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# MRO

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## LINE MAINTENANCE

Driving outsourcing growth trends

Company Profile of Volga-Dnepr Technics

Latest MRO News  
from around the world

People on the Move  
latest appointments

IBA Analysis 



# This way for growth

Emerging airlines from Asia stole the limelight at the just ended Singapore Airshow. In total the event racked in a record breaking US\$32 billion worth of business as Asian carriers flexed their muscle signing multiple orders to fuel the explosive demand for cheap short-haul travel across the region.

Growth from the low-cost airline sector in particular has sparked a surge in demand for line maintenance services globally. Our main

feature looks at how MROs are responding to growing airline expectations to keep line maintenance costs down and drive up efficiency.

Elsewhere, Avia Intelligence looks at how Additive Layer Manufacturing or 3D Printing will revolutionise replacement part and PMA manufacturing. Rus Sutaria, fresh from speaking at the recent AVM Summit in London details how the industry has begun to use the new

technology to produce certified components for use on aircraft.

It seems the new technique has broad reaching ramifications for suppliers of replacement parts and PMAs. Compelling stuff!

Happy reading!

Keith Mwanalushi  
Editor



Line maintenance is expected to be worth an estimated \$13b over the next decade.

Photo: Ameco

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Registration

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Opinion

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IAE V2500 engine

Photo: IAE

### Tigerair awarded Pure-V engine designation

IAE International Aero Engines has awarded Singapore-based operator Tigerair the Pure-V designation for V2500 engines powering its aircraft. A Pure-V designated engine contains IAE-approved parts and repairs throughout the entire engine. The program was created to provide a designation IAE customers' engines that have been maintained to OEM standards, for example those covered by a Fleet Hour Agreement (FHA), and to recognize the superior value of these engines. According to IAE's records, approximately 60% of the V2500 fleet qualifies as Pure-V.

### THAI Smile extends Airbus' Flight Hour Services contract to 20 A320 aircraft

THAI Smile, a subsidiary of THAI Airways and Airbus have extended their existing 15 years 'Flight Hour Services – Tailored Support' (FHS-TSP) contract, adding nine additional leased A320 aircraft to cover its entire fleet of 20 A320 aircraft. The contract provides an extensive scope of A320 line

replaceable units (LRUs), guaranteed spare parts availability through Pool access service and on-site stock at THAI Smile's main base and selected outstations, repair services, logistics services, tools availability, APU and nacelle services.

### Pakistan International Airlines awards P&W PW4000 engine management program

Pratt & Whitney has signed an exclusive, three-year Engine Management Program (EMP) agreement with Pakistan International Airlines (PIA) to maintain the airline's fleet of 12 PW4152 installed engines. The Pratt & Whitney engines that are covered under this agreement power PIA's fleet of A310 aircraft.

### Airbus and Satair open new Singapore centre

Airbus and Satair opened their first joint parts support and distribution facility, "Satair Airbus Singapore Centre" (SASC), located at the Seletar

Aerospace Park in Singapore. The 16,700 m<sup>2</sup> facility will serve customers in the Asia-Pacific region, consolidating the supply chain operations of both Airbus and Satair. Building on both companies' existing presence, SASC has the capacity to almost triple the scope of parts handled. The centre will become the primary spare parts hub for Airbus in the region, providing 24/7 support to airlines and MROs, 365 days a year. The opening consummates the merger of Airbus' former Material and Logistics Management function with Satair – which has now become one common organization: 'Satair Group'.

### CDB Leasing of China first PurePower engines customer in Mainland China

With an order for up to 30 CSeries aircraft, CDB Leasing (CLC) of China will be the first recipient of Pratt & Whitney PurePower engines in mainland China. In a purchase agreement with Bombardier Aerospace, CLC will receive up to 30 CS100/CS300 aircrafts. The CSeries aircraft family is powered exclusively by Pratt & Whitney PurePower PW1500G engines.

### Malaysia Airlines awards P&W \$550m Fleet Management Program

Pratt & Whitney has signed an exclusive, 10-year Fleet Management Program (FMP) agreement with Malaysia Airlines to maintain the airline's fleet of 43 PW4170 installed engines and spare engines. The agreement, which includes an option to extend the contract for up to five additional years, is valued at approximately \$550m. The Pratt & Whitney engines power Malaysia Airlines' fleet of A330 aircraft.

### UTC Aerospace Systems expands C.A.R.E. program for maintenance support on Singapore Airline's Boeing 777 fleet

UTC Aerospace Systems has extended its Comprehensive Accessory Repair and Exchange (C.A.R.E.) program with Singapore Airlines to provide repair services and asset management for the airline's expanded fleet of Boeing 777 aircraft. The original C.A.R.E. program for Singapore Airlines began in 2007 and included service coverage of air management and electric power systems for the carrier's B777 fleet. This expansion of the agreement includes service coverage for eight additional B777-300ER aircraft and extends the agreement through the year 2025.



Alenia Aermacchi, produces the horizontal stabilizer and the central and aft sections of the fuselage for the 787 Dreamliner  
Photo: Alenia Aermacchi

### Boeing and Alenia Aermacchi finalize restructured contract for the 787 Program

Boeing and Alenia Aermacchi, a Finmeccanica Company, have finalized a restructured contract for the 787 Program. The contract establishes a new performance based business arrangement that will drive improved operational performance for Alenia Aermacchi and the 787 program. Based on the market success and increased production rates of the 787 program, Boeing has con-

firmed orders for additional shipsets from Alenia Aermacchi within the contract period. This agreement will strengthen Alenia Aermacchi relationship with Boeing providing stability to the industrial and business performance of Alenia Aermacchi. Alenia Aermacchi is successfully providing the required performance to support program rate increases that hit rate 10. Alenia Aermacchi produces fuselage Section 44 and 46 for the 787 program in Grottaglie plant and horizontal stabilizers in Foggia. To date Alenia Aer-

macchi has delivered nearly 200 units.

### Boeing selects Monarch Aircraft Engineering to provide GoldCare to Norwegian Air International

Monarch Aircraft Engineering (MAEL) has been selected by Boeing to provide GoldCare support to Norwegian Air International's Boeing 787 Dreamliner operation at London Gatwick Airport in the UK. MAEL's experienced engineering team will commence support services in the second quarter of 2014 with the first of four Boeing 787 Dreamliner aircraft entering into an initial short haul flying programme from London Gatwick.

### Boeing starts building first Next-Generation 737 at increased production rate

Boeing is starting assembly this week of the first Next-Generation 737 to be built at the increased rate of 42 airplanes per month. Since 2010, production of the 737 has increased about 33%, from 31.5 to 42 airplanes a month, its highest rate ever. On February 5th, Mechanics will load initial parts of the spars – internal support structures in the wings – into an automated spar-assembly machine. The spar is the first step in building the wings and marks the start of the assembly of the airplane at the Renton, Wash. factory.

### HAECO completes acquisition of TIMCO Aviation Services

Hong Kong Aircraft Engineering Company (HAECO) has completed its previously announced acquisition of TIMCO Aviation Services (TIMCO). With the completion of the transaction, TIMCO will be a wholly-owned subsidiary of HAECO, creating one of the world's leading airframe MRO service providers based on scope of services and products offered. HAECO and TIMCO together will provide customers with an enhanced range of capabilities and will be uniquely positioned to capitalise on significant growth opportunities, particularly in the aircraft interiors engineering and manufacturing market segments. "This is a truly exciting day for HAECO and TIMCO as our companies embark upon a new chapter of global growth," said Augustus Tang, Chief Executive Officer of HAECO. He added, "TIMCO's strong reputation for quality aircraft care and customer services fits well with the HAECO family of companies. We are looking forward to continuing to grow TIMCO's

capabilities and reach, especially in the delivery of aircraft interiors products and services."

### P&W marks opening of new MRO and engineering facility at Singapore Seletar Aerospace Park

Pratt & Whitney marked the official opening of Pratt & Whitney Component Solutions, the company's new repair and engineering facility at Singapore's Seletar Aerospace Park. The new flagship facility performs certain PW4000 engine component repair and will house various office support departments, including the company's recently established regional office, and Global Services Engineering – Asia, which provides highly skilled aftermarket repair design for the company's businesses in the Asia Pacific region. The new Pratt & Whitney Component Solutions unit forms part of Pratt & Whitney's US\$110m investment in Seletar Aerospace Park, where the company

is also building a new 180,000 ft<sup>2</sup> manufacturing facility to manufacture PurePower engine hybrid aluminum fan blades and high pressure turbine disks.

### Bombardier inaugurates first wholly owned service centre in Asia-Pacific Region

Bombardier Aerospace held an inauguration event, coinciding with the Singapore Airshow, to officially open its new full-scale, company-owned service centre located at Seletar Airport in Singapore. The facility features 3,000 m<sup>2</sup> (32,000 ft<sup>2</sup>) of hangar space, 3,500 m<sup>2</sup> (38,000 ft<sup>2</sup>) of dedicated ramp, 3,500 m<sup>2</sup> (38,000 ft<sup>2</sup>) of workshop, warehouse and office space. The service centre includes a staff of over 40 employees and is equipped to perform scheduled and unscheduled maintenance, as well as modifications, avionics installations and aircraft on ground (AOG) support for Bombardier Learjet, Challenger and Global aircraft.

### Nexcelle provides first components for CFM International's LEAP-1C engine

Nexcelle – the joint venture of Aircelle (Safran) and GE Aviation's Middle River Aircraft Systems for a new generation of engine nacelles on integrated propulsion systems – has delivered its first O-Duct nacelle to equip CFM International's LEAP-1C engines for the COMAC C919 jetliner. Developed and manufactured by Aircelle, this innovative O-Duct marks a milestone in Nexcelle's production hardware deliveries, and is to be used – together with other nacelle components – for engine flight test. Nexcelle has also delivered the first LEAP-1C air inlet from Middle River. The hardware has been installed on a LEAP development engine currently undergoing tests. The one-piece composite O-Duct delivered by Nexcelle is a technology breakthrough in nacelle design for integrated propulsion systems, replacing a traditional thrust reverser's two-piece "D" doors. When deployed, the O-Duct moves aftward to the reverse thrust position, eliminating drag links in the engine's secondary flow-path, enhancing the airflow path and improving fuel consumption, while also increasing thrust reverser efficiency.

### Turbomeca extends Indonesian Customer Support Contract

Turbomeca (Safran) announced its agreement with Indonesia's PT Travira Air for a Customer Support agreement extending a "Support By The Hour" (SBH) contract for five more years. The €5.7m (\$9.5m) contract covers a total of 20 engines (Arriel 1D1, 2S1, 2S2 and 1S1), including spares, fitted to seven Sikorsky S76 and one Airbus Helicopters AS350B2 aircraft. Through this agreement Turbomeca reaffirms its commitment to supporting PT Travira Air's fast-growing off-shore operations, from bases in Jakarta (Indonesia) and Kota Bahru (Malaysia).

### Airline Services Components to provide PBH support to Nigeria's Discovery Air

Nigerian-based Discovery Air has selected ASC to provide full component support on its fleet of Boeing B737-300 aircraft. This Power-by-the-Hour (PBH) contract will cover an initial three operational aircraft, with scope to expand as the airline looks to develop its route network domestically and regionally to destinations including Gambia, Ghana and Cameroon. New start-up Discovery Air was incorporated in July 2008 and is set to begin operations with domestic and regional flights from its main hub in



Nexcelle's first O-Duct nacelle component to equip LEAP-1C engines

Photo: Nexcelle

Lagos, Nigeria. Selected for the company's superior strength on the B737 platform, ASC will support Discovery with a dedicated home base stock on-site in Lagos and component pool at London Gatwick. The contract will continue for a period of three years with the option to renew at the end of the term.

