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MRO

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GEAR CHANGE

Landing gear overhaul

Company Profile
Magellan Aviation Group

MRO News
from around the world

People on the Move
latest appointments

ICF Analysis

Burning issues

Pictures of a British Airways 777 burning on the tarmac at Las Vegas airport with a full load of passengers brings home how uncertain aviation can be despite how far we have come as an industry.

It will probably take several months for investigators to unravel why one of the engines caught fire, but I'm sure the FAA [and the entire industry] are keen to get to the bottom of it pronto. Initial reports say the engine was found to have "multiple breaches" in its casing, investigators have said. The plane's left engine - a General Electric GE90-85B - its fuselage and wing were "substantially damaged" by the fire, according to the NTSB.

But at the same time there will be relief that the textbook evacuation procedure was successful.

In this edition we turn our attention to landing gears and GA Telesis and AAR both provide us with analysis on the intricacies of maintaining landing gears. We cover issues from buying or pooling gears to investment in new technologies that cater for new generation gears.

Elsewhere, Jeff Poirier, President of Vector's Engine Services tells us what a typical day entails in his high flying job to the construction of a multi-use test cell at Vector's facility in Prince Edward Island. We also take a closer look at the operations of Magellan Aviation Group.

Happy Reading!

Keith Mwanalushi
Editor

Landing gears have to absorb high dynamic loads. *Photo: AFI KLM E&M*

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Opinion

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Jet Aviation Basel expands its completions production capacity *Photo: Jet Aviation*

Jet Aviation Basel expands Completions production capacity to meet demand

Jet Aviation Basel has recently signed an agreement with Basel Euroairport authorities to expand its Completions production capacity to meet rising demand for services. Jet Aviation Basel is expanding its production operation within its Completions Center where the company produces industry-renowned furniture aircraft interior components and integrated systems for corporate and VIP aircraft interiors. The expansion includes establishing an additional 3,700 m² facility dedicated to finishing and integration activities as well as increasing manufacturing capacity within its current Cabinet shop. Plans also include investments in equipment, such as CNC machines to support cabinet building and glue, spray and paint facilities to support finishing operations. The expansion will be completed in the first quarter of 2016.

Pratt & Whitney opens customer training center in Hyderabad

Pratt & Whitney, a unit of United Technologies, reported the grand opening of its India customer training center in Hyderabad. The training center will be housed at United Technologies Corporation India. Aircraft engineers and technicians will be trained on current and new engine models at this facility. Today, more than 300 aircraft in India are powered by Pratt & Whitney and IAE International Aero Engines AG engines. This number will increase rapidly as the new PurePower PW1000G family of engines enters service in India with IndiGo, GoAir and Air Costa. The PurePower engine is also known as the Geared Turbofan engine, or GTF engine. The Customer Training Center will provide key training for GTF engine and V2500 engine customers, beginning with a capacity of training the equivalent of 2,000 students attending a one-week class per year, with growth capability of up to 4,000 students per year. Building on Pratt & Whitney's East Hartford and Beijing training facilities, this third facility in Hyderabad, India, will satisfy training demand in a fast emerging market like India.

Triumph Group to provide maintenance and repair services for Airbus A320 and A330/340

Triumph Aviation Services Asia, a subsidiary of Triumph Group, has signed a five year contract with Airbus S.A.S. to provide inspection, test, repair and modification of Airbus Proprietary Parts (APP) for the A320 and A330/340 programs. For the duration of the long term contract, the company will provide maintenance and repair services of rudders, elevators, wing sharklets, flaps, slats and other aircraft structures subcontracted by Airbus or received directly from Asia Pacific customers based on a collaborative marketing model. Triumph Group, headquartered in Berwyn, Pennsylvania, designs, engineers, manufactures, repairs and overhauls a broad portfolio of aerostructures, aircraft components, accessories, subassemblies and systems.

FL Technics completes equipment upgrade worth nearly €6m

FL Technics, a global provider of one-stop-shop aircraft maintenance, repair and overhaul services, has successfully finished a two-year long business development project. Over the period of project implementation the company invested almost €6m into high tech maintenance equipment and creating more than 200 new jobs in the company's MRO centre in Kaunas, Lithuania. Following the successful implementation of the project, the company has significantly optimized its processes, both time- and resource-wise. For instance, the recent procurement of a radio-controlled aircraft tug and a fork lift allowed FL Technics to speed up the relevant processes by at least an hour, as well as reduce the number of workforce engaged in the associated tasks by 6 times, leading to a more productive redistribution of human resources. Meanwhile, the acquisition of a ground power unit has enabled the company to provide in-house power supply for aircraft on the ramp, and thus eliminated the need to buy respective services from the airport. The investment has significantly expanded the capabilities of the company's MRO centre in Kaunas. The centre is capable of serving all major types of modern narrow- and wide-body aircraft, including Boeing 747 and Boeing 787 Dreamliner. The MRO base has already created jobs for 219 aviation professionals, including aircraft mechanics, engineers and other aviation technical personnel. Having started in August 2013, the project was partially funded from the EU structural funds.

Vistara signs V2500 engine V-Services agreement

Vistara, a TATA SIA JV and India's fastest growing full service carrier, has signed a V-Services agreement to maintain its fleet of 26 V2500 engines. The V2500 engine is offered through IAE International Aero Engines AG, a multinational aero engine consortium whose shareholders comprise Pratt & Whitney (UTX), Pratt & Whitney Aero Engines International GmbH, Japanese Aero Engines Corporation and MTU Aero Engines. ATA SIA Airlines, known by the brand name Vistara, is a joint venture between Tata Sons and Singapore Airlines with Tata Sons holding the majority stake of 51% in the company and SIA holding the remaining 49%.

First metal cut for A330neo parts underway in Toulouse and Nantes *Photo: Airbus*

Airbus starts production of the first A330neo

Airbus' first A330neo is coming to life one year after the programme was launched, with the first 'cutting of metal' underway at its production facilities in Toulouse and Nantes. Machining of the first engine pylon started during the summer at Airbus' facility in Saint-Eloi (Toulouse), while Airbus' Plant in Nantes began production of the first A330neo centre wing box. The first A330neo Centre Wing Box rib 1 produced in Nantes uses an innovative Isogrid design with 330 triangular pockets which enables the part to meet all our rigidity, strength and low weight requirements. The all-new pylon produced in Saint-Eloi is a key element in the A330neo's innovative design, attaching the latest generation, fuel-efficient Trent 7000 engines to the wings. Made out of light weight titanium, the A330neo pylon uses cutting-edge aerodynamics, materials and design technologies derived from the A350 XWB. The A330neo pylon will be fitted with a new A350 XWB inspired fairing made from composite materials and titanium for ensuring optimised aerodynamics. The A330-800neo and the A330-900neo are two new members of the Airbus Widebody Family with first deliveries scheduled to start in Q4 2017.

