updated to the latest configurations, incorporating all applicable service bulletins and airworthiness directives. Another benefit of an exchange is that customers only need to take an airplane out of service once, reducing maintenance needs. When a similar part is leased, the plane must be taken out of service for both removal and installation.

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West Star Aviation's new 20,000 ft² facility in Grand Junction, CO.
Photo: West Star Aviation

West Star Aviation acquires facility to house newly dedicated landing gear

West Star Aviation has acquired an existing 20,000 ft² facility in Grand Junction, CO to house a newly dedicated landing gear facility. West Star's recent approval of a new landing gear overhaul agreement, and their proven success within landing gear overhaul, will allow for continued specialized support of Challenger, Hawker, and Embraer Phenom and Legacy landing gear overhaul and repair, along with a necessary first-quarter operational date. The former U.S. Tech facility has already begun a full redesign by West Star and will be built out specifically for landing gear overhaul purposes. The facility was located through a Grand Junction community leader, P.J. McGovern, who worked closely with West Star to allow for a prompt renovation and anticipated operational date.

Lufthansa Technik's support for newest Airbus wide-body is in full swing

With Lufthansa ready to start scheduled A350 operations on February 10, 2017, Lufthansa Technik's support for the newest Airbus wide-body is in full swing. Lufthansa Technik is not only licensed and ready to maintain the Airbus A350 in all aspects of the aircraft's life cycle, the company is also the first address for a unique VVIP cabin completion. Lufthansa Technik has been supporting the A350's development with a special focus on maintainability from the very beginning. The company is 100 percent ready to provide engineering and line maintenance services for the A350 today. In the area of material supply, Lufthansa Technik covers a large part of the A350 components, in many cases working together

with original equipment manufacturers. Several supported customer fleets have already achieved a very high technical dispatch reliability. At the beginning of 2017, Lufthansa Technik received an extension of its approval as a design organization for the new aircraft from the European Aviation Safety Agency (EASA Part 21/J). The company is thus authorized to develop and approve repairs and modifications, to a limited extent, under its own responsibility.

Aero Controls receives consignment contract of over 3500 units of 737NG components

Aero Controls has been awarded a consignment contract from an unnamed consignor of over 3500 units of 737NG components with an approximate fair market value of US\$20M.

Included in the award are thrust reversers, inlet cowls, flight control surfaces, wheels, brakes, and other components. This consignment adds depth to the present inventory of Aero Controls and strengthens their position as a supply leader for this fleet type by way of component sales, exchanges and leasing.

FL Technics opens third line maintenance station in Georgia

FL Technics has opened a new line maintenance station at Batumi International Airport (BUS). With the opening of the third location, FL Technics now has ground presence in all of Georgia's international airports. The new line maintenance station is equipped to service the most popular Airbus A320 and Boeing 737NG aircraft types. FL Technics' first and main customer in Batumi is Turkish Airlines. However, the geographical location of the station makes it convenient for airlines mainly from surrounding regions, and the Middle East especially during the summer season.

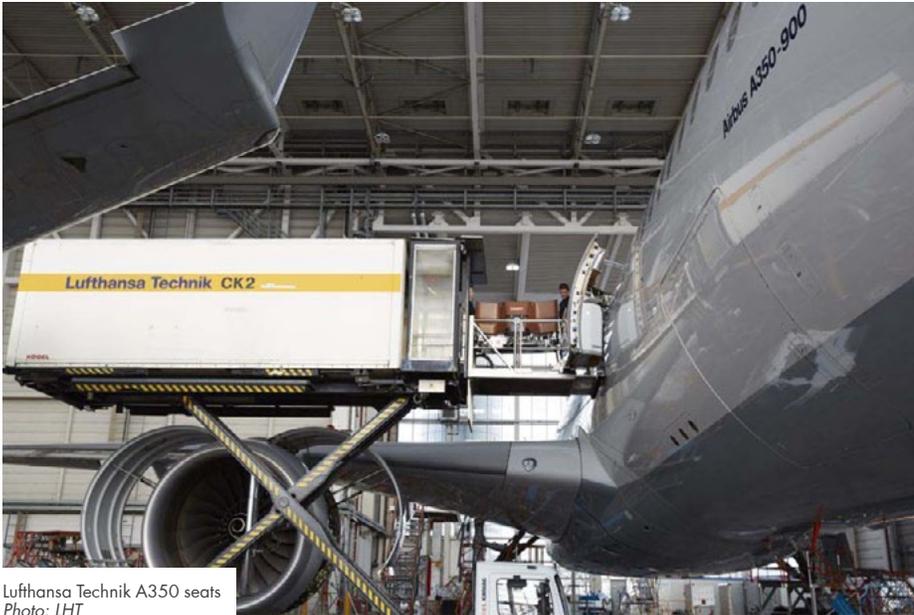
Lufthansa Technik Middle East begins operations at Dubai South

The new facility of Lufthansa Technik Middle East (LTME) has started MRO services in the Aviation District at Dubai South. Recently, the first component, a GE90 engine inlet cowl from Etihad Airways arrived for repair at LTME. LTME also offers material and spares, and engine wash services, for commercial and VIP customers locally. Further evaluation of additional capabilities is ongoing depending on other customer requirements. The current LTME site at Dubai International Airport will be kept operational.



Aviation district at Dubai South

Photo: LHT



Lufthansa Technik A350 seats
Photo: LHT

Lufthansa Technik completes cabin installation of first Lufthansa Airbus A350-900

Another milestone has been reached in advance of the first passenger flight of a Lufthansa A350-900: after more than 1,700 working hours in Lufthansa Technik's maintenance hangar in Munich, the required cabin installations have been completed and the Supplemental Type Certificate (STC) has been issued by the European Aviation Safety Agency (EASA). The aircraft is thus technically cleared to enter scheduled service. "A total of 20 employees from our team worked with colleagues from Munich, Hamburg and Frankfurt on the aircraft over the past three weeks," explains Sven Pawliska, who heads up the long-haul aircraft maintenance at Lufthansa Technik in Munich. "The installation of the Premium Economy Class and new self-service

racks in the Business Class were among the upgrades that are most visible to passengers." The layover was also used to train additional employees on the aircraft type. The Lufthansa Technik team has invested just under 10,000 course days in total in this training.