### Cyclean Engine Wash strengthens presence in Asia

Lufthansa Technik has won two new Asian customers for Cyclean Engine Wash. Asiana Airlines and Hong Kong Airlines now number amongst the more than 30 airlines worldwide using the MRO provider's product. Lufthansa Technik already offers the engine cleaning service at stations in North and South America, Europe, and Asia. Asiana Airlines began cleaning the engines for its entire fleet with the Cyclean System in Seoul,

Korea, in December 2013. Hong Kong Airlines became the newest customer in January 2014, with its own fleet along with the fleet of its subsidiary, Hong Kong Express, having CFM56-5B, PW4000 and RR Trent 700 engines cleaned at the Hong Kong hub. The system's autonomous functionality, with no need for an external power or water supply, makes planning the engine washing for Hong Kong Airlines even more flexible.

### Ontic and Rolls-Royce enter license agreement

Ontic UK have entered into license agreement with Rolls-Royce for the manufacturing and worldwide distribution rights for Dart aircraft engine components. The transition of support and manufacturing capabilities to Ontic's Cheltenham, UK facility will commence immediately. Technical support will continue to be



PILATUS PC-12 NG



Pilatus PC-12 NG Cockpit



Pilatus PC-12 NG

### Pilatus Business Aircraft

Ranked for the 12th year in a row by Professional Pilot magazine as providing the best customer service for business turboprop aircraft, Pilatus Business Aircraft Ltd, a wholly owned subsidiary of Pilatus Aircraft Ltd, was founded in 1996 to provide completions, marketing, sales, and service for Pilatus PC-12 aircraft in North and South America. A global network of authorized PC-12 service and satellite centers also supports Pilatus Business Aircraft customers.



[www.pilatus-aircraft.com](http://www.pilatus-aircraft.com)

## Achieving World-Class Customer Service Programs

**Pilatus Business Aircraft pinpoints Quantum MRO & Logistics software as the foundation of its customer service programs**

### The Challenge

While establishing its benchmark customer service programs, Pilatus determined its accounting system did not have the flexibility and scalability to accommodate the Company's broad business needs. So the search began for aviation-focused software that would adapt to their specific requirements for production, parts and sales purchasing, and warranty management. Ideally the new software would also provide digital maintenance tracking, reliability and other services such as hourly cost maintenance programs to meet the aircraft management needs of Pilatus' customers.

### The Solution

Pilatus Business Aircraft selected Component Control's Quantum MRO & Logistics software to be the platform for managing its aviation-related operational processes. Component Control partnered with Pilatus Business Aircraft to develop Quantum's Aircraft Maintenance and Warranty modules to complement the existing Quantum capabilities and integrate service and work data across their facility. To further expedite parts sales to its network service providers, Pilatus also leveraged the Quantum Parts Search App, an app that is embedded into their corporate website which allows

24/7 online search access, and the ability to send RFQs and purchase orders for Pilatus' certified parts.

With Quantum Aircraft Maintenance and Warranty, Pilatus Business Aircraft is able to offer optional digital maintenance tracking to their customers and facilitate the industry's fastest warranty processing service, posting credits within 7 days. Overall, the Quantum system at Pilatus provides tracking and traceability to birth, addresses regulatory requirements management, and manages all MRO services from engines, to interior modifications and avionics.

"Choosing Quantum software in 2001 to be the platform for administering our customer service programs was a great investment for our company. This is as verified by our status as a world-class customer service provider" confirmed Piotr "Pete" Wolak, VP Customer Service, Pilatus Business Aircraft.



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offered by Rolls-Royce. The Dart engine is in service on an active fleet of 218 aircraft that include the Avro/Hawker Siddeley HS748, HAL 748, Fokker F27, Gulfstream I, NAMC YS11, Convair CV 640. Ontic's global legacy focus is supported from manufacturing and MRO facilities in Chatsworth, California; Houston, Texas; and Cheltenham in the United Kingdom. The Dart engine will be supported primarily from Ontic's Cheltenham, UK facility.

### JSC UTair Aviation once again selects AJW Aviation for additional power-by-the-hour support

AJW Aviation has once again been selected by Russian airline JSC UTair Aviation to extend its power-by-the-hour support contract for an additional twenty A320 and three B767 aircraft. The initial contract which was signed in April 2013 was to provide power-by-the-hour support for the airline's fleet of thirty-seven B737-500 and B737-400 aircraft.

### SR Technics opens for business in Malaysia

SR Technics has successfully ramped-up the start of operations at its new Center of Excellence for component maintenance in Kuala Lumpur, Malaysia. The first components to undergo repair include hydraulic pumps, ball-screw actuators, power drive units and audio control panels. The repair facility will initially support around 300 part numbers, rising to 1,200 by the end of 2014. It will be equipped to handle many labor-intensive repairs, covering five main product areas: avionics panels, hydraulics, mechanical, pneumatics and electrical. The location will initially operate under European Aviation Safety Agency (EASA) approval. Department of Civil Aviation (DCA) Malaysia approval should be secured in February and Federal Aviation Administration (FAA) approval is planned for April. Further approvals from other national aviation authorities will be secured later this year. In addition, Malaysia will also become the base for the company's Regional Customer Service and Distribution Centers for its Asia Pacific-based Integrated Component Services (ICS) customers, managing all their component supply needs. These are scheduled to become operational in Q1 and Q2 respectively. The new set-up in Kuala Lumpur is part of the overall strategy to develop a comprehensive global operational footprint, designed to place the company close to its customers.



Yuken's general manager Mannie Saunders

Photo: Yuken Europe

### Yuken Europe to support Bombardier Aerospace in Northern Ireland

Manufacturing firm Yuken Europe has secured work supporting Bombardier Aerospace at one of its facilities in Northern Ireland. The Liverpool-based company designs and manufactures a broad range of high quality, durable hydraulic equipment including pumps and valves. Its hydraulic technology is used across many different sectors and applications, playing a crucial role in the manufacturing process helping to generate, control and transmit power. Yuken's general manager Mannie Saunders said the Japanese-owned company has been subcontracted by a direct supplier to Bombardier Aerospace, Belfast, to support the upgrade of an industrial press at the aerospace company's fabrications factory in Newtownards, in Northern Ireland. Mr Saunders said Yuken will deliver a full refurbishment programme on the press, taking out and replacing drives and pumps.

### Constant Aviation becomes Embraer Legacy 450/500 Authorized Service Center

Constant Aviation has been selected by Embraer to become an Authorized Service Center at their Cleveland (CLE) Facility on the Legacy 450 and 500 airframes. Constant Aviation will be able to provide complete maintenance and avionics services as well as modifications, composite repairs, Airworthiness Directives and Service Bulletins on both types of aircraft. The organization will also use their previous experience working with

Embraer on warranty claims to provide seamless service to the customers.

### Irish Aer Arann renews confidence in ATR maintenance

Irish airline Aer Arann, operating regional air routes for Aer Lingus Regional, and the European regional aircraft manufacturer ATR have agreed to extend its existing Global Maintenance Agreement (GMA) covering the airline's fleet of eight ATR 72-600s and two ATR 72-500 aircraft for five more years. The original contract was signed in 2007 with the introduction of the first ATR 72-500. Since then ATR has enjoyed a long term strategic partnership with Aer Arann. The airline reiterated their confidence in 2012 by agreeing to introduce eight new generation ATR 72-600s, which deliveries started in June this year.

### ATK and Airbus finalize agreement on A350 XWB-1000 variant

ATK (ATK) has finalized an agreement with Airbus to manufacture and supply composite stringers and frames on the -1000 variant of the A350 XWB program. The contract expansion adds to the work already being performed on the A350 XWB program. This agreement is the next step in ATK's valuable working relationship with Airbus and its partners, Aerolia SAS and Premium Aero-tec GmbH. ATK is currently producing composite stringers and frames for the A350 XWB-900

and has successfully delivered more than 10,000 parts since the inception of the program. These parts – the equivalent of more than 15 ship sets – are a demonstration of ATK’s ability to meet customers’ high quality standards and delivery requirements, and ATK is ready to meet planned production rate increases. The A350 XWB work is performed at ATK’s Aircraft Commercial Center of Excellence (ACCE) facility in Clearfield, Utah. This contract expansion will allow ATK to hire additional professional and manufacturing employees, adding to Utah’s job market.



United Airlines 737-800 with Split Scimitar Winglets

Photo: Aviation Partners Boeing

**Aviation Partners Boeing receives FAA certification for Split Scimitar winglets**

Aviation Partners Boeing (APB) has received Supplemental Type Certification (STC) from the FAA for Split Scimitar Winglets to be installed on Boeing 737-800 aircraft. The Split Scimitar Winglet program is the culmination of a five-year design effort using the latest computational fluid dynamic technology to redefine the aerodynamics of the Blended Winglet into an all-new Split Scimitar Winglet. The unique fea-

ture of the Split Scimitar Winglet is that it uses the existing Blended Winglet structure, but adds new strengthened spars, aerodynamic scimitar tips, and a large ventral strake. APB will develop and certify the Split Scimitar Winglet modification for all of the Boeing 737-700, 800 and 900 series aircraft including Boeing Business Jets. APB expects to start certification flight testing on the 737-900ER in mid-February achieving certification by late July 2014.

**Aerostar further expands Middle East MRO profile**

Romanian aerospace company Aerostar S.A., released that in the past two years the number of ‘C’ and ‘D’ checks carried out by Aerostar for its Middle East, Turkey and North African customers has averaged 26/27 aircraft per year. Last year the market in the region represented some 53% of Aerostar’s commercial MRO busi-



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ness which saw 51 aircraft overhauled at Bacau. Aerostar has ten customers across the Middle East, Turkey and North Africa. In recent weeks aircraft from Royal Air Maroc (Boeing 737 NG), Corendon Airlines of Turkey (Boeing 737 NG & CL), Tailwind Airlines of Turkey (Boeing 737 CL) and Freebird Airlines also from Turkey (Airbus A320 and A321) have been in Aerostar's Bacau facility for maintenance and overhaul.

### Boeing Shanghai signs heavy maintenance agreements with Air Astana and Rossiya Airlines

Boeing Shanghai Aviation Services, (Boeing Shanghai) reported the signing of 767 heavy maintenance agreements with Air Astana and Rossiya Airlines. The airlines, based in Kazakh-

stan and Russia, respectively, are new customers for Boeing Shanghai. Boeing Shanghai will conduct two 767 C-checks for Air Astana and three 767 C-checks for Rossiya Airlines at Boeing Shanghai's facility at Shanghai Pudong International Airport. Work began already in January.

### Royal Jordanian renews component support contract with AFI KLM E&M

Royal Jordanian, a long-standing AFI KLM E&M customer, signed a new contract to provide its A320 fleet with component support. The agreement covers the Royal Jordanian's A320s fleet, which counts 13 aircraft, and includes the provision of a Main Base Kit, pool access and component repairs on a per-flight-hour basis.