AAR signs MOU with KAI to help develop commercial MRO in South Korea

AAR a leader in airframe maintenance and supply chain solutions, and Korea Aerospace Industries (KAI), the largest original equipment manufacturer (OEM) and maintenance, repair and overhaul (MRO) provider for military aerospace customers in Korea, have signed a Memorandum of Understanding (MOU) to work together to establish a commercial aircraft MRO facility in South Korea. AAR's 1MRO Network, the third largest in the world, will provide its best practices in MRO as a consultant to KAI. The two providers are also considering operating the new facility under a joint venture. Under the agreement, AAR and KAI will also focus on growing KAI's MRO services to third-party customers/airlines. And AAR will lend its expertise on FAA and EASA certification and licensing requirements. KAI, the only domestic aircraft OEM and total systems integrator in Korea, builds Apache helicopters for Boeing and jointly developed a next-generation fighter trainer with Lockheed Martin. AAR has a global reputation in the aviation sector for improving operational efficiencies and turn times, as well as lowering airlines' operating costs through its customized solutions.

JSC Donavia deploys AJW engines to manage engine shop visits

As part of an ongoing GTA with Russian airline, JSC Donavia, AJW Engines is to provide engine shop visit management services for CFM56-5B engines. An experienced team of professional engineers from AJW will manage all aspects of the shop visit, supported by the strong commercial acumen of the engines division as a whole. AJW Engines has also negotiated the contractual terms with the chosen MRO on behalf of JSC Donavia. "The Engine Management Service (EMS) we offer is a tailored service whereby we continuously update the customer regarding all processes on a daily basis. In addition, we challenge the MRO to justify their repair choices keeping everyone focused" explains Morgan Brown, Powerplant Engineer – AJW Engines. "This approach not only helps to safeguard the airline from unnecessary expense but also ensures they operate at maximum efficiency and safety. The AJW Group is recognised for its flexible approach across all aircraft support options and the EMS programme for JSC Donavia combines special introductory rates and volume discounts."

Astronics Corporation to supply passenger service units for Boeing 777X Aircraft

Astronics Corporation has been selected to supply the Passenger Service Units (PSU) on the new family of long-range Boeing 777X aircraft. The award is subject to the execution of a final purchase agreement. Mr. Peter J. Gundermann, President and Chief Executive Officer of Astronics, commented, "We have had a long-standing relationship with Boeing on the 777 platform, and we are excited to participate on the 777X. We appreciate the confidence Boeing has expressed in us and look forward to our product contributing to the cabin innovations and improved passenger comfort levels Boeing plans for the 777X."

Delta TechOps signs five-year MRO services agreement with WestJet Airlines

Delta TechOps, Delta Air Lines' maintenance division and Maintenance, Repair and Overhaul (MRO) provider business, signed a new five-year agreement with WestJet Airlines. Delta TechOps will provide exclusive component maintenance-per-flight-hour support for WestJet's four Boeing 767-300ER aircraft. The agreement will cover various aircraft component services for hydraulics, pneumatics, avionics, fuel and oil systems on the aircraft. Delta TechOps will also provide integrated inventory support and main base kit coverage.

U.S. Air Force selects Chromalloy for F108 gas turbine engine module repairs

Chromalloy has been selected by the U.S. Air Force to provide repairs on low pressure turbine modules for the F108 aircraft engine fleet, in a contract valued at up to US$74m. The one-year agreement was contracted by the Tinker Air

Force Base in Oklahoma and includes four one-year options for additional repairs. The contract covers overhaul of the low pressure turbine shaft assembly, Module 14, during scheduled maintenance events of the F108 engines. Work will be performed at facilities within Chromalloy's service network. The F108 powers the KC-135 tanker aircraft fleet and RC-135 reconnaissance aircraft.

StandardAero signs long-term APU maintenance agreement with Mandarin Airlines

StandardAero signed a six-year contract with Mandarin Airlines to perform customized maintenance, repair and overhaul services for APS2300 auxiliary power units (APUs) on its fleet of Embraer ERJ190 regional aircraft. The contract is StandardAero's first APU program in Republic of China (Taiwan) and the new contract is expected to continue until December 31st, 2021, when Mandarin anticipates the retirement of its existing fleet. StandardAero is an OEM-approved APS2300 APU Authorized Repair Facility, and as such, the company's certified APU technicians have completed extensive OEM factory training provide customers with the most comprehensive, experienced and OEM-approved service in the industry. Mandarin Airlines' APUs will be serviced at StandardAero's Maryville, Tennessee facility. Mandarin Airlines is based in Taipei, Republic of China. The Taiwanese carrier operates domestic and regional international flights. The airline services passengers in Taiwan and mainland China as well as destinations in Hong Kong, Philippines, Vietnam, Japan and South Korea.

FL Technics receives EASA Part 145 certificate for Sukhoi Superjet 100-95

FL Technics, a global provider of one-stop-shop aircraft maintenance, repair and overhaul services, announced the extension of its EASA Part 145 certificate by adding Sukhoi Superjet 100-95 aircraft type to its capabilities. From the 31st of August, 2015 onwards, FL Technics engineers are ready to offer both scheduled and unscheduled checks, defect rectification, minor component replacement and other line maintenance works on SSJ100 airplanes. Also, the newly received certificate means that FL Technics will now provide 24/7 AOG support for SSJ100 operators throughout its Line Maintenance network in Europe and Asia.

SOAR and Ascent form working agreement

SOAR and Ascent Aviation Services Corporation (Ascent) have formed a renewable 5-year Cooperative Working Agreement to offer international Aircraft On the Ground (AOG) Field Support Services to the commercial aviation community. With its newly constructed 42,000 ft² hangar in Tuscon Arizona, Ascent is the latest to join the SOAR Network, a collective of quality aviation providers working under the management of SOAR to offer economical field support services. Ascent Aviation's FAA, EASA, NCAA and AFRA Certified repair station specializes in B727, B737 Classic, B737NG, B757, MD80/90, B717, CRJ 100/200 and the Airbus family. Under the management of SOAR, Ascent is participating as a highly valued team member for SOAR AOG Recovery, Evaluation, and Repair activities.

HAITEC Aircraft Maintenance performs first D-Check on a Boeing 747-400 *Photo: HAITEC*

HAITEC Aircraft Maintenance performs first D-Check on Boeing 747-400

HAITEC Aircraft Maintenance performed its first D-Check on a Boeing 747-400. „A D-Check is by far the most comprehensive and demanding check for an aircraft. The aircraft is basically taken apart completely, each part is checked thoroughly. Any material fatigue, hair cracks or any other damages are detected and repaired", explains Frank Rott, CEO at HAITEC. Completing such a check on a Boeing 747-400 generally takes at least five weeks. Depending on technical problems or so-called findings, it can even last up to three months. "Performing such a complex check in minimum time requires highest technical skills and precise planning. Such capabilities are fundamental to positioning HAITEC as a major player within the independent, global MRO market", says Rott.