Avtrade receives planning approval to expand UK Global Headquarters

Avtrade has received final permission to further maximize its UK Global Headquarters site based in Sayers Common, West Sussex. As one of the leading global component service providers to the aviation industry, the rapid growth of Avtrade's global customer base has escalated the need for additional warehousing facilities. The proposed new warehouse will enable the continued investment in aircraft part out, the purchase of large-scale spares

packages, and the further development of new and existing alliances with leading airlines and global MRO providers. This planning approval for phase three of Avtrade's four-phase HQ development will increase expansion of the current site to 250,000 m² and will provide additional jobs to the local community, in addition to facilitating further growth for Avtrade's global operations.

AAR signs landing gear overhaul contract with SkyWest

AAR has signed a three-year agreement to provide landing gear overhaul and exchange services for SkyWest's operating carriers. The agreement, which covers landing gear assemblies and sub-assemblies on its fleet of more than 400 Bombardier CRJ aircraft, includes the option to extend it to five years. The agreement builds on a relationship with SkyWest that dates back to the 1990s. AAR, which will perform the work at its landing gear repair station in Miami, has previously provided similar services for SkyWest Airlines and ExpressJet's fleet of Bombardier commercial passenger jets.

FEAM to become first U.S.-based MRO as Boeing GoldCare line maintenance supplier

FEAM Maintenance/Engineering has signed a multiyear agreement with Boeing as the first U.S.-based MRO to provide GoldCare line maintenance services. The strategic partnership calls for FEAM to provide full handling line maintenance support on new B737 MAX aircraft under its EASA 145 authorization on behalf of Boeing's GoldCare portfolio of global aftermarket support services.

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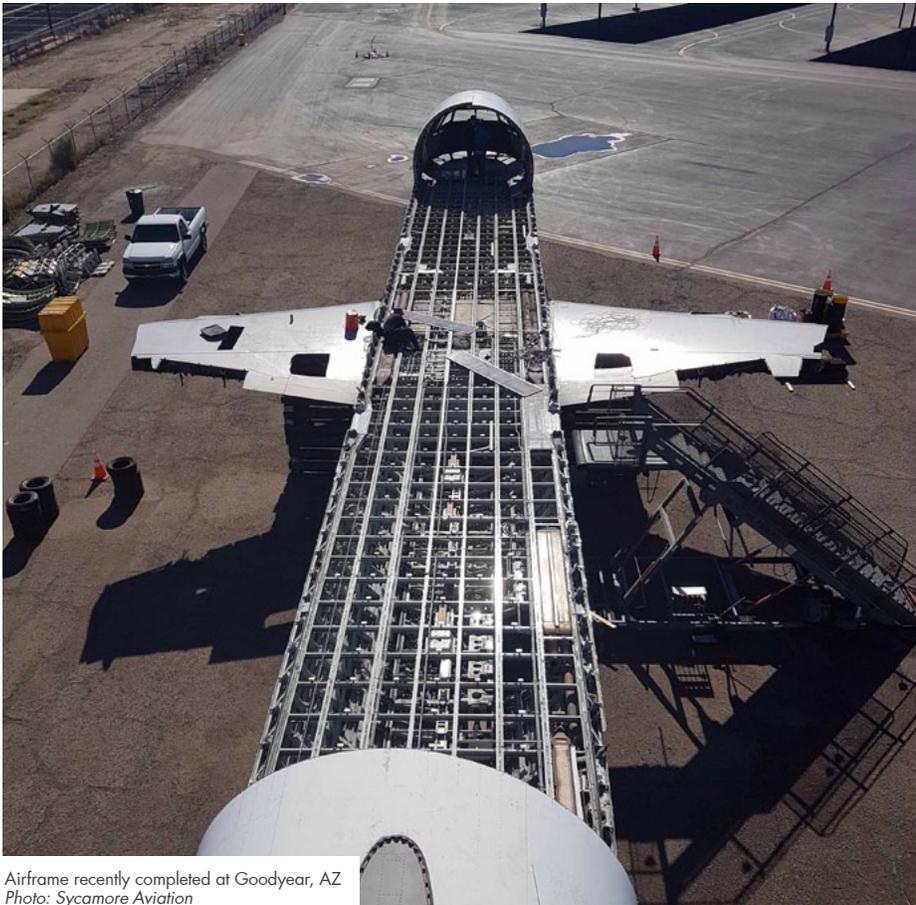
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Airframe recently completed at Goodyear, AZ
Photo: Sycamore Aviation

Sycamore Aviation open new facility in Goodyear, AZ (USA)

Sycamore Aviation has opened its new US facility at Goodyear, AZ. With its excellent infrastructure and easy access through Phoenix Sky Harbor, Goodyear is a well established and premium location for aircraft disassembly and storage. January 2017 saw Sycamore Aviation take residency within a new US\$10m facility at the airport and to date, have carried out several teardowns including B737-800 and A320 family aircraft. Sycamore Aviation specialises in customised and environmentally green disassembly of end-of-life aircraft with the ability to receive, store and teardown all current aircraft types.

GA Telesis and Turkish Interiors enter into distribution agreement

GA Telesis has entered into a long-term agreement for the distribution of Turkish Cabin Interiors' (TCI) galleys and aircraft cabin interior products, as well as all rotatable galley equipment. GAT will also provide operators with aftermarket spare parts support. The agreement will cover all commercial single-aisle, twin-aisle and VIP aircraft. GAT will exclusively

market and distribute TCI's advanced innovative engineering solutions which provide durability coupled with major reductions in gross weight of cabin interior products. "TCI's smart design philosophy brings a light-weight yet durable galley system that is unparalleled in aviation. Considering the industry's growing emphasis on weight reduction, we find TCI's products a perfect fit for our customers," said Jason Reed, President of GA Telesis CSG.

Aero Norway invests in skilled workforce

Norway-based engine MRO facility Aero Norway AS has moved to a shift work programme to increase its production capacity as the rate of engine inductions at the facility continues to grow. Over the next few months its skilled and experienced engineers will supervise the training of ten new apprentices as the company reinforces its commitment to knowledge sharing and deepening the expertise and certification of its internal resource pool. A CFM-authorized repair station, Aero Norway, is specifically designed for CFM56 engine maintenance and has the capacity for up to 120 engines per year. Services cover the entire spectrum of repairs and maintenance

across all three engine models – CFM56-3, CFM56-5B and CFM56-7B; and recent approval by the Civil Aviation Administration of China means that the Aero Norway engine MRO centre is now multi-release FAA, EASA, TCCA and CAAC certified, with application for DGCA also underway.