### Sabena and Barfield extend ATR support agreement

Barfield, a Sabena technics company, started supporting the SATENA ATR fleet in December 2010 through its Airline programs business unit, dedicated to full support contracts. The services provided to the Colombian airline include component and engineering support, pool access and Main Base inventory for a total fleet of 10 aircraft supported by Barfield. Within the scope of this extension, Barfield will increase the Main Base for components in order to fit SATENA's requirements for its fleet expansion. For the past few years, SATENA, owned by the Colombian government, has been undergoing strong fleet modernization, integrating aircraft types such as ATR42-500 and ATR72-500.

### Lufthansa Technik concludes contract with Evergreen Aviation Technologies for component supply

Hamburg-based maintenance, repair and overhaul (MRO) provider Lufthansa Technik AG is expanding its cooperation with EVA Air in Taiwan even further: Lufthansa Technik has concluded a contract with EVA Air's technical services company, Evergreen Aviation Technologies (EGAT), for component supply for the airline's new fleet of Airbus A321 aircraft. The new Total Component Support (TCS) agreement covers component overhaul and engineering services as well as warehousing and pooling at Lufthansa Technik's Singapore facility. EVA Air, a Star Alliance member, has relied on support from Lufthansa Technik for its Airbus A330 fleet for ten years now, and recently entrusted the company with its Boeing 747s as well.

### Lufthansa Technik and UTC Aerospace Systems expand 787 component service agreement

UTC Aerospace Systems, a unit of United Technologies and a key supplier of the Boeing 787 Dreamliner program, and Lufthansa Technik have announced a long-term agreement for maintenance, repair and overhaul (MRO) services for UTC Aerospace Systems interiors products, sensors and integrated systems on the Boeing 787 aircraft. The agreement builds upon a previous contract between the two aerospace service providers and expands Lufthansa Technik's capabilities as a licensed MRO provider for UTC Aerospace Systems on the Boeing 787.

### PEMCO completes first B737-400 Freighter for Air Incheon

PEMCO World Air Services (PEMCO) announced the redelivery of its first 737-400F Air Incheon aircraft. Redelivered in late 2013, the conversion was completed at PEMCO's partner and major MRO provider STAEKO, based in China. Located at the largest cargo airport in Seoul, Korea, Air Incheon specializes in air cargo transport of heavy equipment for oil and gas industries between Korea and Russia. The airline focuses on underserved markets such as Russia's far east (Khabarovsk region), but also flies to China (Qingdao), Japan (Haneda) and Mongolia (Ulan Bator).

### PEMCO redelivers first of two 737-400 Combi aircraft to First Air

PEMCO World Air Services (PEMCO) announced the redelivery of a 737-400 Combi aircraft to First Air, the first of two conversion projects for the Ottawa headquartered carrier. This versatile, PEMCO-built Combi will be used primarily within Northern Canada, providing a unique combination of cargo and passenger services. The 737-400 Combi is capable of simultaneously carrying four and a



PEMCO redelivers a 737-400 Combi aircraft to First Air

Photo: PEMCO

half pallets of freight and 72 passengers. The functional capability of this converted aircraft makes it ideal for accomplishing unique and difficult missions for First Air.



HeliVert gets AR IAC approval for production of commercial AW139  
Photo: AgustaWestland

### HeliVert gets AR IAC approval for production of commercial AW139

HeliVert, a joint venture between Russian Helicopters and AgustaWestland, has received a Certificate of Approval from the Aviation Register of the Interstate Aviation Committee (AR IAC) for production of the AW139 commercial helicopter. The certificate is valid for two years. Following an audit by the AR IAC in May 2012 HeliVert was awarded a one-year Certificate of Approval for production of five AW139s, and production of the first helicopters at the enterprise began in June 2012. A repeat audit for certification of production took place on schedule in November 2013, and as a result a Certificate of Approval for production of commercial AW139s was issued for two years.

### Willis renews and broadens contract with AFI KLM E&M

Willis Lease Finance has signed a new engine and APU support contract with AFI KLM E&M. The aircraft engine lease & finance company has added support for GE90 engine series, CFM56-5 series and the maintenance of all types of APU to the previous agreement covering its fleet of CF6-80 and CFM56-7 turbofan engines. The contract as of January 1st, 2014 will be for multiple years. APU work will be carried out by EPCOR, AFI KLM E&M's specialized subsidiary. The scope of the contract continues to cover overhaul and repair services, on-wing support, and pre-return checks at the end of a lease, all on a "Time and Material" basis.

### Air Transat orders Aviation Partners Boeing Split Scimitar Winglets for Next-Generation 737-800s

Air Transat has ordered Split Scimitar Winglets for its fleet of Boeing Next Generation 737-800

aircraft. APB's newest program is the culmination of a five year design effort using the latest computational fluid dynamic technology to redefine the aerodynamics of the Blended Winglet into an all-new Split Scimitar Winglet. The unique feature of the Split Scimitar Winglet is that it uses the existing Blended Winglet structure, but adds new strengthened spars, aerodynamic scimitar tips, and a large ventral strake. APB looks forward to receiving FAA certification for Split Scimitar Winglets within the next

several days. APB will develop and certify the Split Scimitar Winglet System for several variants of the Boeing Next Generation 737 series of aircraft including the structurally provisioned and non-provisioned 737-700, 737-800, 737-BBJ, the structurally provisioned 737-900 and the 737-900ER.

### ATK awarded composite components contract for Boeing 787 Dreamliner

ATK, an aerospace, defense and commercial products company, was selected by Boeing for a contract, beginning immediately, to produce substructural composite components for the Boeing 787 Dreamliner. ATK composite structures can be found on the Boeing 767 and 757 airplanes, C-17 Globemaster, F-18 fighter, V-22 Osprey, Boeing 702 and GPS II-F satellites, and Delta II and Delta IV launch vehicles. ATK will provide composite substructures for the 787 center fuselage to Boeing at its South Carolina assembly facility and to Alenia for the aft fuselage.

### Flying Colours Corp. to achieve full CAAC approval

Flying Colours Corp., the Canada-based maintenance, completions, and refurbishments specialists, reported that it has become the first Canadian MRO to receive complete airframe and specialized service CCAR 145 MOC, (China Civil Aviation Regulations 145 Maintenance Organization Certificate), approval from the Civil Aviation Administration of China, the CAAC. The certificate, which was awarded on January 10th, 2014, is awarded to foreign companies that already hold their own national CAA approvals and complements the growing list of approvals held by the Peterborough based business. The approval enables Flying Colours Corp. to conduct full airframe inspections, repairs and scheduled

maintenance, along with specialised services including sheet metal work, composite repairs, paintwork, interior completions and modifications on Chinese registered aircraft at its expanding Peterborough, Ontario facility. The initial airframes approved for work include the complete family of Bombardier Global Express aircraft (BD-700-1A10), the Bombardier Challenger (CL 600-2B16) models, and the Challenger 850 type. Flying Colours Corp. will continue to add to the model types listed as customer demand requires.

### Asiana Airlines signs FHS components contract with Airbus for A380 fleet

Asiana Airlines has selected Airbus' Flight Hour Services (FHS) to provide components support for its A380 fleet. The FHS agreement, which will run for 10 years, provides an extensive scope of A380 line replaceable units (LRUs), guaranteed spare parts availability through pool access service and on-site stock at customer main base and selected outstations, as well as repair to Asiana Airlines. South Korean carrier Asiana Airlines will become the twelfth operator of the A380 when it takes delivery of its first aircraft in the second quarter of this year. The airline has firm orders for six A380s and will operate the aircraft on its primary routes from Seoul to the US.

### Gulf Air announces 3-year MRO agreement with JorAMCo

Gulf Air, the national carrier of the Kingdom of Bahrain, has signed a three-year maintenance, repair and overhaul (MRO) agreement with JorAMCo, to meet the airline's Heavy Maintenance and 'C' check fleet requirements. JorAMCo, a regional MRO facility based in Jordan was awarded the contract by Gulf Air following a successful bidding tender process through the Bahrain Tender Board.

### Volga-Dnepr Technics increases aircraft maintenance services in Leipzig

Volga-Dnepr Technics GmbH (VDT), the Leipzig-based maintenance company, has expanded its current scope of activities on Western-built aircraft. The renewed scope of its EASA Part 145 certificate now enables VDT to extend A-check services on Boeing 737-300/-400/-500 and 747-8F and 747-400 (PW-4000) aircraft. The company's Rating C14 has also been expanded to cover wheel and brake repair shop activities on a variety of Boeing 747 aircraft models.



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# Line Maintenance - Driving outsourcing growth trends

Analysis by *Keith Mwanalushi*

The global line maintenance outsourcing business is growing. With airlines continuously having to worry about costs and efficiency, how far have service providers gone to meet operator expectations? *AviTrader MRO* speaks to some key players.



The cost of line maintenance has remained stable.

Photo: Iberia

Cost pressures are putting airlines in a difficult position. Rising oil prices are pressuring them to look for more economically convenient solutions when it comes to maintenance of their aircraft. The line maintenance sector has seen considerable investment and expansion due to a general surge in demand particularly coming from the rapid growth in the low-cost airline sector.

Low-cost carriers both in Europe and worldwide do contribute significantly to the workload of line maintenance providers, since the carriers maintain higher frequency of flights and thus creating an increased demand for routine checks and inspections.

“However, as low-cost carriers prefer to con-

duct turnaround flights, usually their aircraft are scheduled for more complex services at main bases during night time. Therefore, they need line maintenance providers at other airports only to perform minor works or in AOG cases. Moreover, the fleets of low-cost airlines usually consist of one type of aircraft thus requiring less diversified technical personnel,” explains Asta Zirlyte, Head of Line Maintenance at FL Technics.

With this surge in demand, assumingly, the cost of line maintenance would be in an upward trajectory but Zirlyte says that in fact this segment of MRO has actually remained quite stable. “While new technologies spur up the prices for engine and component MRO, the cost of line maintenance is increasing at a relatively lower pace, since it is mainly based on manpower cost,” adds Zirlyte.

Peter Van der Horst, VP Line Maintenance at AFI KLM E&M observes that in general, there is a continuous demand to lower cost of line maintenance. “The surge in demand from low-cost airlines does not have an effect on handling rates. Within the short-haul market it is common that the cockpit crew performs the pre-flight check on the outstations. In case of technical complaints or AOG situations line maintenance MRO will support the airline on the basis of an on-call contract.”

Ignacio de la Iglesia, Iberia’s MCC (Maintenance Control Centre) and Planning Manager sees that currently there are high cost pressures in all areas of MRO and line maintenance is no exception. “The main change comes from airlines, redefining maintenance requirement to fit new maintenance concepts or maintenance programmes,” says de la Iglesia. He stresses that an increase in technical crew cooperation together with stronger maintenance control centres, allows more precise instructions on providers and tighter control on work and therefore on costs.

Seasonality may also dictate demand for services. UK-based Monarch Aircraft Engineering (MAEL) for instance has always been faced with the seasonality of provisioning line maintenance services for the operator, with the peak activity starting to increase from April through to October. “However, we also have several line maintenance contracts that are constant throughout

the year. We have seen little geographical variations,” comments John-Paul Williams, General Manager Line Maintenance for MAEL.

“We notice clear differences in demand due to seasonal operations,” notes de la Iglesia from Iberia. “Each customer has different needs: for some carriers, the capability to support strong peak operations is critical, so being able to be flexible while keeping prices competitive is the key. For other carries with more regular operation, cost control and value added support services are the differential issues.”