Boeing completes 777X firm configuration

Boeing completed the firm configuration milestone for the 777-9, the first member of the 777X family to be developed. The Boeing 777X team reached this significant design milestone after working closely with airline customers and key suppliers to optimize the configuration of the new airplane. The 777X family includes the 777-8 and the 777-9 – both designed to respond to market needs and customer preferences. The firm configuration milestone marks the completion of configuration trade studies required to finalize the airplane's capability and basic design. Wind tunnel test results, aerodynamic performance and structural loads are also evaluated to ensure the airplane meets requirements. This allows the 777X team to begin detailed design of parts, assemblies and other systems for the airplane. As detailed designs are completed and released, production can begin. The 777X program has received orders and commitments for 320 airplanes from six customers worldwide. Production is set to begin in 2017.

easyJet selects UTC Aerospace Systems to provide wheels, carbon brakes and MRO support

UTC Aerospace Systems has been selected by easyJet to supply the wheels, carbon brakes and MRO support for the 68 new Airbus A320ceo aircraft being added to their fleet. UTC Aerospace Systems has been the wheel and brake supplier to easyJet since their A320 aircraft entered service. UTC Aerospace Systems will provide the equipment through its Landing Systems facility in Troy, Ohio. MRO services will be performed at the company's Hatfield, U.K., location in close proximity to easyJet's home base.

MTU Maintenance and Atlasglobal extend cooperation on V2500 engines *Photo: MTU Maintenance*

MTU Maintenance extends V2500 MRO contract with Turkish carrier Atlasglobal

MTU Maintenance and the Turkish carrier Atlasglobal Airlines, formally known as Atlasjet Airlines, have extended their cooperation regarding the maintenance of Atlasglobal's V2500 engines. Over the next five years, MTU Maintenance will continue to provide the airline with exclusive MRO services for this engine type. The cooperation between MTU and Atlasglobal dates back to 2006 with a V2500 contract for the carrier's fleet of Airbus A320-200 /A321-200 aircraft. Since then, it was continuously expanded to include additional engines and services, such as spare engine support and MTUPlus Engine Trend Monitoring. As one of the top five engine maintenance providers worldwide, MTU Maintenance is also the market leader for MRO work on the V2500 engine. The company has a market share of 37 percent and has completed close to 4,000 shop visits. Turkish Atlasglobal was established as Atlasjet Airlines in 2001 and offers sched-uled flights to destinations in Turkey as well as Asia, Middle East and Europe. As of today, the company operates a fleet of 22 Airbus narrowbody aircraft and it is one of Turkey's leading airlines.

AJW Aviation signs power-by-the-hour agreement with Ellinair

Ellinair, the Greek airline, has chosen AJW Aviation to provide full power-by-the-hour services for its A320 aircraft. AJW Leasing will

also site main base kit at its operational headquarters in Macedonia International Airport in Thessaloniki. Since the company's launch in 2013, Ellinair has rapidly expanded its route network, connecting mainland Greece and the Greek Islands with Russia, Kazakhstan, Ukraine, Latvia, Georgia and its latest destination, Turkey. AJW's long-established logistics support system throughout these regions is important to Ellinair as the airline plans to fast-track its modernisation programme and increase its fleet of Airbus A320s to five aircraft within two years.

Kaman awarded five-year contract extension for G280 Gulfstream program

Kaman Aerosystems (Kaman) reported that its UK operation has been successful in securing a five-year contract extension on the Gulfstream G280 program for the supply of Ailerons and Winglets to Triumph Aerostructures. This takes the period of program deliveries out to 2019 and firmly consolidates Kaman as a key supplier on the G280 program. The contract extension has an expected value of more than US$27m over the next 5 years. The Aileron assemblies are comprised of monolithic and sandwich composite parts manufactured in-house by Kaman, brought together into the final assembly with bought-out components from the Kaman supply chain. The Winglet assemblies are comprised of complex double curvature sandwich composite parts manufactured in-house by Kaman and assembled with bought-out components and hardware. The components are then shipped to Triumph to be incorporated into the complete Gulfstream G280 Wing build.

Magnetic MRO introduces HPC Blades Blend Repair Services for CFM56 family engines

Total Technical Care provider Magnetic MRO based in Tallinn, Estonia launches High Pressure Compressor (HPC) Blades Boroblend Repair Service for CFM56-3, -5A,-5B and -7B Engines. With the addition of HPC Blend Repair Capability, Magnetic MRO will be able to assist in AOG situations caused by FOD and be a very cost-effective solution for aircraft owners and airlines. The aforementioned service is performed on-wing and does not require engine removal or disassembly – access to the damaged blade is gained via regular borescope inspection ports.

Next generation of Airbus' all-new wide-body airliner takes shape *Photo: Airbus*

Lufthansa Bombardier Aviation Services and OHS Aviation Services to expand cooperation with international focus

OHS Aviation Services, the specialist for interior design of business jets and Lufthansa Bombardier Aviation Services (LBAS), the exclusive maintenance facility for Bombardier business jets, offer more services from a single source. "We now want to expand our successful cooperation in the form of joint customer acquisition abroad and rely on combined refurbishment and maintenance product packages" says Christoph Meyerrose, CEO of LBAS. For the customer refurbishment is attractively priced and optimally integrated into a forthcoming check. Even short-term requests are served. Also OHS has expanded its engineering sector: besides "Minor Changes" the EASA Part 21J certified Design Organization can now permit "Major Changes" and STC´s for all aircraft categories. At airport BER LBAS and OHS offer a fully comprehensive maintenance and refurbishment program, including engineering services. The close proximity to the BER location allows a straight forwarded common customer care. This has proven to be very efficient over the years. With joint international customer acquisition this successful cooperation is being further expanded.

First A350-1000 wing goes into production

The wings for the first Airbus A350-1000 have begun the process of assembly at Broughton, North Wales. The A350-1000 wing has the same span of the A350-900 that is already in service, but 90% of the parts have been modified and the trailing edge has been extended to resize the wing for the additional payload and range. At 32 metres long by six metres wide, the A350 XWB wing is the largest single part made from carbon fibre composite material in use in civil aviation today. They are designed and developed at Airbus' facility in Filton, near Bristol, where a number of other systems are designed and tested including fuel systems and landing gear. The high-performance wings of the A350 XWB make the aircraft faster, more efficient and quieter. The wing design includes several streamlined features. Among these are droop-nose leading edge devices and new adaptive dropped-hinge flaps, which increase the jetliner's efficiency at low speeds. To improve efficiency at higher speeds, the A350 XWB can deflect its wing flaps differentially, optimising the wing profile and providing better load control.

AerFin continues expansion with acquisition of Airline Services Components

AerFin reported the acquisition of the trade and assets of Airline Services Components (ASC), a leading commercial aircraft rotable component business based at London Gatwick Airport. ASC Management team and staff will transfer to AerFin, enhancing the company's airframe parts distribution and routes to market for Boeing and Airbus components, including recent acquisitions of A320, A330 and A340. The strategic acquisition will see AerFin acquire a dedicated aircraft component distribution centre strategically located near London Gatwick Airport, providing 24/7 AOG support, sale, exchanges and power by the hour support agreements across all major commercial airframe platforms. Bob James CEO of AerFin Limited said, "This strategic acquisition brings full airframe component support capability through ASC's highly experienced management team, and a Gatwick Airport based operation allowing AerFin to provide complete aircraft nose to tail support, with a 24/7 AOG desk accessible to all of our customers worldwide".