StandardAero signs partnership agreement with Solenta Aviation Workshop

StandardAero has signed a new, exclusive, two-year partnership agreement with Johannesburg, South Africa-based Solenta Aviation Workshop, to provide a guaranteed LRU, MRO and exchange program to support Solenta's PT6A/PW100 engine operations. As a strategic partner, the program is specifically designed to provide Solenta Aviation Workshop with highly customized service options to proactively support the company's expansive worldwide operation. Per the agreement, StandardAero will provide an exhaustive suite of services, which will include engine LRU repair, engine LRU exchange, service bulletins and airworthiness directives recommendations, unscheduled and AOG support, troubleshooting support and program management. StandardAero will provide services at the company's maintenance facilities in Winnipeg, Canada and Tilburg, The Netherlands.

Triumph selected for Cessna Citation Longitude program components.

Triumph Group (TGI) has been selected by Textron Aviation to supply aluminum machined parts for the new Cessna Citation Longitude super-midsize aircraft. Triumph Precision Components' Complex High Speed Center of Excellence, based in Wichita, will produce the aluminum spars and wing skins for the Longitude program. To add manufacturing capacity, Triumph invested in a new Makino A6 5-axis horizontal machining center that became operational in August 2016. The A6 machine is built specifically for high-efficiency machining of complex aluminum monolithic parts of up to six meters in length. The new agreement continues a long-standing relationship between Triumph and Textron Aviation. Triumph currently provides a number of structural components and systems for Textron Aviation, including stringers, bulkheads, frames and spar caps. This agreement will contribute to organic growth for Triumph. Delivering on customer commitments, becoming predictably profitable, and driving organic growth are fundamental to the company's long-term strategy.



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B/E Aerospace reports 2016 financial results

B/E Aerospace announced its full year and fourth-quarter 2016 financial results. Full year 2016 revenues of US\$2.9bn increased 7.4% as compared with the prior year. Full year 2016 bookings were approximately US\$3.3bn and the book-to-bill ratio was 1.1 to 1. The company's 2016 full-year and fourth-quarter results include after-tax charges totaling approximately US\$20.0m related to the pending Rockwell Collins merger transaction and restructuring charges. On a GAAP basis, full-year 2016 operating earnings of US\$506.6m increased 12.0% as compared with the prior year. Net earnings of US\$311.1m increased 8.9% as compared with the prior year. As of December 31, 2016, backlog increased by approximately US\$300m, as compared with December 31, 2015, to approximately US\$3.5bn, while awarded but unbooked backlog was approximately US\$5.6bn. Total backlog, both booked, and awarded but unbooked, was approximately US\$9.1bn.

Government of Canada will provide CA\$372.5m in repayable contributions to Bombardier

The Government of Canada is committed to keeping Canada at the forefront of global leadership in the aerospace sector. The aerospace industry is one of the most innovative industries in Canada, and it provides over 211,000 quality jobs for Canadians, and CA\$28bn annually in GDP to Canada's economy. That is why, today, the Government of Canada announced that it will provide CA\$372.5m in repayable contributions to Bombardier. This funding will be provided over four years and will support thousands of good middle-class jobs, strengthen the long-term competitiveness of Bombardier, and help to build the aircraft of the future. Through its collaboration with Bombardier, the Government of Canada is investing in thousands of Canadians and hundreds of suppliers across the country. As the nation's largest aerospace company, Bombardier supports thousands of jobs in design, engineering and manufacturing through its nationwide supply chain of companies. This initiative by the Government of Canada will fund research and development for the new Global 7000 business jet and ongoing activities related to the development of the company's C Series aircraft. (USD1.00 = CA\$1.32 at time of publication.)

Triumph Group reports third-quarter fiscal 2017 results

Net sales for the fiscal third quarter of 2017 declined 8% from the prior year quarter net sales, including US\$1.2m of incremental sales from the October 2015 acquisition of Fairchild Controls, offset by US\$4.5m of revenues related to the second-quarter divestiture. On an organic basis, sales were down 7% primarily due to production rate reductions by customers on the 747-8, G450/550 and C-17 programs, changes in model mix, decreased demand in commercial rotorcraft, and foreign exchange rates. These factors were partially offset by increased production rates on the 767/Tanker program and stronger sales in the Product Support segment resulting from key contract wins with regional and commercial operators for components and accessories. Operating income included US\$14.1m of restructuring costs and a US\$14.4m loss on the pending sale of assets of Triumph Air Repair, the APU overhaul operations of Triumph Aviation Services-Asia and Triumph Engines-Tempe. Cumulative catch-up adjustments on long-term contracts

were a net favorable US\$2.1m. Net income for the third quarter of fiscal year 2017 was US\$29.3m.

SIA Engineering Group posts profit of S\$52.6m for third quarter

The Group posted a profit attributable to owners of the parent of S\$52.6m for the third quarter of FY2016-17, an increase of S\$3.2m or 6.5%. Profit this quarter included a S\$2.3m gain on the partial disposal of an associated company, while the same quarter last year was impacted by provisions for closure costs and impairment of two associated companies. Operating profit of S\$25.2m was S\$3.8m or 13.1% lower than the same quarter last year. Revenue of S\$272.3m saw a decrease of S\$2.9m or 1.1%, mainly from lower fleet management and airframe and component overhaul revenue, mitigated in part by higher line maintenance revenue. Expenditure at S\$247.1m increased at a lower rate of 0.4% or S\$0.9m as the current quarter benefitted from an exchange gain of S\$4.8m, while increases in staff costs were mitigated by lower subcontract costs. For the quarter, share of profits of joint-venture companies was S\$14.3m, S\$3.2m lower than the same quarter last year. However, contributions from associated companies increased by S\$1.6m or 10.2% to S\$17.3m. (US\$1.00 = S\$1.41 at time of publication.)

Milestone Aviation Group provides US\$230m secured debt facility to Bristow Group

Milestone Aviation Group, a GE Capital Aviation Services (GECAS) company and the global leader in helicopter leasing, has signed a commitment letter with Bristow Group, a leading provider of global industrial aviation services. Under the agreement, Milestone is providing a US\$230m secured term loan facility to a subsidiary of Bristow, secured by a pool of Bristow's helicopter assets. As part of the agreement, Bristow will extend select Sikorsky S-92 leases with Milestone, and Milestone will also defer lease rentals on select Airbus H225 assets on lease to Bristow.