Along with legacy carriers Peter Van der Horst sees an increasing focus to optimise the number of flights during the summer season. He says this demands more flexibility from the MRO’s with increasing cost and hardly the possibility to charge these towards the airline. “For geographical variations we offer network solutions for any operator. The structure of our network, which includes the global logistics reach of AFI KLM E&M, means that we can organise tailor made line maintenance support in line with customer expectations and operational demands for remote destinations,” states Mr Van der Horst.

However, Roger Meels, Technical Director at Direct Maintenance sees seasonal demand from a “yes and no” perspective. “We have a number of line stations which are mainly driving on leisure travellers and where there is a rainy season during which time there is no traffic. On the other hand, when supporting regular carriers that operate a consistent schedule, there is not that much variation.”



Outsourcing will continue as airlines focus on their main business says Asta Zirlyte, FL Technics



Cost pressures are putting airlines in a difficult position

Photo: Iberia

Based in Beijing, Ameco has eight outstations in China so far including Shanghai, Guangzhou, Chongqing, Chengdu, Nanjing, Hangzhou, Tianjin, and Qingdao. “Certainly in Beijing, the first-tier city, the cost is lowest for the MRO, because it’s convenient and cheaper for line maintenance support on tooling, mechanics, engineering and facilities,” a spokeswoman tells AviTrader MRO. “Some MRO providers follow the steps of worldwide airlines that add flights in the Chinese second or third tier cities to extend the line maintenance network, though the cost will possibly be higher,” she states.

A recent industry forecast conducted by Team SAI reveals that in the next 10 years line maintenance will still have the smallest MRO market share (\$13.2b out of \$76b). Asta Zirlyte from FL Technics is not surprised that the share of line maintenance in the overall MRO market won’t see any significant changes in the near future due to the nature of the work performed. “But the outsourcing trend will continue to develop as airlines continue to focus on their main business – transporting passengers and goods.

“As preferences of the clients and trends in air travel tend to change fast, the airlines have to react to secure the demand for their services. Thus, being able to promptly adapt their line maintenance services, with regard to both, changes in locations or in aircraft type, this is of high importance,” Zirlyte asserts.

Line maintenance in the old days was conducted by airlines themselves or outsourced to another airline that had a convenient presence in a certain location, provided they met the required standards.

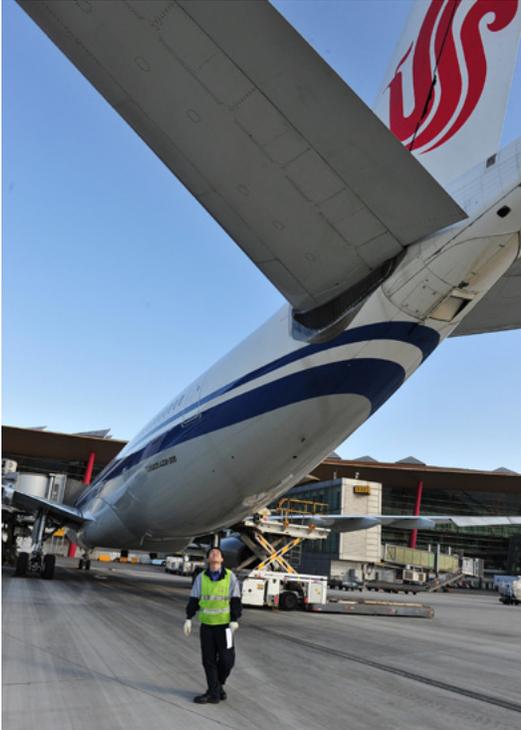
Roger Meels points out that for many airlines the provision of third party line maintenance is not a top priority, it can be a smart way to help reducing their cost base, at locations where one happens to have a presence with a certain cover.

“MRO’s have a different angle,” Meels states. “There is more flexibility and agility to follow an airline requiring services remotely. Generally services offered by an MRO like Direct Maintenance are highly dedicated, since there is no mother fleet to satisfy or prioritise.”

As we know cash is king in an airline environment. Mr Meels gives the following scenario. “Imagine one airline is supporting the other airline for years with a B767 operation, nice and steady. Now the B767 is replaced by a B787. It requires quite some skill to convince your CFO to invest the required sums and to make this happen in days where an airline is very much focused on its own future and cash is spending is conservative.”

Mr Van der Horst from AFI KLM is of the opinion that new aircraft designs demand less maintenance in general, although the complexity and the extensive use of composites and electrical systems will change line maintenance dramatically. “I believe that this is an opportunity to differentiate within the line maintenance business in the coming years. For some airlines this will lower the step towards outsourcing for airline owned MRO’s, like we are, this is an opportunity to specialise and to gain business,” he adds.

Aircraft manufacturers now offer total support packages for airlines like Boeing’s GoldCare and



Line maintenance is expected to be worth an estimated \$13b over the next decade  
Photo: Ameco

for some MROs this presents increasing opportunity providing the service level is superior.

“MRO’s will build on their existing relationships with the aircraft manufacturers and leverage their skills in line maintenance where the aircraft manufacturers have limited Part 145 line maintenance approval,” says John-Paul Williams from MAEL. “Many OEM’s find it cost effective to partner with a Part 145 organisation that already has a Part 145 Line maintenance experience and networks,” he adds.

In terms of factors that could drive an increase in line maintenance for third parties, Mr de la Iglesia from Iberia gives a few pointers. Firstly, cost control: from an airline point of view, he states that it could be more favourable to link maintenance costs to airline activity (e.g. flight hours) than fixing it to a work force, thus increasing complexity with need to manage labour relationships.

Secondly, he adds that tightening requirements on regulations is also raising critical load needed to manage cost efficiently, and outsourcing could be a solution for that. “Following that, we are seeing an increase in wider scope request for services, as multi-stations, full support, line maintenance plus spares. All linked to extensive service level agreements giving airlines the capacity to drive costs down while keeping full control of operational performance,” de la Iglesia notes.

The industry is now excitedly anticipating the outcome of the current boom in new aircraft design and technologies as the 787s, A350s and ultimately the 777X enter service in greater numbers in the coming years. “The extensive use of composite materials and electrical systems of these new aircraft designs requires a different approach from a line maintenance approach,” declares Peter Van der Horst.

Preparing and certifying labour to understand how to work with these new technologies is crucial. As an example he says during training and certifying staff, simulations are used to familiarize them with the use of the maintenance laptop, aircraft systems and software loading. And another example is the assessment of composite damages and the execution of temporary repairs. “New technologies will not only need a different maintenance approach but also need a different awareness from ground handling staff handling these aircraft,” Van der Horst continues.

At MAEL, in order to be in a position to win future contracts the company is investing heavily in training and tooling. The Part 147 Monarch Aircraft Engineering Training Academy (MAETA) was one of the first in the UK outside of Boeing to offer Boeing 787 Dreamliner type training courses including practical and theory.

Roger Meels from Direct Maintenance stresses that the investments to train up staff for new aircraft models are quite immense. “In the past

24 months we ourselves have had to gear up for A380, B747-8 and B787. Such type training courses are a little rare and not frequently offered, which has an unnecessary upwards trend in terms of costs.

“In fact we have seen OEM’s wanting to ‘protect their aftermarket’ by avoiding or limiting access to courses by anyone who is not an airline buying their aircraft. We also noticed engine OEM’s insisting on payments or agreements to be signed for attending aircraft type training in line with Part-147.”

Meels argues that this is not in the interest of the OEM’s airline customers who have purchased new technology aircraft, “and in a number of cases are being forced to operate with riding engineers on brand new aircraft flying long haul stretches, due to absence of qualified line maintenance providers on site.”

He also does not see new technology aircraft as something very special or rather typical. “Apart from having deep pockets, one needs to prepare like any other aircraft model, meaning to have all required parameters in place, such as tooling, staff, and manuals and so on.” He does acknowledge that it will require some time obviously to build up specific knowledge and experience.

“In our own specific case, we have not had one single flight cancellation since we commenced supporting the A380 over 18 months ago while delays have been really minimal, to the level of unavoidable. We see the same performance when comparing our B747-8 statistics,” Meels.



Investments to train up staff for new aircraft models are immense

Photo: Ameco



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### Bombardier posts earnings of \$418m in fiscal year 2013

Bombardier Aerospace's revenues amounted to \$2.9bn for the three-month period ended December 31, 2013, compared to \$2.6bn for the corresponding period last fiscal year. For the year, revenues totalled \$9.4bn, compared to \$8.6bn last fiscal year. For the fourth quarter ended December 31, 2013, EBIT totalled \$93m, or 3.2% of revenues (\$94m, or 3.3%, before special items), compared to \$84m, or 3.2%, for the same quarter the previous year. EBIT before special items totalled \$388m or 4.1% of revenues for the year ended December 31, 2013, compared to \$367m, or 4.3% last fiscal year. For the year, EBIT was \$418m, or 4.5% of revenues, compared to \$390m, or 4.5%, last fiscal year. Free cash flow totalled \$87m for the fourth quarter ended December 31, 2013, compared to \$277m for the corresponding period last fiscal year. For the year ended December 31, 2013, free cash flow usage totalled \$1.2bn compared to a usage of \$867m for the last fiscal year. A total of 238 aircraft were delivered during the year ended December 31, 2013, compared to 233 for the last fiscal year, mostly in line with guidance.

### Rolls-Royce 2013 full year results

Rolls-Royce's underlying revenue increased 27% to £15.5bn, including £2.6bn in revenue from Tognum. Excluding Tognum, the Group's revenue increased 6% to £12.9bn, with 7% growth in original equipment and 4% growth in services. In 2013, 47% of the Group's revenue was generated by the sale of aftermarket parts and services (52% in 2012). Underlying profit before tax increased 23% to £1.8bn, including a £180m increase from Tognum. Excluding Tognum, profit increased 11% to £1.5bn, reflecting volume growth, continued strong margins in Defence Aerospace and the restructured relationship with International Aero Engines. The order book increased 19%, to £71.6bn, up 16% excluding Tognum. Power Systems' order book of £1.9bn, reflects growth of 6%. Rolls-Royce received orders for engines to power 334 widebody aircraft; a significant year for Civil Aerospace. The order book increased in Civil Aerospace, Marine, Energy and Power Systems, but decreased in Defence Aerospace. The order intake in 2013 included new orders of £18.9bn in Civil Aerospace, £1.6bn in Defence Aerospace, £2.7bn in Marine, £1.1bn in Energy and £2.7bn in Power Systems. The regional composition is broadly unchanged, with Asia and the Middle East representing 49% of the total order book.

### Héroux-Devtek acquires British landing gear company APPH

Héroux-Devtek, a leading Canadian manufacturer of aerospace products, has acquired the entire share capital of U.K.-based APPH and U.S.-based APPH Wichita, subsidiaries of BBA Aviation. APPH is an integrated provider of landing gear and hydraulic systems and assemblies for original equipment manufacturer ("OEM") and aftermarket applications. Headquartered in Runcorn, United Kingdom, APPH specializes in the design, engineering, manufacturing and aftermarket support of landing gear and hydraulic systems and assemblies for fixed and rotary wing civil and military aircraft. Héroux-Devtek is acquiring four plants located in the United Kingdom and one plant in Wichita, Kansas. These plants have a combined workforce of approximately 400 employees,

including a design engineering department staffed with 40 professionals. APPH's main design programs include landing gear systems for the Hawk, SAAB Gripen, AW101, C27J Spartan and EC175 aircraft. For the 12-month period ended December 31, 2013, APPH generated revenues of approximately US\$77m and an adjusted EBITDA of approximately US\$12.5m. The purchase price, net of about US\$4m of cash acquired, is approximately US\$124m. The transaction is being financed with the Corporation's available cash and existing credit facilities.