RUAG reports stable earnings despite Swiss franc's strength and critical export situation

International technology group RUAG managed to maintain its profit margin and generate stable earnings in the first half of the year despite difficult global economic conditions. The Group posted an organic decline in sales of 5.4% (CHF 49m) due to revenue being deferred into the second half of the year, when RUAG expects to be able to make up for this decline. The strong Swiss franc depressed the Group's net sales by an additional 5.8% (CHF 53m), while acquisitions boosted sales by 0.6% (CHF 7m). Overall, RUAG generated net sales of CHF 824m (CHF 921m) in the first half of the year. Earnings before interest and taxes (EBIT) decreased by 5.7% to CHF 47m (CHF 50m). Despite these declines, RUAG managed to hold the operating profit margin (EBIT as a percentage of operating income) steady at 5.6% (5.6%). The percentage of sales generated by RUAG in Europe and North America showed the strongest growth. The technology group increased outlays on research and development by 7.9% to CHF 68m (CHF 63m).

HEICO Corporation makes two more important acquisitions

HEICO Corporation has completed two more acquisitions, in addition to one announced last week. Both purchases were made for cash, but other transaction terms and financial details were not disclosed. HEICO stated that it expects both acquisitions to be accretive to its earnings within the first year after the closing. The Company's Electronic Technologies Group completed the acquisition of 80.1% of the shares of privately-held Midwest Microwave Solutions, from MMS's founders/managers. Hiawatha, IA-based MMS designs, manufactures and sells unique Size, Weight, Power and Cost (SWAP-C) optimized Communications and Electronic Intercept Receivers and Tuners for military and intelligence applications. HEICO's Flight Support Group acquired Astroseal Products Manufacturing. Astroseal makes expanded foil mesh which is integrated into composite aerospace structures for lightning strike protection in fixed and rotary wing aircraft. Nearly all aircraft make use of composites needing Astroseal's "Astrostrike"products for both shielding and lightning protection on large areas of the fuselage, wings, empennage, stabilizers, engine nacelles, propellers, winglets and the rotor blades.

Hong Kong Aviation Capital closes new $725m 5 year warehouse facility

Hong Kong Aviation Capital (HKAC) announced the completion of a new $725m secured limited-recourse warehouse facility. The facility provides HKAC significant flexibility with 100% blind capacity to finance its future aircraft deliveries or refinance existing aircraft. The facility was oversubscribed and is priced competitively at a margin of 2.00%. The facility was structured by Credit Suisse and was widely syndicated to banks based in the Americas, Europe, the Middle East and Asia.

Satcom Direct Communications inks agreement to acquire Airbus DS SatCom Government

Global aeronautical communications provider Satcom Direct Communications, has entered into a purchase agreement to acquire Airbus DS SatCom Government (ASGI), expanding its market presence and offerings to the U.S. government sector. ASGI is a government satellite communications business unit of Airbus Defense and Space for the U.S. market and will operate as a subsidiary of Satcom Direct Communications (SDC), of Satellite Beach, FL. The purchase agreement includes acquisition of ASGI's business operations as well as two satellite earth stations located on the East and West Coasts of the United States. "Combining the two organizations provides distinct synergies, allowing for a greater support infrastructure as well as enhanced capabilities, technology and expertise to our respective U.S. government customers," said David Greenhill, President of Satcom Direct Communications. "The acquisition will also provide an increased ability to competitively offer fixed and mobile satellite services in Ku, Ka, L, C, and X bands in multiple markets, especially aviation." The deal has been submitted to the U.S. authority and is expected to close within the next few months.

Gear up

MROs will have to invest in new infrastructure to maintain landing gears for new aircraft types but also pull resources to establish more efficient ways to test for gear faults and repairs. ***Keith Mwanalushi*** reports.

Landing gear designs, materials and surface treatments are beginning to change. *Photo: Emirates Group*

Picture this scenario as described by Lufthansa Technic – the Airbus A340 has just landed. During this everyday procedure, the landing gear has to absorb high dynamic loads when up to 285 tons of aluminium and payload arrive on the airport runway. Here, the landing gear becomes the sole direct link between the airframe and tarmac and is vital to the safe conclusion of the flight.

Like all other components which make up an aircraft the landing gear – often simply known as the 'legs' by aircrew and ground crew – is checked and maintained daily, repaired as required and fully overhauled at regular intervals. A full landing gear overhaul is a task for specialists that requires the use of special tools, equipment and technology. For this reason, many airlines have sub-contracted this work to organisations with commensurate equipment and know-how – clearly a momentous task!

A number of airlines seem to be increasingly reluctant to buy spare landing gear sets preferring to rely on pooling programmes and leases, but does this put MRO organisations into a financial burden? "In general no," replies Jason Reed, President of GA Telesis Component Solutions Group. He says landing gear MRO shops have usually found it increasingly necessary to invest in several sets of spares to facilitate large programmes or campaigns.

"Sometimes they are able to charge their customers a nominal lease fee for the use of the rotable gear set, they can provide an all-inclusive price in the overhaul costs which includes a portion of rotable costs, and other times they are expected to absorb the cost of acquisition for these rotable gear sets as part of their service," Reed mentions.

In addition, Reed explains that with the amount of aircraft in the market today, rotable sets can be used/serviceable and not necessarily new, which highly mitigates the costs in the business case. "However, some gear sets, like the 777-300ER could be as high as $20 million to invest in, making it very difficult for some shops to justify the business case," he adds.

AAR also has the resources to maintain a large pool of landing gear rotable inventory, both components and complete gears, for exchange and lease transactions to support aircraft operators. "Obviously, this requires increased capital investment by the MROs, whether they purchase new or from the aftermarket. This may be mitigated by joint pooling efforts with either the airlines, OEMs or brokers who own inventory for which they can recognise some additional income," contributes Jesus Banal, VP of Landing Gear for AAR.

AAR is seeing the greatest demand for gear overhaul on A320, 737NG, 777, E175, E190 and CRJ700/900. And over at GA Telesis the biggest

Reed - MROs can invest in several sets of spares to facilitate large programmes or campaigns *Photo: GA Telesis*

demand is on A320 & A321 Enhanced, A330 Enhanced, 737-800 &-900, 767-300ER and 777-300ER.

Over in China, earlier this year, GAMECO had a ground breaking ceremony for the Longwan Aircraft Landing Gear (LDG) overhaul facility in Taiping County, China. Construction began in December last year. The Longwan facility is designed for LDG repair processes with NDT (Non Destructive Testing) machining and chemical surface treatment. The facility covers gears on 737,777 and Airbus A320 and A330.

The general manager of GAMECO Norbert Marx said at the time of the opening ceremony: "China Southern Airlines is not only a shareholder of GAMECO, but by operating over 600 aircraft in the group, also our biggest customer. Landing gears are one of the most critical components of an airplane and it needs overhaul every 10 years. CSN's fleet is at the peak of landing gear removal in the coming years, which is a great business opportunity for us."