Spirit AeroSystems meets 2016 guidance

Spirit AeroSystems reported fourth quarter and full-year 2016 financial results driven by strong operating performance of mature programs. Spirit's fourth-quarter 2016 revenue was US\$1.6bn, down by two percent compared to the same period in 2015, primarily driven by lower production deliveries on the Boeing 747 and 777 programs, and partially offset by higher activity on non-recurring programs. Revenue for the full year increased two percent to US\$6.8bn, primarily due to higher production deliveries on the Airbus A350 XWB and Boeing 767 programs, partially offset by lower revenue recognized due to the impact of pricing terms on the Boeing 787 program and lower production deliveries on the Boeing 747 program. Operating income for the fourth quarter of 2016 was US\$161m, compared to US\$206m in the same period of 2015, primarily due to one-time incentive payments received in the fourth quarter of 2015. Operating income for the full year was US\$725m compared to US\$863m in 2015, with the decrease primarily resulting from forward loss charges recognized during the second quarter of 2016. Fourth-quarter reported EPS was US\$0.89,

compared to US\$1.01 EPS for the same period of 2015. Full-year EPS was US\$3.70, compared to US\$5.66 EPS in 2015.

Hawker Pacific acquires Adagold FBO Operations in Brisbane and Cairns

Hawker Pacific has reported the acquisition of Adagold's Fixed Base Operations (FBO) in Brisbane and Cairns. The two acquired FBO operations have been operating under the Hawker Pacific brand since January 24, 2017. In Brisbane, Hawker Pacific will operate from both its existing FBO facility and from the newly acquired FBO in the General Aviation precinct, providing unique access opportunities for customers. As Asia Pacific's premier Fixed Based Operator, Hawker Pacific operates a network of world-class facilities across Australia and in the key Asian ports of Singapore and Shanghai, offering outstanding customer service and crew facilities on a 24/7/365 basis. The expansion of Hawker Pacific's Fixed Base Operations further strengthens the company's capacity to take full advantage of growth opportunities in Queensland. The acquisition comes as Queensland gears up for the 2018 Commonwealth Games on the Gold Coast, the scheduled completion of a new runway at Brisbane Airport in 2020, and the opening of a new casino in Brisbane. Cairns continues to be a premier tourist destination with increased business traffic. In addition to added

capacity, the closer proximity of the new FBO facility to the new runway at Brisbane Airport will deliver significant time saving for Hawker Pacific customers, particularly when utilizing the General Aviation precinct.

Dos Rios Partners acquires Pathfinder Aviation

Dos Rios Partners, a Texas-based private equity firm, has acquired Pathfinder Aviation. Dos Rios partnered with Chuck Constant and Pete Henrikson of Phoenix Aviation Group of Dallas, TX and acquired Pathfinder from its founder and previous owner, Michael Fell. Chuck Constant and Pete Henrikson will lead the company as CEO and EVP of Operations, respectively. Pathfinder is one of the most-tenured and fastest-growing operators in Alaska and was founded in 2000 by Mike Fell to provide aviation services to the Alaskan market and beyond. With its rich history of operating fixed-wing aircraft and helicopters in Alaska and other locations around the world, Pathfinder has proven to be a strong international aviation company serving customers year-round in the North Slope & Cook Inlet. Mr. Fell's focus on customer service and safety is prominent in every facet of the Pathfinder culture.

Other News

Honeywell has joined the Clean Sky 2 Joint Undertaking, the largest European research program developing innovative technologies aimed at reducing carbon dioxide emissions and noise levels produced by aircraft. As a core partner of Clean Sky, Honeywell received funding worth €35m (US\$37m) to back the development of aerospace technologies in support of the initiative. The funding will further strengthen Honeywell's commitment to its European engineering centers, particularly in the Czech Republic, France and the United Kingdom. As part of its membership, Honeywell will undertake projects to develop priority technologies from cockpit solutions to health monitoring. It will also use the funding to advance its electromechanical actuators, which help improve aircraft performance and encourage lower operating costs.

Lufthansa Technik has equipped a fourth VIP aircraft with the fastest available Internet connection. In addition to two Boeing 737-VIPs and an Airbus A340-VIP, the owner of an A330-VIP is now one of the first private customers to be able to use the new Ka-band broadband Internet solution. The experts in the VIP & Special Mission Aircraft Services business unit are currently installing this technology in yet another A340, and more completion contracts for VIP aircraft are currently in the acquisition stage. The integration and approval of what is presently the fastest Internet connection on board has become routine for the experts at Lufthansa Technik. The latest aircraft

was even returned to the customer two days ahead of schedule.

To enhance its service in Line Maintenance, **SR Technics** has optimized its operational office by moving to a mobile environment. Following extensive testing in order to determine which systems and devices provided the best operational data access, SR Technics' Line Maintenance engineers and technicians are now equipped with mobile tablets which gives them the ability to perform their duties more efficiently, whenever and wherever the work is performed. This technology upgrade will increase quality and make processes leaner, besides providing the teams with a handy work solution. Connected to a secure data server, this virtual solution allows SR Technics experts to access aircraft documentation, live flight operations information, planning functions and work package distribution. It also includes task completion confirmation linked with the back office's electronic operational control board. The feedback from maintenance personnel confirms that the new equipment is helping them to perform their tasks more efficiently. "We are continuously looking for new innovations and ways to improve our operations," says Jakob Straub, Head of Line Maintenance at SR Technics. "With the integration of the mobile solution, Line Maintenance has found an efficient way to respond and even stay one step ahead of our customers' needs."



The A340 is a prime target for part out.
Photo: Lufthansa Technik Philippines

Parted planes

Aircraft retirements and a demand for parts to support aftermarket and maintenance services are two of the leading factors that are driving the aircraft teardown and part-out market.

Keith Mwanalushi looks closer at the current trends in the sector

The teardown market is highly fragmented with a number of leading and smaller players that engage in various activities associated with aircraft disassembly and dismantling, as well as component management and aircraft material logistics and supply chains.

Clearly, the strongest demand for part-out and teardown is coming from the narrowbody aircraft such as the 737NG and A320 series. John Benschmidt, VP for sales and marketing at Aero Controls Inc says the component commonality of these aircraft to other series within the family strengthen the value since the material has wider use. "The sheer volume of these aircraft families within the global fleet naturally result in a higher quantity of aircraft retirements, teardowns, and need for part-out to support the spare parts market."