### SIA Engineering Group posts profit of \$60.5m for 3<sup>rd</sup> quarter 2013-14

SIAEC Group posted a profit attributable to owners of the parent of \$60.5m for the quarter ended 31<sup>st</sup> December 2013. During the quarter, revenue increased by \$5.6m or 2.0% to \$283.8m, while expenditure grew at a higher rate of 4.7% or \$11.6m. As a consequence, operating profit of \$25.2m was \$6.0m lower than that for the same quarter last year. The increase in expenditure was mainly from staff costs, sub-contract and material costs. There was also a smaller exchange gain of \$0.1m in the current period as compared to a gain of \$1.6m in the third quarter of last year.

### Apollo Aviation Group ends 2013 with further acquisitions for SASOF II

Apollo Aviation Group, a multi-strategy aviation investment manager specializing in mid-life and mature aircraft, has contracted to purchase five aircraft for \$53m in the fourth quarter of 2013 on behalf of its second aviation fund, SASOF II. The aircraft include three in-production models (A320ceo family aircraft). Since SASOF II's inception, Apollo Aviation has contracted to acquire 44 aircraft, eight engines and one airframe with a total gross purchase price of \$640m.

### Boeing Commercial Airplanes reports full year revenue of \$53bn

Boeing Commercial Airplanes fourth-quarter revenue increased to \$14.7bn and full-year revenue increased to a record \$53bn on higher delivery volume. Fourth-quarter operating margin improved to 10.3% and full-year operating margin grew to 10.9% on the higher volume, favorable delivery mix and continued strong operating performance. During the quarter, the company launched the 777X with 259 orders and commitments. During the year, the 787 program completed first flight of the 787-9, successfully launched the 787-10 and began operating at a 10 per month production rate in final assembly. The 737 program delivered at a record production rate of 38 per month and has won nearly 1,800 firm orders for the 737 MAX since launch. In 2013, a record 648 commercial aircraft were delivered. In January 2014, the company reached an eight-year contract extension through 2024 with the International Association of Machinists & Aerospace Workers District 751 (IAM). Commercial Airplanes booked 465 net orders during the quarter and 1,355 during the year. Backlog remains strong with 5,080 airplanes valued at a record \$374 billion.

### Wesco Aircraft Holdings to acquire Haas Group for \$550m

Wesco Aircraft, a leading provider of comprehensive supply chain management services to the global aerospace industry, has entered into an agreement to acquire Haas Group for \$550m in cash, subject to certain closing adjustments, from certain investment funds affiliated with The Jordan Company. With \$573.5m in 2012 revenues, Haas is a leading global provider of chemical supply chain management solutions to the commercial aerospace, airline, military, energy, and other markets. Haas is headquartered in West Chester, PA, with over 1,300 employees and 35 distribution hubs and forward stocking locations around the world.

### Astronics to acquire EADS North America Test and Services Division

Astronics Corporation, a leading provider of advanced technologies for the global aerospace and defense industries, has entered into a definitive agreement to acquire substantially all of the assets and liabilities of EADS North America's Test and Services division (EADS T&S) for approximately \$53m in cash plus a net working capital adjustment. The agreement is expected to close in February, subject to normal closing requirements including Hart-Scott-Rodino approval. Upon closing, EADS T&S will be reported in Astronics' Test Systems

segment. EADS T&S, located in Irvine, California, is a leading provider of highly engineered automatic test systems (ATS), subsystems and instruments for the semi-conductor, consumer electronics, commercial aerospace and defense industries. EADS T&S provides fully customized testing systems and support services for these markets. It also designs and manufactures test equipment under the well-respected test instrument brands known as Racal and Talon. EADS T&S had 2013 sales of approximately \$70m. Sales for 2014 for the business are expected to be approximately \$100m.

### B/E Aerospace released fourth quarter and full year 2013 financial results

B/E Aerospace reported that fourth quarter 2013 commercial aircraft segment (CAS) revenues increased 19.6% while operating earnings of \$84.0m increased 22.4% as compared with the prior year period. Operating margin of 17.6% expanded 40 basis points as compared to the same period of the prior year, due to operating leverage at the higher revenue level and ongoing operational efficiency initiatives. For the year ended December 31, 2013, CAS operating earnings of \$320.3m increased 18.1% as compared with the prior year and operating margin of 17.9% expanded 40 basis points due to operating leverage at the higher revenue level and ongoing operational efficiency initiatives.

## Other News



Fokker Services B.V.

As of February 11th, **Doric Lease Corp** has been rebranded as **Amedeo**. The rebranding initiative is part of a bigger vision to build a dedicated and actively managed widebody aircraft acquisition and leasing platform. The company announced an order for 20 A380s at the 50th Paris Airshow in June 2013 and will continue focusing on the widebody leasing sector, acting in a principal investment capacity with respect to both aircraft acquisitions and sale and leaseback transactions. **Doric GmbH** (Doric Group) is a separate entity and this rebranding does not affect the Doric Group.

**Fokker Services B.V.** announced a package of restructuring measures to address the changing conditions of the Fokker aircraft maintenance, logistics and parts availability market it is operating in. The measures include a significant reduction of staff in The Netherlands, as well as cost reduction and operational improvements plans. The measures are designed to enhance growth in new (other than Fokker platform) segments and to increase efficiency. Fokker Services saw its operational EBIT decreasing in 2013 to €4m from €9.9m in 2012. The management of Fokker Services informed employees, the Works Council and the labor organizations about the restructuring, which includes a job loss of 200 FTEs divided over its Dutch locations Hoofddorp, Oude Meer and Woensdrecht. Fokker Services employs around 930 FTEs, of which around 730 in The Netherlands. All intended (200) redundancies will involve the Dutch organization. Photo: Fokker Services (ohne Text)

**GA Telesis Component Repair Group Southeast** ("GATCRGSE") has developed a pneumatic aircraft engine starter test facility utilizing state-of-the-art technologies. By introducing a modern dynamometer, digital data acquisition and automation, the new test facility allows for simulation on multiple engine platforms with various load specifications. "Deviating from older practices and applying new innovative inertial simulation technologies is an exciting and necessary development for our company," said Nicholas Gimbel, Engineering Manager for GATCRGSE. "Introduction of this equipment allows us improved testing reliability and remarkable efficiencies that older-generation technology could not deliver," added Gimbel.



Turkish Airlines selects Thales' TopSeries Avant IFE  
Photo: Thales

**Thales**, a leader in In-Flight Entertainment and Connectivity (IFEC) and **Turkish Airlines** announced the Thales TopSeries AVANT in-flight entertainment system has been officially selected on board 25 of its A321 and 20 of its B737 aircraft. Turkish Airlines and Thales have also agreed to a 10 year service agreement for the provision of media content support to ensure a dynamic and engaging passenger experience. Turkish Airlines will start taking delivery of its A321 fleet in March 2015 and its' B737 aircraft in January 2016.

**flydubai** has signed an agreement to implement Boeing's suite of mobile maintenance applications. The airline will deploy Maintenance Turn Time, Toolbox Mobile Library and Toolbox Mobile Parts – solutions that provide real-time access to the information technicians need to quickly resolve maintenance issues. As a cooperative partner, flydubai worked closely with **Boeing** to finalize the functionality and operability of the mobile maintenance products, which will be integrated with the airline's maintenance planning systems. The mobile maintenance applications provide technicians with real-time, mobile access to technical manuals, part numbers and parts inventory availability, maintenance history and other information needed to support time-critical maintenance tasks. Two-way collaboration capabilities enable technicians

to rapidly share documents, photos and other information needed to troubleshoot issues, support operations decisions and improve maintenance turn times.

**JorAMCo** has licensed the **AirVault** Mx Records Management Solution to provide it with a new, web-based aircraft maintenance record management system. The Amman, Jordan-based MRO's strategy of providing value added services to its customers, required a state-of-the art solution that stores and manages customers' growing aircraft maintenance records.

**Swiss-AS** announced **Oman Air** as one of the latest newcomers to the AMOS community. Following a thorough selection process, which included two tenders and a number of presentations, Oman Air finally found AMOS to be the optimum solution in replacing its legacy system. AMOS fully meets Oman Air's need to benefit from state-of-the-art developments and industry benchmarks in MRO software, to sustain and extend its competitive advantage. The national carrier has an open and flexible approach to re-engineering its processes in accordance with proven aviation best-practices, which will be implemented with AMOS. The goal here is sustainable cost reduction, as well as an improvement of the operational efficiency and effectiveness of the engineering division.

**IFE Services**, a subsidiary of **Global Eagle Entertainment**, has been appointed by **Iraqi Airways** as its in-flight entertainment (IFE) content provider. IFE Services, one of the world's leading specialists in passenger entertainment, is supplying Iraqi Airways with a selection of Hollywood and Arabic movies, Kurdish music and drama, comedy and documentary TV shows. The IFE content is available for passengers to enjoy in Arabic and English via the audio video on-demand (AVOD) seat-back systems on the aircraft.

**EPCOR**, a wholly owned AFI KLM E&M (Air France Industries KLM Engineering and Maintenance) subsidiary dedicated to total support of Auxiliary Power Units (APU) and Pneumatic Components, is driving LEAN MRO operations with Quantum Control. EASA and FAR 145 accredited, EPCOR's engineering experts continuously work on APU and APU component development while also providing repair and overhaul for air cycle machines, environmental control system components, engine starters, leading edge flap drive units, and other pneumatic components, all supported by a worldwide logistics network.

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## VDT set on expansion



Plans to perform up to C-Checks this year.

Photo: Volga-Dnepr Technics

Volga-Dnepr Technics is an MRO that specialises in Western-built aircraft. The company is based at Leipzig/Halle (LEJ) airport, where it operates an 8,500 square meter hangar and supporting facilities.

Volga-Dnepr Technics just recently expanded its current scope of activities on Western-built aircraft. The renewed scope of its EASA Part 145 certificate now enables the company to extend A-check services on Boeing 737-300/-400/-500 and 747-8F and 747-400 (PW-4000) aircraft. The company's Rating C14 has also been expanded to cover wheel and brake repair shop activities on a variety of Boeing 747 aircraft models.

Mr Ildar Ilyasov, Managing Director at Volga-Dnepr-Technics GmbH (VDT) tells AviTrader MRO that the development of up-to-date MRO infrastructure at VDT is considered the most important objective in the company's strategy. "During the past year VDT has considerably enlarged its operational capacity, particularly with the opening of our new MRO hangar facility in Leipzig," says Mr Ilyasov.

He adds that it's imperative for a growing business to make the investment in order to attract the

revenue. "We are very confident of our business potential in Germany and we now have a new, fully-equipped MRO operation to serve our airline customers. This will enable us to satisfy internal demand for aircraft maintenance from within our own Group and to increase our financial results by expanding our product line and client base of other carriers."

The aircraft hangar with total area of 8,500 square meters is designed to accommodate one cargo aircraft of the AN-124-100 type, IL-76TD or Boeing 747 size category or four narrow bodies at any one time. "At present, the average load factor of the hangar is approximately 65%. Our facilities are available to AirBridgeCargo Airlines, Volga-Dnepr Airlines and to third party clients," Ilyasov points out.