In Europe Liebherr-Aerospace has been busy with landing gear activity recently. In May, the company announced that it had set up testing capabilities for shimmy dampers installed on the E170 and E190 aircraft of operators in the Americas. Thus, the company is able to carry out the tests at its facility in Saline, Michigan (USA). In the past, such tests were solely performed at Liebherr-Aerospace Lindenberg GmbH in Lindenberg (Germany).

About 2,200 shimmy dampers are installed on the E-Jet s of operators all over the world, of which over 50% are based in the Americas.

According to Liebherr, the shimmy damper dampens the torsional movement of the wheels, which are transmitted to the main fitting through the torque links when the aircraft is taxiing. It is installed at the pivot point between the upper and lower torque links of the main landing gear shock strut.

In June, Liebherr – Aerospace further announced that it had signed a deal with Air France spin-off carrier HOP! The agreement covers the overhaul of the landing gear systems on board the airlines' Embraer E170 and E190 aircraft. The contract was signed at Paris Air Show in June this year.

Following a programme signed in 2007 for 37 EMB135/145 aircraft, the companies now concluded an overhaul agreement for HOP's fleet of 26 Embraer E170 and E190.

Joining a landing gear pooling programme is an attractive option. *Photo: JorAMCo*

Liebherr-Aerospace will carry out all overhaul activities at its facility in Lindenberg (Germany). Arndt Schoenemann, Managing Director Liebherr-Aerospace Lindenberg GmbH said: "With this contract, HOP! Air France and Liebherr-Aerospace are continuing and strengthening their collaboration. Moreover, this new contract confirms our leading position in E-Jet landing gear overhauls in Europe."

> "Landing gears are one of the most critical components of an airplane and it needs overhaul every 10 years."
> Norbert Marx, general manager of GAMECO

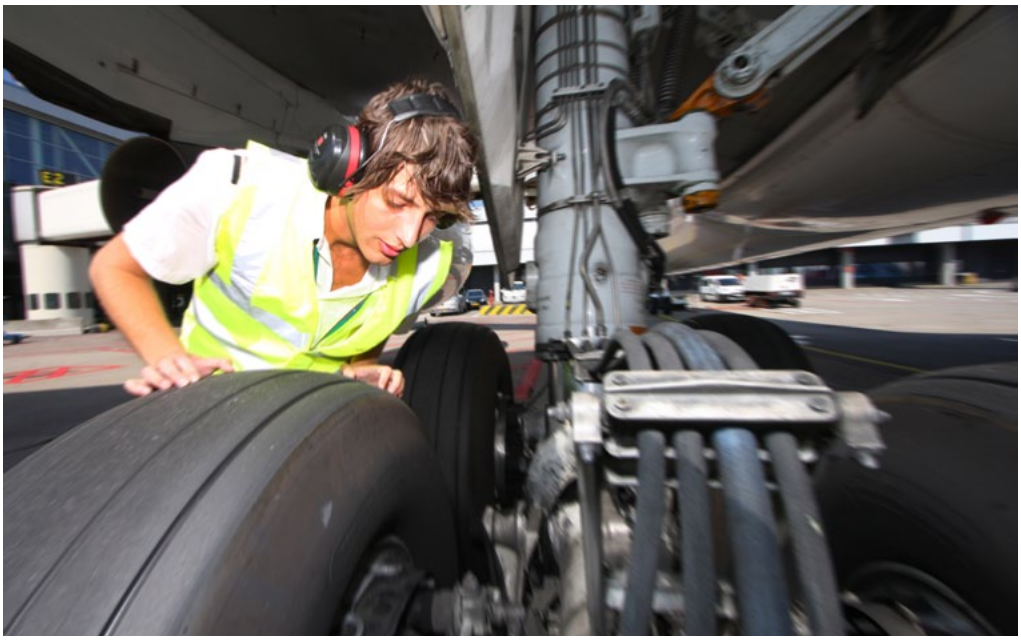
The complete landing gear systems for the E-Jet family E170, E175, E190 and E195, which include the brake systems, were developed and manufactured by the OEM Liebherr-Aerospace.

Landing gear for newer aircraft models will supposedly require investment in new technologies and spares and this may have some impact on gear MRO procedures and we asked experts at GA Telesis and AAR if there will be any impact on older generation aircraft.

"Landing gear designs, materials and surface treatments are beginning to change already for gear such as the A380, 787 and A350 pro-

grammes," confirms Reed from GA Telesis. "The biggest change is around the use of lighter weight, but stronger materials such as titanium. This is driving advancements in repair methods and tooling for machining during the overhaul and repair process."

On top of that, Reed says the replacement of Hexavalent Chromium with HVOF (High Velocity Oxygen Fuel) spray and surface treatments that replace the previous use of dull cadmium are creating additional costs and TAT for those who are in the industry for a long time. "This creates further barriers to entry for smaller MRO gear shops to compete, especially as repair demand of older models with chrome and cadmium continues to diminish. We will start to see not only larger MROs, but even smaller MROs outsource those particular special processes in order to minimise their costs or to gain entry into the market," Reed states.



Line maintenance checks should detect general faults. *Photo: Direct Maintenance*

Banal from AAR also mentions that newer types of aircraft gears will require investment in specialised machinery to apply, remove and finish grind exotic plating such as HVOF, also, he says there is increased applications of proprietary liner repairs.

Aerostar is a subcontractor for the production of landing gear components. *Photo: Keith Mwanalushi*

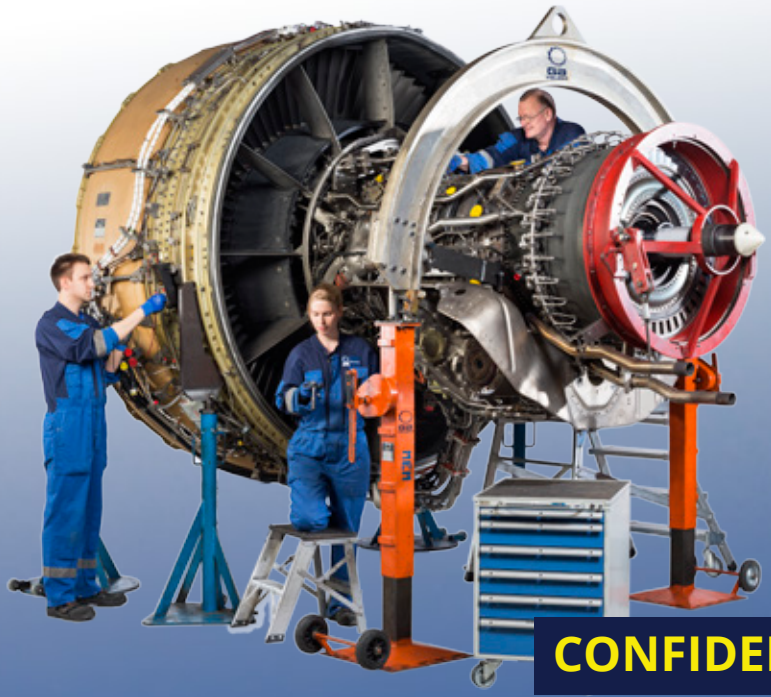
Airbus A380 and 787 overhauls on the horizon will require investment in larger infrastructures (i.e. equipment and machinery). Banal continues: "AAR LGS is one of the few landing gear overhaul facilities that already has the required equipment to fully process components from the A340 and B777 landing gears and has incorporated additional equipment purchases in our long-range plans to fully cover the industry requirements."