Larry Montreuil, VP for asset management and business development at Werner Aero Services also sees the greatest demand in the narrowbody fleet as the A320NEOs and B737MAX deliveries begin. "Demand for V2500 powered A320s has also increased due to the need to accomplish shop visits on the Vs. Spare V2500 engines have become increasingly valuable to support all of the shop visits coming up in the next couple of years." Montreuil adds these shop visits are likely to extend the service life of the engines and encourage more use of the aircraft. "Continued use of the A320 classic fleet will sustain demand for used surplus material; with aircraft tear downs being the most cost effective source of these spare parts," he asserts.

When speaking to customers, Stratton Borchers president at True Aero reveals that the conversation inevitably turns to CFM56-5B/7B and

V2500-A5 material and the relevant airframes associated with each.

"There is substantial demand for these parts as engines are entering MRO's for predicted shop visits, but the primary driver is the lack of supply on the teardown side of the equation," notes Borchers. He adds that bidders ranging from lessors, teardown facilities, and OEM's are buying assets that normally would go for teardown to support shop visits are instead burning off green time, supporting internal PBH contracts or rebuilding the engines for lease that have an exponential impact on the supply and demand balance for the market. "These activities increase the demand for parts at specific cycles remaining thresholds and simultaneously reduces the supply of engines that are teardown candidates. The hamster wheel will start to slow as too many



Montreuil says the spare parts market is volatile and greatly influenced by supply and demand.
Photo: Werner Aero Services



There's a significant supply of 737 Classic material.
Photo: Keith Mwanalushi

companies rush into rebuilding engines and cannot find a home for their shiny new toys."

The value of parts is a key factor in deciding whether an aircraft should be parted-out. At Aeronautical Support International (ASI), President Dean Morgan says they are always looking at a supportable fleet size. "Sometimes the industry forgets, every time an asset is parted-out there is one less aircraft or engine in the market to support. Also we are looking at market characteristics, such as how tight of a hold the OEM have on the aftermarket of a given asset type."

Max Wooldrik from Apco Aviation reminds that the biggest driver in terms of part value is the availability of that specific part on the market. "If you take a 737 classic for example....that aircraft has been parted-out so many times so much that the market is absolutely saturated with 737 classic parts. Therefore you are competing with so many others that are offering that exact same part. This usually ends up in having to lower the price to make the deal." That is in contrast to a type that has not been parted-out before – "the only competition you will then have is factory new parts from the OEM, and that in turn keeps up the part value obviously," Wooldrik continues.

In the market today Life Limited Parts (LLPs) such as landing gears with more than 50% life remaining before overhaul due, LLP status on APU and engines will have a major contributing factor on valuation, according to Conrad Vandersluis, VP strategic material and asset management at AJW Aviation. "A focus on standard use Line Replaceable Unit's (LRUs) will continue to drive the valuation depending on market supply and demand.

"Saturation is now clear on slow moving parts such as flying control surfaces where requirements can be erratic and in turn highly competitive," observes Vandersluis.

The valuation of certain components, especially larger assemblies (for example engine inlet cowls, thrust reversers, and APUs) can fluctuate

rapidly depending on the market supply. "If a group of aircraft within the same family are parted-out at the same time and the market is instantly flooded with these items, a drop in value can occur. Whereas, if an operator needs a part due to an AOG situation and the spares market only has a few available, the value can instantaneously increase," states Benschmidt.

Shifts in strategy of operator fleets also greatly affect market value, he adds. "When Amazon announced their plans to build an Amazon Prime Air fleet of 767s, that aircraft end-of-life value increased due to the spare parts potential."

Larry Montreuil echoes those sentiments saying the spare parts market is volatile and greatly influenced by supply and demand. He says some parts have lost considerable value due to the high number of aircraft part outs and low usage. "Thrust reversers are an example of this situation. Meanwhile, upgrades, SBs and ADs, fleet changes and standardisation drives demand and with it, prices for other parts."

Aircraft such as the 737 classics that were once a prime target for part-out are staying longer in service due to low fuel prices. These were once a very high retirement aircraft type but now this has reduced in the numbers



John Benschmidt, VP Sales & Marketing at Aero Control Inc.



Demand for V2500 powered A320s has increased.
Photo: MTU

being retired therefore surplus availability has also subsequently reduced. AJW Aviation observe that operators have in the past taken the view of reducing cost by buying replacements rather than repairing as cost to repair was higher than what you could purchase components on the market. On some LRU's this has now changed due to surplus availability, Vandersluis stated.

There's a significant supply of 737 classic material in the marketplace so prices for that material remain low and the demand is fairly low as well in comparison to newer aircraft. Benschmidt highlights that there will always be the classic/older generation aircraft being flown by some operators regardless of whether it's due to falling fuel prices, asset management, or maintenance strategies so there will still be some sort of demand for these spare parts.

"The cost of acquisition plus teardown of older generation aircraft will, at some point, outweigh the value of the material. The return on these investments is greatly affected by the reduced sales velocity of the material so that must be taken into account as well. When should the shift from investing in part-outs of the classics to the newer generation to support a more prolific fleet occur? That's the multi-million dollar question," Benschmidt declares.

Understanding the past allows us to put the present in perspective. At the height of the 737 classics, there were over 3,000 aircraft in service, "but that number has diminished to 856 active aircraft with another 1,068 in storage," says Jim Legg VP materials at True Aero. The active fleet of 737CL's will continue to reduce through retirements, is serving

as a bridge aircraft until new order aircraft become available or servicing the niche market in freighter conversion and will continue to see

limited service life while oil prices remain low, he foresees.

"In the market today Life Limited Parts (LLPs) such as landing gears with more than 50% life remaining before overhaul due, LLP status on APU and engines will have a major contributing factor on valuation."

Conrad Vandersluis, VP strategic material and asset management at AJW Aviation

"There is a surplus of material from teardowns and OEM/operator legacy inventories that are available to support the remaining aircraft in operation. The engine and component

markets are considered a high scrap rate material due to the cost of repair and overhaul being more expensive which incentivises owners to find a replacement unit to fill the demand cycle moving forward instead of inducting the asset," states Legg.

The 737 classic will continue to see service but is defiantly considered a sunset platform.

In some respect, the teardown market is going through some kind of revolution that has created some challenges. As with what's happening in many other industries, Bensch-



Vandersluis - Saturation is now clear on slow moving parts.
Photo: AJW Aviation



The valuation of certain components can fluctuate rapidly.

heidt is seeing further consolidation of the companies and facilities offering teardown services. He says this is an indication of a maturing market which is a great thing as another way to create value within commercial aviation. "However, the teardown market needs to be cautious not to get too comfortable. Focus on competitive pricing and customer service so other alternative entrants don't take advantage of an opportunity," he warns.