In 2014 VDT plans to go further and expand aircraft maintenance services up to C-Check. "We will also set up a composite material and metal structures repair shop, and we will start offering fuel tank servicing and engine washing services. This will help us to consolidate our position in the European market and improve our overall business performance."

Line maintenance is another growing area of business. As new technologies in airframe design take shape, MROs globally must prepare to handle a larger number of 787s; A350 and ultimately the 777X to remain competitive. However, Ilyasov stresses that first of all, VDT's strategy is focused on serving the Volga-Dnepr Group fleet.

"Speaking of VDT GmbH in particular, you have to take into account demand in the German

market, and monitor the needs and requirements of customers that operate flights to the Leipzig and Frankfurt airports, where we have operations. In 2014, we are planning to expand our external customer base."

He adds that the level of customer demand and capacity of the hangar will dictate how much the company will achieve. He is also confident that the expansion of the business up to C-Check for the aircraft types already certificated (Boeing 737-300/400/500, Boeing 747-8F, B-747-400) should provide considerable growth opportunities. "As regards line maintenance checks of the new aircraft types, everything will depend on the Group's strategy and potential customers," he says.

With regards to where he sees the greatest growth potential from an MRO perspective, Mr Ilyasov points to the global airfreight market, where carriers are operating mid-range and long-range aircraft. "We will also see more business from updated versions of Airbus A320neo and Boeing 737max aircraft as they join airline fleets to replace older jets."

He also mentions that VDT's strongest area of growth will be scheduled aircraft maintenance. "Market analysis shows that at the present time customers are seeking reasonable and clever cost minimisation in their selection of maintenance service providers. In Europe, there is strong competition in this market but we see potential for VDT because of our growing reputation and the overall shortage of MRO hangar capacity."

Mr Ilyasov reminds that to be a successful provider of maintenance and repair services, "we must continue to carry out monitoring of modern trends in the aviation market and in adjacent industries as well as urgently respond to such changes."



Ildar Ilyasov, Managing Director, Volga-Dnepr-Technics GmbH

## In the hot seat.....

**Keith Mwanalushi** speaks to Hisham Hassan Nasser – Chairman and CEO - EGYPTAIR Maintenance & Engineering Company



Eng. Hisham Hassan Nasser  
CEO - EGYPTAIR Maintenance & Engineering

**AviTrader MRO:** What attracted you to the aviation and MRO industry?

**Nasser:** I joined EGYPTAIR in 1984 and the term MRO was not commonly used as it is today or 15 years ago. I think being in the aviation field and particularly in the domain related to MRO helps to put you on a platform where you feel and witness the evolution in technology and techniques used to make things go better and faster. In my opinion, I think I was lucky to witness the different generations of aircraft types and the related applied technology in MRO in general. It is a day to day challenge for someone who is able to understand and cope with changes; it makes a person feel that he adds value.

**AviTrader MRO:** What is the most challenging part of your job?

**Nasser:** Dealing with transitions. This business is evolving very rapidly and the ability to manage changes is so important. We have to be able to differentiate between employees who are good and willing and those who are not in order to minimise resistance as much as possible and drive things forward. It is always difficult to identify talents with a good profile who can really lead and support while implementing changes. Practically and theoretically, the most challenging part is focused on minimising cost and time with the best quality and efficient services. Another chal-

lenging part of my job is how to deal with human emotions, in my opinion the human capital is the most important element for success.

**AviTrader MRO:** Which sector of the MRO industry do you believe is growing most rapidly and why?

**Nasser:** The whole thing is changing, airframe, engine, components, but in my opinion I see that the aircraft cabin and cabin related business is really growing fast. Operator's realised the importance of the cabin's appearance for their passengers and how this influences the decision and choices that passengers make. These are all systems related to the cabin such as lighting, entertainment systems as passengers nowadays are looking for luxuries, high technology and cabin comforts. OEMs have realised this quickly and are competing with each other in this domain and this subsequently puts a burden on our shoulders to make sure that our work will live up to the operator and subsequently the passenger's expectations. So I think that in the future, an MRO will be distinguished from another by how it performs with cabin maintenance.

**AviTrader MRO:** What concerns you the most about the MRO industry?

**Nasser:** What concerns me is the competition

with OEMs in the MRO business. I fully understand that OEMs spent and invested huge amounts of money in R&D in order to produce the latest products and they have all the right to guarantee their return on investment. This may give added pressure to small sized and non-airline aligned MROs. On the other hand we may find ourselves in a very difficult position to invest in tooling and test equipment to be able to work with new technology aircraft as they are very expensive and they will automatically drive most airlines to look for total care package solutions with OEM rather than upgrading airline MRO capability. However, I'm sure that the need will bring everybody to work together ultimately.

**AviTrader MRO:** Growth in the regional jet market has created multiple opportunities for new aircraft manufacturers. What impact do you think these OEMs have on global fleet renewal in the coming years?

**Nasser:** Russia, China and Japan are likely to emerge as significant players over the next two decades, a development that will give Western companies major short-term cost-reduction opportunities that they must capture. For the long term this may generate an environment for emerging new players representing a novel form of competition for today's incumbents.



Parent airline Egyptair is a major source of the MRO business.

Photo: Airbus

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# Four engines for long haul – How does it stand in the present climate?

by Jonathan McDonald, Senior Analyst - *Istat Appraiser* and Dr. Stuart Hatcher, Head of Valuations & Risk - *Istat Appraiser*

Airbus and Rolls-Royce have made a big push to improve the future prospects of the Airbus A340-600 by appealing to a wider operating base. IBA Group has performed an initial independent analysis on how this may affect the cash operating costs versus the in-service competition. In performing this analysis, IBA has pitted various aircraft based on current seating trends plus future Airbus A340 seating densities for both the Airbus A340-300 and Airbus A340-600 variants for two typical mission lengths that may or may not be optimised for each and every variant under analysis. This analysis has been entirely presented from a cost per trip/cost per seat basis as opposed to a possibly misleading analysis that focused on event costs instead. The figures presented within this article are based upon IBA estimations, publicly available OEM data, and extensive maintenance cost research performed by IBA.

Although the article is aimed mainly at the Airbus A340, references are made to the Boeing 747-400 as well, given that the article is subjected on four engine aircraft.

**Reduced Ownership Costs can be an attraction:**  
IBA will now explain why

Values and lease rates of used Airbus A340 series aircraft have faced downward pressure during the past four years. This is particularly the case for the Airbus A340-200 /-300 series, where IBA has seen ample transaction data to support this. The next few sentences reveal to what extent the market values of used Airbus A340-200s and -300s have reduced.

A number of early build Airbus A340-300s and Airbus A340-200s were traded around the period 2005 to 2007. Depending on specification and maintenance condition, typical trading values were in the region of US\$ 28,000,000 to US\$ 38,000,000. Corresponding Airbus A340-300 lease rates were in the US\$ 450,000 to US\$ 520,000 range.

The period 2009 / 2010 onwards proved challenging in terms of Airbus A340-300 market conditions, and with this came a sharp reduction in market values and lease rates. By 2011, IBA was becoming aware of Airbus A340-300s being traded at part-out levels, attracting values of US\$ 12,000,000 or lower. Correspond-

ing monthly Airbus A340-300 lease rates were reducing to between US\$ 220,000 and US\$ 250,000. Since then, market values and lease rates of Airbus A340-200 and Airbus A340-300 aircraft have reduced further. IBA is aware that lease rates of Airbus A340-300 aircraft can now creep below the US\$ 200,000 per month mark.

This negative value pressure has also affected Boeing 747-400 passenger aircraft. During the period 2005 to 2007, IBA was appraising earlier delivery Boeing 747-400 passenger aircraft at between US\$ 33,000,000 and US\$ 45,000,000.

less, IBA’s judgement is that lease rates of Airbus A340-600 series aircraft are likely to have come under some scrutiny during this recent, challenging period.

What this means is that the four engine Airbus A340-300, Airbus A340-600 and Boeing 747-400 have a distinct advantage over the Boeing 777-200ER and Boeing 777-300ER due to the lower acquisition costs. Monthly lease rate rental ranges for the different models are shown in the first table.

Year of Delivery	A340-300	747-400	A340-600	777-200ER	777-300ER
<b>Monthly Lease Rate Rentals (US\$ 000s)</b>					
1990		180-230			
1994	165-185	190-260			
1998	190-220	220-285		390-450	
2002	245-265	280-355	345-375	460-540	
2004			360-390	565-610	830-910
2006			420-460	630-675	860-965

By the period 2010 / 2011, similar Boeing 747-400 aircraft were being priced at around the US\$ 10,000,000 – US\$ 12,000,000 mark – with most of that value resident in the four GE CF6-80C2B1F engines. By 2013 / 2014, part-out values of Boeing 747-400 aircraft are likely to have reduced further.

Assuming a secondary market operator is looking to acquire five used wide-bodies on 5 year leases, IBA will compare lease rate costs of Airbus A340-300s versus those of the Boeing 777-200ER. IBA also compares used Airbus A340-600 lease rates to used Boeing 777-300ERs. For reference the Boeing 747-400 is also included.

Model	Lease Rate	No. Aircraft	Months Lease	Total Lease Expenditure
1998 Airbus A340-300	\$205,000	5	60	\$61,500,000
1998 Boeing 777-200ER	\$420,000	5	60	\$126,000,000
<b>Total Saving Airbus A340-300:</b>				<b>\$64,500,000</b>

Boeing 747-400 lease rates, which had typically been in the US\$ 450,000 – US\$ 600,000 bracket during 2007, had slipped to around US\$ 250,000 by 2011 on an early 1990s delivery Boeing 747-400. Since then they have reduced further.

When comparing the lease costs of a fleet of five 1998 delivered Airbus A340-300s over a five year term to those of five similar age Boeing 777-200ERs over a similar term, the Airbus A340-300 represents a saving in excess of US\$ 64,000,000. In contextual terms this is the equivalent to

Model	Lease Rate	No. Aircraft	Months Lease	Total Lease Expenditure
2004 Airbus A340-600	\$375,000	5	60	\$112,500,000
2004 Boeing 777-300ER	\$870,000	5	60	\$261,000,000
<b>Total Saving Airbus A340-600:</b>				<b>\$148,500,000</b>

Historical transactional data on Airbus A340-600 aircraft is admittedly rather scarce as there has been little in the way of true operator a) to operator b) transactions. Neverthe-

the market value of a seven year old Airbus A330-300.

When comparing the lease costs of a fleet of five 2004 delivered Airbus A340-600s over a five year term, to those of five 2004 delivered Boeing 777-300ERs over a similar term, the Airbus A340-600 represents a saving in excess of US\$ 148,000,000. In contextual terms this is the equivalent to the market value of a one to two year old Boeing 777-300ER.

Model	Lease Rate	No. Aircraft	Months Lease	Total Lease Expenditure
2002 Boeing 747-400	\$316,000	5	60	\$94,800,000
2004 Boeing 777-300ER	\$870,000	5	60	\$261,000,000
Total Saving Boeing 747-400:				\$166,200,000

When comparing the lease costs of a fleet of five 2002 delivered Boeing 747-400s over a five year term to those of five 2004 delivered Boeing 777-300ERs, the Boeing 747-400 represents a saving in excess of US\$ 166,000,000. In contextual terms this is the equivalent to the market value of a well specified, brand new Boeing 777-300ER.