Regarding the most cost efficient method for airlines or MRO's to test for gear faults and repairs, Banal feels that while on the aircraft, the primary source of information about gears comes from pilot reports. He says there is a lot of information that can be derived during normal aircraft turnarounds, such as observation of leaks or low struts.

"During shop visits, standard industry NDT methods are employed during component processing and leak testing is performed upon assembly," Banal says.

AAR LGS is an independent landing gear facility and is not associated with an OEM or airline. The company is one of a few that has the equipment and personnel to "properly process landing gear components in house." In addition to providing in-house services to MROs and airlines, Banal refers to "Tiger Teams" - a service the company provides to perform on-site field repairs.

In terms of faults and repairs Reed similarly attributes this to regular checks during line maintenance and A Checks. "Gear swings in base maintenance, and the utilisation of NDT technology and scanning equipment to check for corrosion and cracks within the gears and assembly can also be done during A Checks for inner and outer cylinder reviews to ensure longer life or quicker findings if on-wing," Reed sums up.



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We are capable of supporting three segments of the air transport industry: commuter/regional turbo-prop, regional jet, and commercial narrow- and wide-body. Working closely with our customers throughout the world, we provide the most comprehensive and valuable support possible.

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B&B Marketing Enterprises, located in Pompano Beach, Florida, is a subsidiary of Magellan specialising in OEM new and new surplus consumable and expendable aircraft material distribution. Their product lines align well with Magellan's rotable inventory and include all Boeing and Airbus wide- and narrowbody types, ATR and Embraer E-Jets, GE CF6 and CFM56, and Dornier 328, Eurocopter and Airbus helicopters.

MAG warehouse stock *Photo: Magellan Aviation Group*

In 2014, Magellan was presented with the President's E Award, given by the US Department of Commerce for our outstanding achievements in the expansion of exports worldwide. This honor was made possible due in part to Magellan's extensive capital resources as well as the global network provided by our partner, Marubeni Corporation.

Magellan Aviation Group is dedicated to ensuring that our warehouses are stocked and ready to satisfy the requirements of our customers. We are active purchasers of regional and commercial aircraft and engines,

MAG engine inventory *Photo: Magellan Aviation Group*

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Airframe Support Capabilities

- **Regional**
  - o ATR 42 / 72
  - o Dash 8 100 / 200 / 300 / 400
  - o Embraer 175 / 175 / 190 / 195
  - o CRJ 100 / 200 / 700 / 900
- **Commercial**
  - o Airbus A300 / A310 / A320 / A330 / A340
  - o Boeing 737 (Classic & NG) / 747 / 757 / 767 / 777
  - o McDonnell Douglas MD-11

Engine Sales & Leasing / Parts Support Capabilities

- **Regional**
  - o PW100 All Series
  - o CF34-3A1 / B1
  - o CF34-8C5 / B1
  - o CF34-8E5 / A1
  - o AE3007A1
- **Commercial**
  - o CF6-80C1
  - o PW4000 (all series)
  - o CFM56-3 / -5 / -7BE
  - o V2500-A5

In the hot seat.....

Keith Mwanalushi speaks to Jeff Poirier, President of Vector's Engine Services - Atlantic division

AviTrader MRO: What attracted you to this business?

Poirier: In 1993, I joined Vector (then known as Atlantic Turbines in Prince Edward Island, Canada) as part of an on the job training directly from college. At that time in my life, it was a job. The fast paced industry and the personal relationships made it worth the investment - and to this day, it is the relationships and friendships made around the world that makes this industry the best one to work in.

AviTrader MRO: What does a typical day's work entail in your job?

Poirier: With locations all around the world reporting into our facility in Prince Edward Island, Canada. My day begins quite early and ends late at night. Our African customers for instance are already awake when I wake up in the morning and our Asia Pacific customers are starting their day when I am ready for bed. My day involves general oversight of eight locations and a strong dedicated team of 620 plus employees.

Jeff Poirier, President of Vector's Engine Services

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

Poirier: It is the daily juggling to try and find that common ground to make as many people (employees or customers) happy with our decisions. It would be simple if every answer was 'yes' but it cannot be - we have a shareholder that is expecting reasonable returns for their investment - we have customers that expect it to be most cost effective every year and employees that expect to be treated fair – sometimes it is challenging to balance it all.

AviTrader MRO: How is the market responding to your recently launched VMAX programme for the JT15D engine?

Poirier: The market has responded very positively. Existing customers that we transferred over have been thus far impressed with the service provided - and new customers have shown interest in the JT15D Vmax offering. We will continue to grow the Vmax brand, expanding it into certain PT6A markets in the near future.

AviTrader MRO: Vector also invested in a new engine test cell. What is the significance of this?

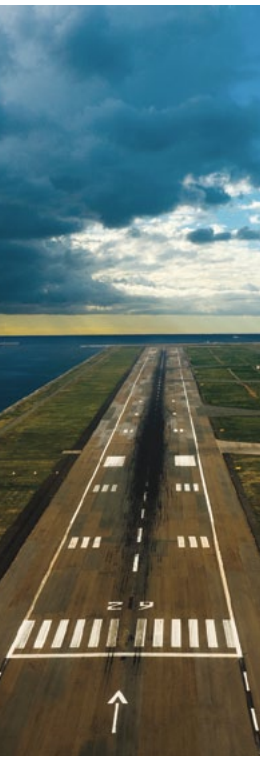
Poirier: Vector has partnered with local governments to finance the construction of a multi-use test cell at our facility in Prince Edward Island. This new cell will be able to test both PW100 and PT6A turbo-props and will be built to easily adapt to future turbo-prop engines, therefore, allowing us to expand into other markets in the near future. The additional test cell will allow us to manage risk on the current single use cells, expand capacity for additional market share growth and lastly, as indicated above, allow us to invest into new turboprop markets.

AviTrader MRO: In terms of turboprops, which types are you seeing more demand for MRO services?

Poirier: Regional, scheduled and freight remain steady. Corporate and charter work is showing some positive trends but the volumes remain lighter than what we have experienced in the past. Major repairs and overhauls are replaced with engines remaining on condition (quick repairs, minor accessing) to prolong time on wing and defer heavy maintenance costs.

AviTrader MRO: What capabilities do you have in place for helicopter work?

Poirier: Vector Aerospace, from our sister divisions in Richmond, British Columbia and Gosport, UK provide extensive engine, airframe and components maintenance repair and overhaul to varying helicopter platforms. A complete listing of capabilities can be found on our website.