"There are so many companies trying to get into the teardown business that have absolutely no clue what they are doing," Wooldrik weighs in.

He explains that these companies often do have access to some form of capital and they start buying airplanes without sufficient knowledge about the part-out business. "These companies tend to overbid on assets which in turn drives the prices up."

However, Wooldrik assures that this issue usually addresses itself because these companies more often than not fail as they discover sooner or later that they've paid more for the asset than they will ever make selling the individual parts.

Borchers reckons there should be a standardised framework that unites operators, leasing companies, MRO's and parts companies on what to require upon redelivery that will follow the part through its lifecycle.

And there is increasing competition in engine teardown too. Morgan, with 25 years' experience in the commercial aircraft engine overhaul and trading business knows that engines represent the majority of the

aircraft's aftermarket value and this attracts a lot of part-out companies to taking on the engine part-out business.

However, Morgan does not recommend anyone getting into the engine business without adequate technical expertise. He says the numbers (deal size) are large, but the potential to get hurt is even larger. "You need to have a very good understanding of the market, hardware repair and scrap characteristics and customer demand characteristics. At ASI we have built a team that will be very competitive in the engine part-out business, with both technical know-how and key customer relationships the engine business is our strength."

Engine maintenance is very material intensive. The wave of shop visits requires an economical source of engine material to avoid the extremely high costs of new parts, Montreuil relays. "The engine shops who have sold PBH agreements are highly motivated to acquire used material that can reduce their shop visit costs. Even if some material that is required is out of scope of PBH and considered over and above, or it's a time and material shop visit, lead times of new material make sourcing used material more attractive."

Material is the number one cost driver for engine maintenance. And as Benschmidt sums up, having an alternative to purchase serviceable material at a reduced price that will achieve the same end result rather than new OEM parts is driving the demand and growth in the engine teardown market.



The smart factory

On the road to MRO 4.0:
with human-machine synergies

Human-machine synergies will be more apparent.
Photo: Lufthansa Technik

The tone for tomorrow's working world is being set today – by mega-trends such as the digitalisation of industry. Buzzwords such as “artificial intelligence” and “digitalisation” dominated discussions at this year's World Economic Forum in Davos as well. What applies to machinery and plant engineering also applies to the aviation industry, especially to the production units of manufacturers and MRO companies.

“We went to work on this trend years ago, determining its potential in all the relevant production units, initiating innovation projects and starting to integrate new advanced technologies in our work processes,” says Dr. Helge Sachs, Head of Innovation Management, Technology and Product Development at Lufthansa Technik. The condition for this was created, among other things, in platform-based, cross-divisional projects that enabled the potential for selected automation processes to be evaluated more thoroughly and verified in concrete prototypical applications. These projects provided many important insights for subsequent implementation projects and automation processes. Some divisions are already using meaningful technologies in relation to the Internet of Things and organising their maintenance activities in a more resource-efficient manner.

Engine overhaul, in particular, is benefiting from many years of basic research. First of all, the unit managed to automate energy-intensive multi-stage inspection processes and combine them in a single process step. On that basis, it was then able to develop innovative new manufacturing procedures and an intelligent automation technology for defective components. This

means manual repair processes are now supported by an adaptive automated process chain, with robots and humans involved in the partially automated repair process in equal measure. Meanwhile, another engine unit has been using an automated repair procedure for modern 3D high-pressure compressor blades for several years. Specially developed by Lufthansa Technik, this procedure increases efficiency and prolongs the blades' service life significantly.

Besides these and other automation processes in the areas of damage diagnosis and repairs, digitalisation processes are also becoming increasingly important. For instance, the digital networking of machine tools for landing gear overhauls has helped exploit existing digital potential even better, resulting in profitable cost savings. And component services is even working on networking entire engine test facilities and defining storage formats in order to make test protocols and measured values available for data analysis anywhere, anytime. In addition, data from the test facility will be integrated with other life cycle data of aircraft components to further improve the maintenance process.

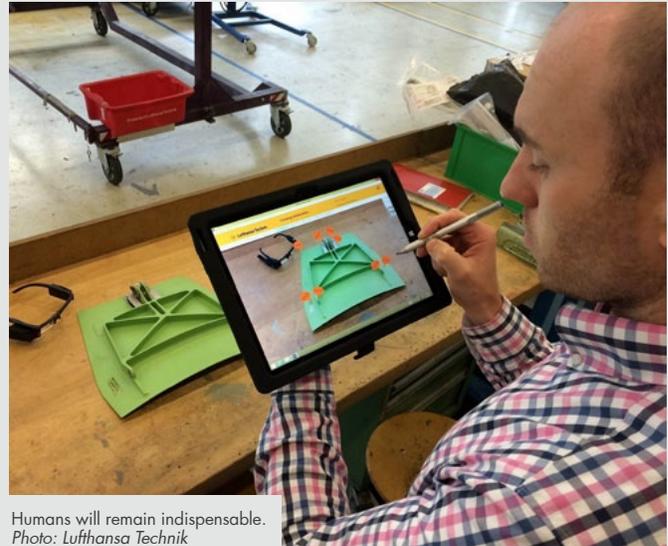
Lufthansa Technik's plans for ground support equipment go even further: In the future, a self-controlling, intelligent system will independently plan the tools and equipment needed to complete work orders and coordinate their transportation. All the companies and departments involved in the value chain will be digitally interlinked to optimise the high level of planning effort. But digitalisation is relevant to more than just complex processes; digital functions are also increasingly used in mobile services.

The images produced by borescopes during visual inspections of compressor blades, for instance, are now transmitted to the screen digitally rather than through optical fibers.

In addition to digitalising existing processes, Lufthansa Technik is also using more and more digital assistance systems in various areas. For example, the company has tested smart glasses – small portable computers that display process-relevant information in the user's field of vision. Employees thus have both hands free to perform their actual tasks and can complete the work more efficiently. Other smart glasses are used for training purposes, supporting the user by displaying step-by-step instructions. And the airframe related components unit is already in the process of evaluating assisted reality systems for the innovative topic of remote maintenance.

On the road to MRO 4.0, it is important for Lufthansa Technik not just to develop, integrate and implement state-of-the-art technologies and processes on its own, but also to look at the bigger picture. That is why many of the company's units are further intensifying the exchange of know-how and targeted co-operation with other departments, manufacturers, start-ups and research institutions. "That's the only way we can remain open to new developments," explains Dr. Helge Sachs.