Whether measured in market value terms or lease rate terms there is certainly a strong case to be made for the lower acquisition costs of the four engine Airbus A340-300s, Airbus A340-600s and Boeing 747-400s, especially when one considers that a late 1990s Boeing 777-200ER still has a market value of US\$ 38,000,000 and that even the earliest Boeing 777-300ERs attract market values of US\$ 85,800,000.

**Competitive Maintenance Costs**

One area where the Boeing 777-300ER and Boeing 747-400 have traditionally had an advantage over the Airbus A340-600 is in the cost of engine maintenance. While both the performance restoration / overhaul and Life Limited Parts (LLP) stack costs of one General Electric GE90-115B engine are considerably more than for one Rolls-Royce Trent 556, there are only two engines per airframe to consider on the Boeing 777 versus four on the Airbus A340-600. The older Boeing 747-400 of course has four engines though most are powered by Pratt & Whitney PW4056 or General Electric CF6-80C2B1F engines.

In order to reduce the perception of Airbus A340-600s having high engine maintenance costs, Rolls-Royce has worked closely with Airbus and introduced the concept of “Four for the price of two”, whereby an operator is only charged for the price of two Rolls-Royce Trent 556 performance restorations. This, as will be revealed in later analysis, can have a marked effect on the Airbus A340-600 operating economics.

Four engine economics is less of an issue for the Airbus A340-300, which is powered by four CFM56-5C4s that are derived from narrow-body aircraft engines.

**Low Density Seating Airbus A340 aircraft are not optimised**

Some Airbus A340-300 legacy carriers have gradually been phasing out their aircraft. Some examples have been placed with secondary market operators such as Aerolineas Argentinas, Iran

Aseman, HiFly, Mahan Air and Airblue. Placing aircraft with these airlines presents the opportunity to reconfigure relatively low density Airbus A340-300s into a higher density seating, which should reduce the seat mile costs.

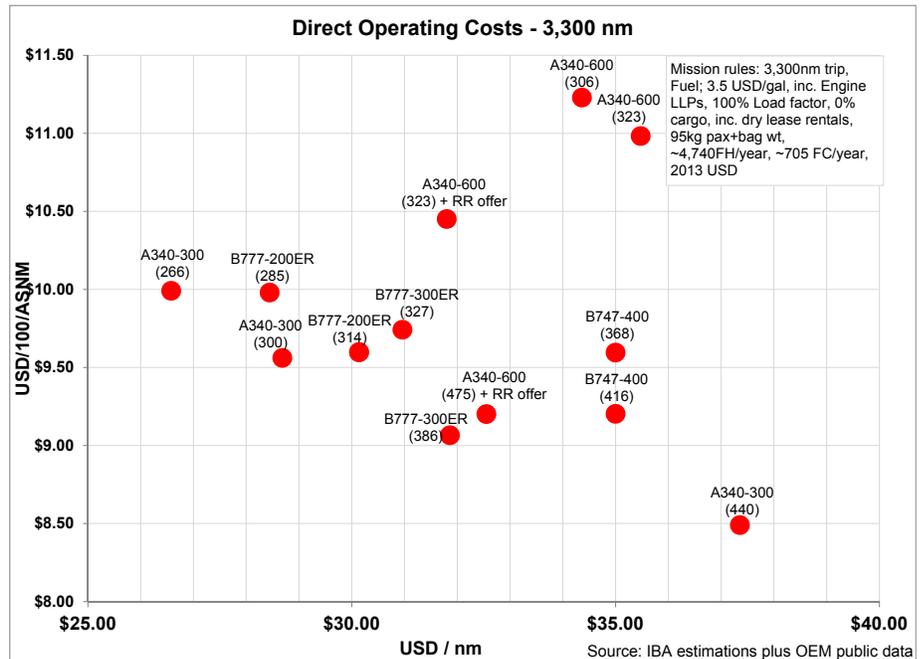
IBA has analysed the cash operating costs of a selection of two and four engine Airbus and Boeing wide-body aircraft. The analysis covers Airbus A340-300, Airbus A340-600, Boeing 747-400 (GE CF6-80C2B1F engines), Boeing 777-200ER, and Boeing 777-300ER aircraft over 3,300 nm and 6,000 nm sectors.

bus A340-300’s DOC seat mile costs rise more markedly than those of the 285 seat Boeing 777-200ER. Whereas the Boeing 777-200ER’s DOC seat mile costs rise by 8.9%, those of the Airbus A340-300 rise by 11.1%. The Boeing 777-200ER still maintains the higher trip cost though.

The Airbus A340-300 remains competitive over the 3,300 nm sector, when it is in higher density configuration with 300 seats. The Boeing 777-200ER, now with a higher density layout at 314 seats, has a more noticeable increase in DOC seat mile costs. The Boeing 777-200ER DOC seat mile cost is now marginally higher than for the Airbus A340-300.

Once the analysis covers a 6,000nm sector, the 314 seats Boeing 777-200ER regains a slight competitive edge on the 300 seater Airbus A340-300 as the DOC seat mile costs are slightly lower. On the 3,300nm sector the 314 seats Boeing 777-200ER has nearly 5% higher trip costs than the Airbus A340-300. This trend continues on the 6,000 nm sector.

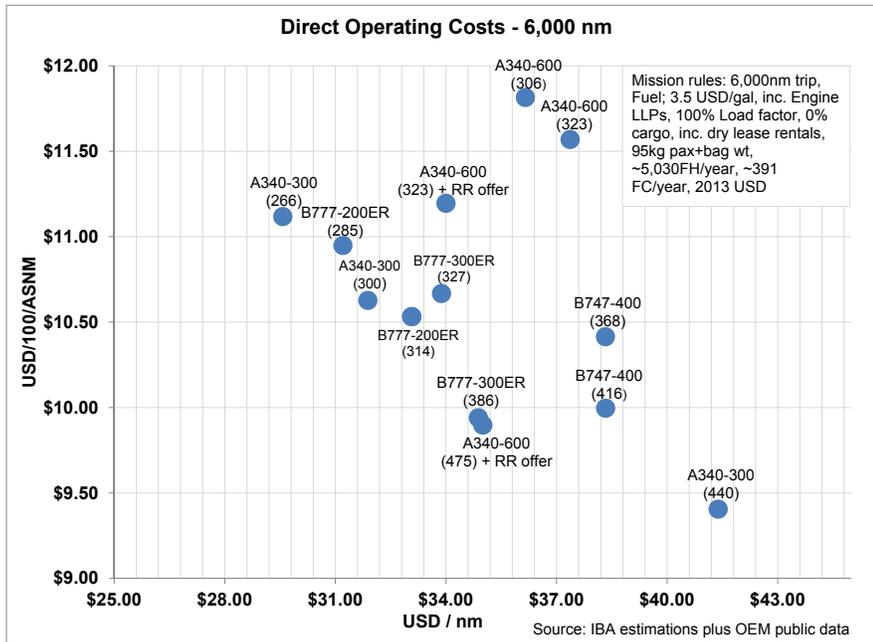
Moving to the larger capacity models, IBA will now assess the Boeing 747-400, Boeing 777-



With 266 seats configuration, the Airbus A340-300 has an all but identical DOC Seat Mile Cost to the 285 seats Boeing 777-200ER. However, as the Airbus A340-300 is a lighter aircraft (MTOW of 275,000 kg versus 297,560 kg for the Boeing 777-200ER), trip costs are expected to be lower.

Interestingly, when the same aircraft are compared over a 6,000 nm sector, the 266 seat Air-

300ER and Airbus A340-600. On the 3,300 nm sector, IBA’s analysis suggests that the 306 seats and 323 seats Airbus A340-600 has higher DOC seat mile costs than the Boeing 777-300ER with 386 seats. Typically these are anywhere between 17% and 20% higher. With 368 seats the Boeing 747-400 sits somewhere between the Boeing 777-300ER and Airbus A340-600s when measuring DOC seat mile costs.



600 improve when combining a higher density cabin configuration of 475 seats and the Rolls-Royce four shop visits for the price which two offer. Airbus has sensibly recognised that significant future Airbus A340-600 re-marketing prospects lie in high density configured cabins. On the 3,300 nm sector, the Airbus A340-600, with 475 seats and the Rolls-Royce offer, has only a slightly higher DOC seat mile cost than the Boeing 777-300ER (386 seats). They are very similar to those of the Boeing 747-400 (416 seats).

On the 3,300 nm sector, the trip cost for the 475 seats (RR 4 for 2) Airbus A340-600 sits comfortably and quite competitively between the lower capacity Boeing 777-300ER and Boeing 747-400.

The reason why IBA has selected 306 and 323 seat configurations for the Airbus A340-600 is because most are still operated by first tier operators such as Virgin Atlantic, Qatar, Lufthansa and Etihad. Typically, these operators use the aircraft

on long haul sectors and have relatively low seating densities owing to generous premium cabin allowances.

The DOC seat mile costs for the Airbus A340-

**IBA** The IBA is an independent aviation consulting firm based in Leatherhead, UK, with representation worldwide.

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# The future's bright...the future's 3D

## How ALM can revolutionise replacement part and PMA manufacture

Analysis by Rus Sutaria – Avia Intelligence Limited, London

Aviation and aerospace appear to be entering a fascinating period in terms of exciting new production technologies and techniques. None more so than the introduction of Additive Layer Manufacturing - ALM (or 3D Printing) as a means of fabricating plastic, and more recently metal components that are cheaper and quicker to produce, and with little or no waste of raw materials. In previous years ALM had the role of producing prototypes of components. More recently, the production and certification to EASA Form 1 approved aircraft parts within the civilian environment has now become a reality according to BAE Systems Regional Aircraft.

The aircraft manufacturer has successfully produced a plastic window breather pipe utilising the new and innovative 3D printing technology. The breather pipe was originally produced using plastic injection moulding techniques. Since the tooling for the injection moulded product was no longer available. BAE Systems are busily experimenting with and building their knowledge on 3D printing technology, and have successfully test-flown 3D components on the Tornado.

As a concept, 3D printing is nothing new. In actuality, techniques like 'Stereo lithography' were being employed by the major OEMs during the 1980s as a means of 'rapid prototyping'. The 1990s saw the introduction of other 3D printing

methods like laser sintering, as rapid prototyping became commonplace. It is only recently (at the turn of the millennium), that engineers had begun to realise the importance of 3D printing as a viable aerospace manufacturing technique, and describe the process utilising the current terminology 'Additive Layer Manufacturing'. By its very definition, ALM is the exact opposite of subtractive manufacturing techniques, which offer manufacturers of aircraft components an unfavourable 'Buy-to-Fly' ratio of 10:1. In other words, a typically machined component may only account for 10% of the material from which it had been originally manufactured. ALM provides the opportunity of more efficient use of raw materials thus leading to lower costs, and even a lowering of the carbon foot-print for both manufacturers and operators alike. In many ways, 3D printing is an ecologically friendly process!

As well as components made from plastic, 3D printing is also suitable for metal components, and there are already some fine examples of non-critical parts that are already serving aboard aircraft like the Tornado. However the real breakthroughs for metal 3D printing appear to have taken place within engine design and production arena, with the application of ALM in the manufacture of 24 additively manufactured parts aboard Pratt & Whitney's PurePower PW1500G. Even more astounding, is the development of

'gas-path' components like fuel nozzles on-board CFMs' Leap-1 engine that reduces a complex 20-piece design that employs a combination of casting, forging and machining processes into a 'one-piece' component that is 33% lighter and five times more durable than its' traditionally manufactured counter-part. If that does not impress you, then how about MTU Aero Engines who are working with 'Selective Laser Melting' (another ALM process) to produce critical items like casing parts and stator vanes.