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Aircraft development programmes

Analysis by Peter Zimm, *Principal – ICF International.*

This past decade has seen an unprecedented level of new aircraft development. Fuel, having tripled in price by the mid-2000's, consumed a majority of airline operating budgets. Airlines turned to manufacturers to develop new, more efficient aircraft – and to extract better fuel economy from existing airplane models. The result: two clean sheet design widebodies (787 and A350) and a clean sheet narrowbody (CSeries), a major redesign of the 747, re-winged E-Jets and 777, and re-engined A320s and 737s. Furthermore, if that weren't enough, new entrants sprung into the market, offering new aircraft to the narrowbody and regional jet markets: Sukhoi (Superjet), Irkut (MS-21), Comac (C919) and Mitsubishi (MRJ). And the development wave was by no means limited to airframes: engines – enablers if not catalysts of significant fuel burn improvements – underwent elevated levels of development as well – Rolls-Royce's Trent Series, CFM's LEAP, GE's GEnX and upcoming GE9X, Engine Alliance's GP7200, and, of course, Pratt & Whitney's Geared Turbofan. Indeed, by the end of the decade, Boeing, Airbus, and Embraer will have fielded new models in every seat-range segment – the only exception being the 757 replacement (aka MOM).

However, even as the industry is flush with both production and development work, we can begin to see the end of the development surge: the clean sheet widebody aircraft have entered service, their follow-on variants will be in production in the next few years, and most of the narrowbodies and regional jets will enter service by the end of 2017. The A330neo is due to enter service in 2017. After that time, only Embraer's E2 and Boeing's 777X will remain to be developed[1]. In the not-so-distant past, commercial aerospace cycles would have been offset by military programmes, but in our post-Great-Recession world of lower defense spending (at least in the West) and increasing use of COTS and smaller, cheaper unmanned aircraft, new military programmes will hardly make the difference: only the T-X programme (T-38 replacement), Long Range Strike Bomber (requirement has not yet been defined), and the remaining tail of JSF development spend remain. So, development activity will fall back to historical levels and the pattern of intermittent development will resume.

[1] *While A380neo and Boeing's 757 replacement (aka MOM) are being talked about, formal launches would seem to be a long way off.*

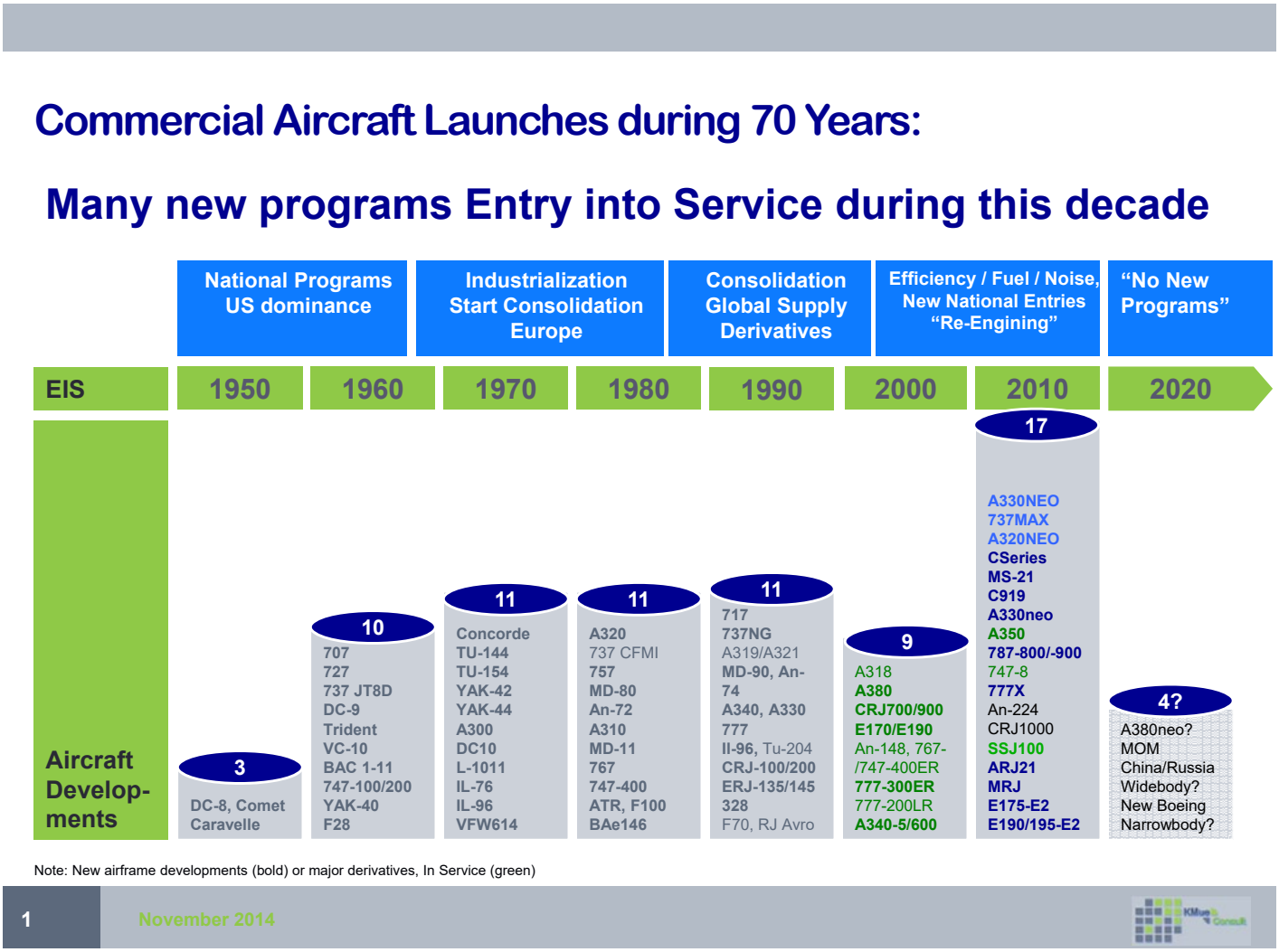

Figure 1: Air Transport Development Programs by Decade

The on-set of this era of "No New Programmes" has serious implications for aviation and aerospace:

• ***Airlines*** may be the least directly impacted by the coming dearth of development. They enjoy the fruits of the redesign cycles, are taking delivery of new, more fuel efficient (albeit relatively more expensive) aircraft. Accelerated retirements of less efficient airplanes created a glut of surplus replacement material, lowering maintenance costs for those still operating older airplanes. And now, lower fuel prices have brought unforeseen profits in an industry that has honed its fuel conservation activities. Lastly, the redesign cycle gifted OEMs with reservoirs of technologies that can be incrementally inserted into existing aircraft and engine designs, providing a hedge should fuel prices edge up again.