In the age of Industry 4.0 and digital transformation, certain tasks will disappear. But at the same time, many jobs with new profiles will be created. Intelligent machines will take over more and more difficult, monotonous tasks to relieve employees. "But



Humans will remain indispensable.
Photo: Lufthansa Technik

humans will remain indispensable, and continue to perform the work they do best. The high professionalism of humans and the quality and precision of machines can thus be combined, providing us with added value in the form of high product quality and efficiency," says Dr. Helge Sachs. In short, it's an ideal human-machine synergy in tomorrow's smart factory.



Increasingly, intelligent systems will plan tools and equipment needed.
Photo: Lufthansa Technik

In the hot seat.....

Graham Grose, Global Industry Director of Aerospace and Defence at IFS

AviTrader MRO: What is IFS' current activity in the civil aviation sector?

Grose: The civil aviation sector is a key industry for IFS. Our flagship products, IFS Applications and IFS Maintainix, supports the civil aviation industry by offering a unique, end-to-end solution that covers everything from fleet and asset management to MRO and supply chain management. IFS provides reduced risk and costs for operators through end-to-end efficiency and a streamlined maintenance process. Customers in civil aviation include Emirates, Alitalia, Scandinavian Airlines, GE Aviation and many more. We recently unveiled the new IFS Tail Planning, Optimisation and Assignment solution to the global civil aviation industry, helping airlines synchronise aircraft allocation with their maintenance requirements.

AviTrader MRO: IFS recently acquired Mxi Technologies. Can you give us a few more details about the terms of the acquisition?

Grose: Both IFS and the company selling Mxi, Moelis Capital Partners / Nexphase (a US private equity firm), agreed that there is a very strong strategic rationale for combining the two businesses and that IFS presented a natural home for Mxi, its customers and its staff. IFS and Mxi's Maintainix products complement each other perfectly for line maintenance, complex assembly MRO and component MRO. By combining the two offerings, IFS can offer a unique and complete aviation maintenance approach rivalled by no other enterprise application vendor. In the future, IFS will continue to invest, support and offer both IFS and Mxi solutions as they both have their respective strengths for specific customer needs. The functionality will be developed so that IFS can deploy the aviation maintenance solution as a best-of-breed solution - offering a great "break-in" to customers already



IFS recently acquired Mxi Technologies.

running competing enterprise-wide products - or as part of an IFS end-to-end enterprise solution. Both IFS and Mxi are privately held companies so the terms of the acquisition will not be publicly disclosed.

AviTrader MRO: Will Mxi retain its brand identity?

Grose: Mxi and IFS are both global businesses, and the primary driver is to combine the strengths of both companies to better serve and grow our position within the global civil aviation market. The sector expertise of the IFS Aerospace & Defense Centre of Excellence will combine with the industry experience of Mxi to establish a new IFS Aviation & Defense Business Unit. There are a lot of similarities in the way IFS and Mxi approach product development, and we think there is a great opportunity to learn from each other to improve the way both companies work. That will be a key focus of integration.

AviTrader MRO: What led to the interest in the Mxi MRO software?

Grose: IFS has been monitoring Mxi for some time and in light of our growth plans, ability to execute and the opportunity being created by combining Mxi with IFS, we felt now was the right time to move on the acquisition. IFS wants to continue to grow and there is a great opportunity to build upon the company's leadership position in the global asset-centric civil aviation industry. Mxi is a market leader in the Aviation Maintenance Software (AMS) sector thanks to successful implementations of its Maintainix solution at many commercial airlines operators. Mxi is renowned for its compliance-centric approach, which is a very good fit for IFS and offers great opportunities in addressing the market moving forward. In addition, Mxi has over 265 employees who are predominantly located in North America, which means IFS can rapidly expand its presence within the region.

AviTrader MRO: The MRO software market is getting quite competitive. How will this acquisition benefit the end user?

Grose: Mxi and IFS customers will benefit from the fact that IFS will significantly strengthen its capabilities and competence in civil aviation. Mxi's Maintainix product suite consists of an Operator Edition and MRO Edition and includes capabilities that will extend and deepen the functionality of IFS, especially addressing the line maintenance area, as well as complementing the strength of IFS in MRO - which will ulti-



Graham Grose, Global Industry Director of Aerospace and Defence at IFS

mately benefit the end-user.

Both companies believe there is an appetite in the market offering Maintainix as a best-of-breed solution, and at the same time invest in integration with IFS Applications, so we can also bring a full end-to-end enterprise solution to support all our customers' needs.

AviTrader MRO: In terms of solutions for the aviation sector, what's next in the pipeline at IFS?

Grose: At a recent event in Asia, the fastest growing region for air passenger demand, IFS unveiled its new Tail Planning, Optimisation and Assignment solution for the global civil aviation industry. Designed in collaboration with a world-leading airline, the solution helps synchronise maintenance tasks with busy airline schedules to optimise operations. The benefits include better fuel efficiency, maintenance cost reductions and allows airline planners to react faster to unexpected events such as extreme weather conditions or unscheduled maintenance.

In the future, IFS will continue to focus on achieving growth in its key geographies and target industries - of which civil aviation is one. Specifically, the aviation maintenance market is a very attractive industry with maintenance efficiency one of the primary drivers to improve profit margins. Boeing predicts orders for nearly 40,000 new aircraft in the next 20 years, and more aircraft means more maintenance. We look forward to delivering our solutions to more customers as the market continues to grow worldwide.



There is need for some modifications to ATR-42 STOL aircraft.
Photo: ATR

As regional aircraft manufacturer ATR continues to roll out its popular new -600 series, there is a strategic push towards the services sector. **Keith Mwanalushi** finds out from new CEO Christian Scherer.

It's no surprise these days for OEMs to be heavily involved in aftermarket services for their products, and it's no different at ATR. The company sells its aircraft with the option to sign up to a Global Maintenance Agreement (GMA) - a comprehensive technical support for ATR-600 aircraft.

ATR is strategically developing this business. "I'm happy to report that we have seen a very healthy growth in services in particular in total care packages [GMA] this is where we take care of everything you want us to," Scherer explains while on board a BRA [former Braathens] ATR 72-600 above Sweden in February.

Scherer reports that the services business has seen a very healthy double digit growth and it is generating profitable revenue. "We subcontract to MROs and we work directly with airlines to provide a power-by-the-hour service or it can be very tailored including certain equipment, including airframe only, engine, and everything from toe to tail of the airplane."