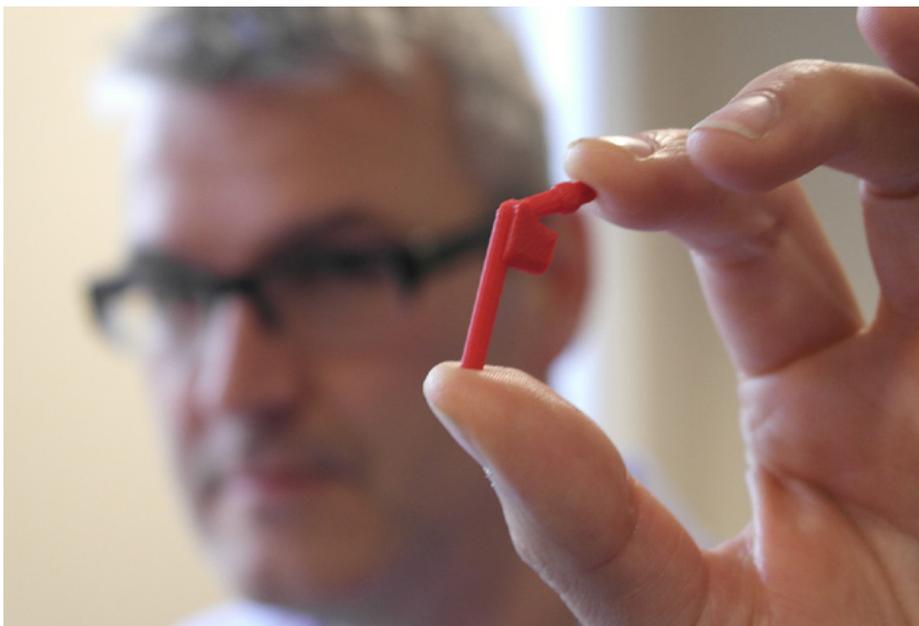


Rus Sutaria, Director – Content and Knowledge Services  
Photo: Avia Intelligence Ltd

Any experienced engineer will tell you, that some of the best and most cost effective products owe their success to simplicity of design, testing and ultimately production. ALM offers the PMA guys the opportunity of ease of compliance relating to their components utilising the same manufacturing techniques that are currently being studied by the OEM guys. Yet, there is little evidence of PMA manufacturers even considering ALM as the manufacturing game-changer that will help them level the playing field with regard to acceptability of their components on board aircraft.

The beauty of 3D printing equipment, is its' ability to produce just about any component without the need to re-calibrate or re-programme the machinery the way you would need to if producing components utilising traditional methods that might involve Computer Numeric Control (CNC). To illustrate the point, think of your laptop computer connected to a bulk standard inkjet printer. Once you have finished printing this article, you may decide to print a word-processed document or even a presentation. Do you switch to different equipment or re-calibrate your current inkjet printer to complete the task? Off-course you don't, and that is the unique selling point of 3D printing technology to the aerospace industry. In other words, the complete simplification of the logistics and production planning processes.

PMA and replacement part manufacturers should recognise (if they have not already done so) the operating benefits presented by 3D printing. Where OEMs utilised 3D printing techniques for



3D printed BAe 146 window breather pipe.

Photo: BAE Systems



Window breather pipes can be fitted on board in-service BAe 146 and RJs.

Photo: BAE Systems

rapid prototyping, PMAs should be utilising the technology to do exactly the same, and then employ the same equipment to fabricate production examples. In this author's opinion, the cost of developing, proving and ultimately certifying PMA components in this way will mean considerable reduction in development as well as production costs. Not only that, PMA components developed and manufactured utilising identical techniques and materials being considered by the OEMs would make the argument against utilising PMA on-board aircraft that much more difficult.

This article has already discussed the application of ALM in start-of the art technologies, however the chief benefit of 3D Printing is its' ability to facilitate the PMA and replacement parts market with potential solutions for operators of aircraft where parts are prone to obsolescence issues, need quick turn rounds as well as for small batch production. PMA and replacement parts guys must already be considering support of life extension and ageing aircraft programmes that involve large numbers of elderly fleets in places like the Americas, Australasia and the African continent as a whole. These organisations might also consider utilising a range of locally sourced ALM businesses or installing relatively inexpensive 3D fabrication facilities in key geographical locations, thus providing better support and functionality closer to home. As an example, 3D printing facilities could conceivably be placed within MRO businesses of varying capability and size.

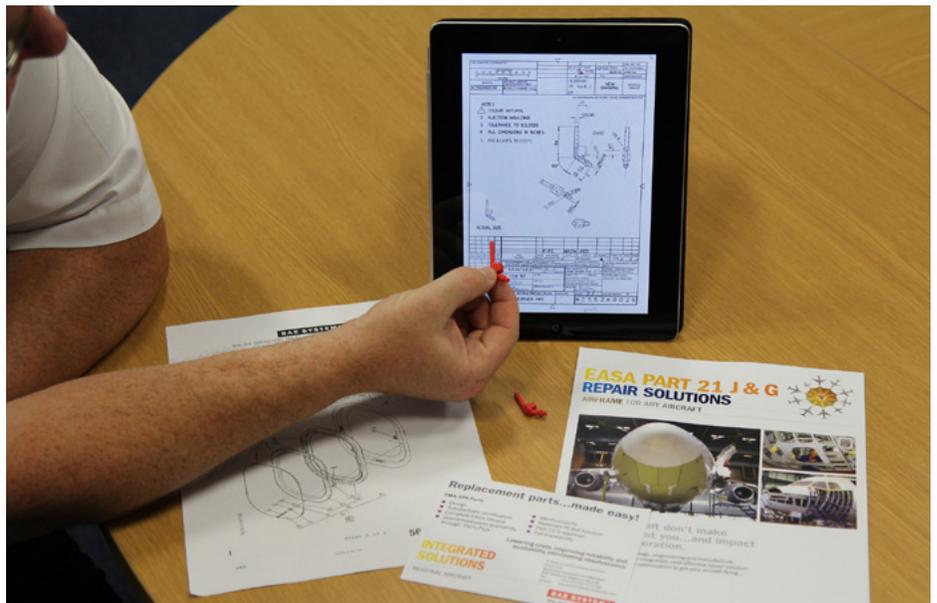
A case in point is the fabrication of the BAE Systems window breather pipe on board the BAe 146/RJ. BAE Systems sub contracts the actual production work to an independent third part

3D printing specialist whom then produces the 3D components under BAE Systems own Part 21 design and production organisation approvals. Consequently release of these components to service falls under BAE Systems and their Part-21 privileges. In this situation the companies involved are working together in the same country or region. However the principle equally applies to businesses wishing to work in this way on differing sides of the globe.

Utilising specialist 3D printing businesses such as the one employed by BAE Systems, would be considered a relatively sane approach not only to mitigate any financial risk associated with

setting-up an ALM division or business, but also the means through which PMAs can further penetrate challenging markets like Africa through local knowledge and collaboration with Independent MROs from within those regions.

Overall, Additive Layer Manufacturing is here to stay. It will not be the manufacturing answer to all components on board an aircraft, however with minimal investment, ALM could provide PMAs with a cost effective development tool, manufacturing solution, and with clever commercial strategy provide PMAs with further and deeper presence in the more challenging regions of the world.



Utilising specialist 3D printing mitigates any financial risk associated with setting-up an ALM division. Photo: BAE Systems



Chris Reuther, CIRCOR Aerospace & Defense, VP of Finance  
Photo: CIRCOR Aerospace & Defense

CIRCOR Aerospace & Defense, a division of CIRCOR International, has selected **Chris Reuther** as Group Vice President of Finance based in Corona, CA. He will have division enterprise-wide oversight for controls and compliance, financial planning and analysis, strategic planning, operations planning, pricing and proposals, general accounting and financial reporting. Reuther joins CIRCOR with over 15 years of experience from United Technologies Corporation (UTC) where he worked within the finance organization for several different subsidiaries of UTC. In his most current role at Sikorsky Aerospace Services, he held the position of Lead Manager of Financial Planning and Analysis.

TES Aviation Group of Wales, UK, Singapore and Dallas welcomes **Nick Louden** as their new CFO. Nick is a chartered accountant having started his career with KPMG before taking a variety of Finance Director and Group Finance Director roles with Christie Tyler, National Britannia and Environmental Scientifics Group. In the last 5 years Nick has worked at Board, Executive and Operational Levels in integrating a large number of businesses on behalf of a leading international private equity investor. He brings a wealth of experience in broader finance roles, change management, deal modelling, deal performance reporting, investor management, re-financing and debt /equity raising.

**Benoit Defforge** has been appointed Managing Director, Airbus Corporate Jets, effective 1st January 2014. He now leads Airbus' corporate jet business globally, combining his new role with that of his previous one as Head of the Airbus Corporate Jet Centre (ACJC). In his role as Managing Director of Airbus Corporate Jets, Defforge replaces Airbus veteran Habib Fekih, who played a leading role in establishing the company's business aviation role in the early days, and who has been instrumental in consolidating it in recent years. Habib Fekih moves on to further responsibilities within the Airbus group.



Benoit Defforge, new Managing Director Airbus Corporate Jets  
Photo: Airbus

Triumph Group released that **M. David Kornblatt**, Executive Vice President and Chief Financial Officer, will transition from that position in February 2014, to become the company's Director of Corporate Development. He will be succeeded as Chief Financial Officer by Jeffrey L. McRae, currently President of Triumph Aerostructures – Vought Aircraft Division, upon formal election by the company's board of directors, which is also expected to occur in February.

A change in management is underway at Lufthansa Technik Philippines: on February 1st, **Dr. Burkhard Andrich**, currently Senior Vice President Aircraft Component Services at Lufthansa Technik in Hamburg, will take over as President and CEO of the Manila-based Lufthansa Technik Philippines (LTP). This joint venture with Philippine aviation service provid-

er MacroAsia Corporation has a staff of 2,700 and offers a wide range of aircraft maintenance, repair and overhaul (MRO) services to customers worldwide, focusing on base maintenance checks for Airbus aircraft. Succeeding Andrich on February 1st, as Senior Vice President Aircraft Component Services is Harald Gloy. Gloy came to Lufthansa Technik in Hamburg in 2003. Following a tenure as Director Production Aircraft Base Maintenance he took over Component Maintenance Services as Vice President and thereafter Gloy became Vice President Engine Overhaul in November 2012. Gerald Frielinghaus joined Lufthansa Technik in 1985 and has held the post of President and CEO of Lufthansa Technik Philippines since 2011. He will return to Germany to manage the Paperless Maintenance project in Frankfurt – a migration from paper-based to electronic aircraft maintenance documentation that has high strategic and commercial value for the airlines of the Lufthansa Group and Lufthansa Technik.

**Chris Cannady** has been appointed as OEM Sales Manager for Universal Avionics. Based out of Universal Avionics' U.S. Midwest Office in Wichita, Kansas, Mr. Cannady's overall responsibility is to develop and maintain existing sales of the company's products to U.S. Original Equipment Manufacturers (OEM).



Chris Cannady ,OEM Sales Manager, US  
Photo: Universal Avionics

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