• ***MROs*** are more likely to feel the effects of the introduction of new designs and aircraft than the fall off in new development programmes. In with the new was enabled by out with the old, but some venerable, spare-part and part repair-producing legacy programmes (i.e., 767, A330, 747, CF6) will sunset in the next decade even as new designs hit their first heavy overhaul intervals. However, one aspect of the new designs was to extend overhaul intervals (the 787 heavy check interval is 50% longer than its predecessor) and new technologies may mean money saving alternative parts and repairs will not be immediately available – and may be harder to develop for the newest generation of airplanes. By design, the new aircraft should have lower unit maintenance costs and increased reliability, so the amount of time aircraft and associated components spend in hangars/workshops will reduce, making capability investment decisions all the more important and difficult. And last but not least, the new supply chain models adopted for some of these new programmes (e.g., higher involvement of Tier 1 OEMs in systems design, development in the 787 and A350) also means that the OEMs will inevitably be more aggressive in protecting/gaining share in the aftermarket.

• ***OEMs*** will clearly face challenges. Most important will be retention of engineering capability and talent, built to a high level by continual programme development activity. Once there is less to work on and shareholders expect to reap the benefits of prior-year development investments, they will have to choose carefully what capabilities they want to retain. A second challenge will be the aftermarket. Large stocks of surplus parts remain in the market for the legacy programmes, and, as these spares-producing legacy platforms give way to more reliable, longer lived new designs, spare parts revenues may be longer in coming. On the bright side, however, the new platforms will likely be better protected from PMA parts and DER repairs.

The decade has seen an unprecedented level of new aircraft development *Photo: Boeing*

• ***Suppliers*** to the OEMs will probably face some of the greatest challenges. OEM priorities were already shifting to "cost out" from "rate readiness" but when the development storm passes and the market becomes mostly about delivery, the focus on reducing cost will increase (even more). And suppliers, addicted to a regular stream of new programme opportunities to pursue and more focus on ensuring deliveries are on time, will face a new environment characterized by design for cost rather than for performance and the need to focus on execution.

In light of this upcoming sea change, how can companies respond?

Deliver. Manufacturers who provide high service levels make their customer's lives easier and win the right to bid on more work – which will be critical in a world in which programme builds will be known and battle lines more static. Furthermore, from an operations perspective, actions that increase factory throughput and reduce schedule variability frequently have cost and yield benefits as well.

De-Cost. As OEMs push themselves and the supply base to remove cost, companies who are ahead of the curve will be in a better position to address challenges customers may push down to them – as well as earn returns and make critical investments.

Defend. Even though programme development will taper off, engineering and technology will continue to be important. Manufacturers should be sure to identify those technologies and capabilities they want to retain and have a clear plan to preserve them. In addition, markets that afford their suppliers with aftermarket revenue streams are generally attractive, but with the changes in the aftermarket (e.g., the rise of MRO integrators, the increase in surplus parts) and airframe OEMs' push for more non-manufacturing revenues will make these streams important to defend – if they haven't been compromised already (e.g., some suppliers had to open their aftermarkets in order to get on new programmes).

Once the development cycle begins its descent around 2018, the environment for OEMs and suppliers will shift from programme development to efficient production, from performance-driven technology to cost-reduction technology. However, there is still time to take the steps needed to position your business for the world to come.

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Commsoft announced that start-up Russian airline, **JSC UVT AERO**, a user of its MRO IT system, OASES, was awarded its Air Operator Certificate (AOC) on July 8th, by the Federal Transport Agency of the Ministry of Transport for the Russian Federation. The regional airline is based in Bugulma and Kazan in the Republic of Tatarstan, Russia. The airline has signed a 10 concurrent users, five-year contract with Commsoft to use its flagship MRO solution for scheduled and charter passenger operations. Earlier this week, it announced the expansion of its service to take in six cities in Russia, including the region of Crimea. JSC UVT AERO's fleet of eight Bombadier CRJ-200 regional airliners have already all been implemented in OASES. They are now undertaking a series of scheduled domestic flights between Bugulma and Moscow Domodedovo and Kazan and Moscow Vnukovo, as well as between Kazan and St. Petersburg, Sochi and the Crimean capital of Simferopol.

Gogo (GOGO), a leading provider of in-flight connectivity, has received the final Supplemental Type Certificate (STC) from the **FAA** required to launch Gogo's 2Ku next generation satellite connectivity service. The technology is currently installed on Gogo's 737-500 test plane and is now cleared for in-flight testing. Gogo expects to launch commercial service of its 2Ku technology later this year. Seven commercial airlines have signed up for either a trial or fleet deployment of 2Ku covering more than 500 commercial aircraft. Gogo expects to launch commercial service later this year and begin rapid installation of the backlog of 500 aircraft in 2016. 2Ku is expected to deliver peak speeds of more than 70 Mbps to the aircraft, which is more than 20 times the bandwidth provided by Gogo's first generation Air to Ground solution in the U.S.

TES introduced a new full aircraft transition service, an extension of the existing engine transition service that TES has been successfully delivering to its client base since the company began operations in 1995. Under this new service, TES is able to offer both existing and new clients a single source solution for both airframe and engines, incorporating physical and records inspections, borescope inspections, and where required, aircraft registration/deregistration, ferry flight, fuelling and crew services. TES launched this service with the delivery of an aircraft to long term TES partner **Icelandair**.

People On The Move

Daryl Taylor

Airbus reported that **Daryl Taylor** has joined its leadership team at the Airbus U.S. Manufacturing Facility in Mobile, Alabama. Taylor will train at the aircraft manufacturer's assembly facilities in Europe before returning to transition duties and assume operational oversight of the facility as the Vice President and General Manager. The Vice President and General Manager is currently **Dr. Ulrich Weber**, who has been responsible for the construction and commissioning of Airbus' first manufacturing facility in the U.S. The Vice President and General Manager of the Airbus U.S. Manufacturing Facility is responsible for ensuring the assembly and delivery of on-time, on-quality and on-cost aircraft to customers. He also oversees the operations of all necessary systems and support staff in the A320 Family production facility. The position reports directly to **Barry Eccleston**, President of Airbus Americas.

Wayne Easlea has been appointed Operations Director of KLM UK Engineering, a wholly owned AFI KLM E&M subsidiary specialising in maintenance solutions for regional and narrow body aircraft fleets.

Dr. Christian Langer has been appointed as Managing Director of Lufthansa Technik Logistik Services (LTLS) with effect from September 1st, 2015. He takes over this role from **Andreas Meisel**, who moved from this position after more than four years to join Ameco Beijing as Chief MRO Operation Officer of the Executive Management.

Dr. Christian Langer

Nico Buchholz

Bombardier appointed **Nico Buchholz** as Senior Vice President and Chief Procurement Officer (CPO). In this new position, Mr. Buchholz will lead the Corporation's supply chain activities and closely manage relations with suppliers across the global value chain. With his team, he will ensure that goods and services purchased by Bombardier's four business segments meet the highest standards in terms of quality, on-time delivery and cost-efficiency. Prior to joining Bombardier, Mr. Buchholz spent 14 years at Lufthansa, first as Senior Vice President, Corporate Fleet and then as Executive Vice President, Fleet Management, Lufthansa Group.