A typical example was the GMA signed with Saudi Arabia's Nesma Airlines last year. The agreement includes a spare parts inventory on lease at the airline's premises, the access to ATR's spare part pools offering up-front exchange and timely availability, and the single channel management by ATR of the maintenance, repair and overhaul of propellers, engines, landing gears, and LRUs (Line Replaceable Units). The GMA includes also a direct delivery of these equipment at the customer's premises through a tailored door-to-door service.

In addition to the availability and repair services, ATR will also handle airframe maintenance for "C" checks and calendar inspections of the aircraft. The global maintenance agreement will help the airline to ease maintenance costs and tasks, while pro-



Scherer says the services business has seen healthy double digit growth.
Photo: ATR

viding accurate and timely services and the expertise and knowledge from the aircraft manufacturer.

“Our customers give us a thumbs up on that product, it’s profitable and it’s an emerging business. Services represents about 15% of our business now,” Scherer reveals.

In any case, the CEO affirms the simplicity and the frugal nature of the new ATR-600 airplanes in relation to maintenance – “our maintenance costs are predictable and are lower than the higher cost jets so we are a low cost, high class solution.”

ATR is currently proposing a short haul take off version of the ATR42 – STOL (Short take-off and landing) which will require some modifications to the aircraft. “What we are currently doing is testing the market on it and we have some good traction here and there but it is a significant investment because the main change will be the rudder.”

He explains that there is need for more rudder control to take evasive action in some small airfields with obstacles, for instance where you have a mountain on one side so if you need to do an engine out manoeuvre you need to be able to turn against the good engine and that necessitates a lot more rudder control – “it’s a significant modification and significant investment so typically, the shareholders will say they understand the logic and the business case if we can sell enough quantities and break even. We are testing the market and we are trying to secure one or two deals that will allow us to have a market validation.”

There are a few other modifications – the other major one being carbon brakes, “we have carbon brakes on the 72-600 but we don’t have carbon brakes on the -42 but that is any easy thing to do. And the last one is engine power, more power to the engines,” he states.



GMA's help airline to ease maintenance costs.

Photo: ATR



Pat Fenwick

Jet Aviation at St. Louis has named aviation veteran **Pat Fenwick** to the new position of MRO manager that was created in the continuous effort to improve customer service

in MRO maintenance projects. "Pat Fenwick has the perfect combination of industry experience, expertise, technical savvy, leadership ability and passion for aviation," said **Chuck Krugh**, senior vice president and general manager at Jet Aviation St. Louis.

With the upcoming end of his mandate as a Member of the Group Executive Committee (GEC), **Marwan Lahoud** will leave his current position as Head of International, Strategy and Public Affairs of Airbus, effective end of February. Lahoud has been a Member of the GEC for ten years and served the company in different roles over 20 years.

TrueAero has appointed **Lisa Clark** to the position of Asset Acquisition Analyst. Ms. Clark is a recent graduate of Baylor University with a Bachelor of Business Administration in Finance and Management. Her enthusiasm and qualifications will make a significant contribution to TrueAero's asset evaluation process.



John Wing

PEMCO World Air Services announced the promotion of **John Wing** from program manager to senior MRO manager. Wing will be based in Tampa where he will oversee all maintenance operations. He brings a background of proven leadership, program management excellence, and innovation to his new role.



Gaël Méheust

CFM International (CFM) has named **Gaël Méheust** as its new president and chief executive officer, effective immediately. Mr. Méheust is replacing **Jean-Paul Ebanga**, who had served as CFM president and CEO since February 2011 and has now moved to another position within Safran. CFM, the 50/50 joint company between GE and Safran Aircraft Engines, is headquartered in West Chester, Ohio, near Cincinnati. The

company was formed in 1974 and the two parent companies have an extended partnership agreement to the year 2040.

Matthew F. Bromberg will succeed **Bennett Croswell** as president of Pratt & Whitney's military engines business upon his retirement in May. Bromberg, who most recently served as president of the company's commercial engines aftermarket business, will join Pratt & Whitney Military Engines as Senior Vice President, Feb. 1, to ensure a smooth transition. Croswell will support UTC in a consulting capacity following his retirement.



Dario Fetahović

FAI Technik, the maintenance division of German-headquartered FAI Group, has appointed **Dario Fetahović** as Head of Maintenance, Planning and Customer Support, with immediate effect. Fetahović joins from Bombardier Aerospace's Amsterdam Service Centre, where he held the same position, bringing extensive experience in aircraft engineering and maintenance, and especially in base maintenance of Bombardier aircraft working with a global customer network.

Information Technology

Aviation IT company **Locatory.com** has deployed a new integration for its marketplace solution with **Pentagon 2000SQ**. The partnership is in its third year and integrates the most important Locatory.com marketplace solutions with the Pentagon 2000SQ system. This integration brings tangible benefits for all Pentagon and Locatory.com users. Companies in the aviation industry have an opportunity to utilize both tools to support their daily workflow. Shorter procurement cycle time and increased efficiency of business processes are key benefits available to users of both systems through this partnership. "Our customers realize that we all operate in an increasingly connected industry, and a direct interface to the Locatory.com services provides value that helps to increase revenue opportunities as well as lower overall operating costs. The Locatory.com technology platform has been very robust and reliable for us from an integration perspective, and the support team is very responsive and knowledgeable whenever assistance is required" said Gabriel Mofaz, President of Pentagon 2000 Software. PENTAGON 2000's total software solution is always improving. Development is guided by the operational re-

quirements and best practices of their customers, who rank among the leading companies in their industry.

GMF AeroAsia has signed a long-term agreement with **Satair Group** concerning the Airbus Managed Inventory (AMI) and Just In Time (JIT) services. The Airbus subsidiary Satair Group's AMI solution optimises inventory management and ensures that high-usage and non-repairable parts are automatically replenished. To improve the competitiveness of GMF AeroAsia, AMI guarantees parts availability and decreases inventory stock and surplus levels. The JIT solution offers fixed pricing, consolidated shipments and exclusive stocking on behalf of the customer. Together with the AMI service, GMF AeroAsia will get comprehensive coverage of both consumables and expendables. The scope of the AMI service initially is covering Airbus standard parts only, and the JIT solution covers Satair Group's broad range of distribution lines. However, there is a possibility to adapt and add other material categories in line with business evolution, fleet growth and aircraft configuration changes.