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Spinning around

Managing spare engines

MRO News
from around the world

People on the Move
latest appointments

Q&A:
AerSale



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MRO

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Opinion

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The thing about spare engines...

In this issue of *AviTrader MRO* we home in on the spare engines debate. We received an overwhelming response to the topic from various players in the business, so thank you to all our contributors.

When it comes to how airlines optimise the cost and availability of spare engines, Werner Aero had an interesting observation saying the tools for optimisation depends on the size of the airline and whether aircraft/engines are bought new from OEMs. If it is a new buy, airlines have the opportunity to delay the acquisition of spare engines due to a "honeymoon" maintenance period and the ability to "lean" on the OEM support initially. Also dependent on the size of the fleet will determine whether the airline will invest in their own "purchased" spare engines or rely on supply from

lease companies. These can range from dedicated lease engines to mid term leases to support from the market on an emergency basis.

AerFin states that digital technology will help airlines reduce their spare engine ratios. Most, if not all, of the new generation of engines have significantly more sensors on the engine allowing the operator to more accurately predict engine removals through increased data about the engine. More powerful analytics will help the operator to eventually reduce the spare engine coverage required.

There is more insight in our cover story and look out for a separate insight from Willis Lease!

Keith Mwanalushi
Editor



Photo: Keith Mwanalushi

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Image of the new aircraft carbon brake plant in Feyzin, near Lyon, France
Photo: Safran

Safran to build new aircraft carbon brake plant near Lyon

The Chief Executive Officer of Safran, Philippe Petitcolin, has announced the construction of a new aircraft carbon brake plant in Feyzin, near Lyon. This new plant will strengthen the production capacity of Safran Landing Systems, the Group's landing and braking system specialist. Carbon brakes for aircraft are currently produced at three Safran facilities: the legacy site in Villeurbanne (near Lyon), also Safran's global research center for friction materials at Walton, Kentucky in the United States, and Sendayan in Malaysia. The facility will incorporate the full range of "Factory 4.0" technologies developed by Safran, resulting in a significant reduction in energy and water consumption, as well as increased use of renewable energies. Along with this new plant, the company is launching a major Research & Technology program in partnership with laboratories, universities and small businesses in the region, backed by support from the federal and local governments.

Aeroflot chooses Spatial to supply A321 Door Trainers

Spatial, provider of cabin crew training simulators, has been chosen by Aeroflot to supply two A321 Door Trainers. The Door Trainers will be used to train Aeroflot's cabin crew to become completely proficient in the safe operation of the A321 aircraft emergency exits and doors including procedures for all normal, abnormal and emergency scenarios. The high-fidelity devices will simulate all

faults that may ever be encountered on the A321 aircraft door types including door and handle jams, power assist failures, automatic and manual slide inflation failures and door indicator malfunctions. The trainers will provide all legacy and current A321 exit types, including the A321NX ACF semi-automatic Over Wing Exit (OWE) – as well as attendant stations, passenger seating, replica overhead stowage bins and both standard and emergency lighting. The simulators will be seamlessly controlled by an intuitive, easy-to-use Instructor Operator Station (IOS). After being manufactured at Spatial's state-of-the-art facility in Dubai, the A321 Door Trainers will be

installed at Aeroflot's Crew Training Centre at Moscow's Sheremetyevo Airport.

Cebu Pacific Air adds A321s to AFI KLM E&M components contract

Seven A321ceo and 32 A321neo aircraft are being included in the component support contract originally signed in 2017 by Cebu Pacific Air initially covering its fleet of over 40 Airbus A320s. AFI KLM E&M is proud to support the expansion of one of the most profitable low-cost airlines on a rapidly growing market. The array of services provided under the long-term contract includes component repairs from Singapore and AFI KLM E&M's worldwide repair network as well as access to a local spares pool. The contract extension bolsters AFI KLM E&M's leadership position in the Asian market for component support services, embodied in particular through its local joint venture with Sabena Technics, Singapore Component Solutions (SCS) as well as a large regional customer community operating from various hubs throughout the region.

Air Europa selects Sabena technics for base maintenance on two Dreamliners

Spanish carrier Air Europa, has trusted Sabena technics to perform base maintenance operations on two of its Boeing 787-8s. For the past two years, Sabena technics has been providing Air Europa with airframe solutions for its fleet of A330s. Later this year, the French MRO will perform C-checks, "nose to tail," on the two Dreamliners in its Bordeaux facilities.



Sabena technics to perform base maintenance on two Dreamliners from Air Europa
Photo: AirTeamImages

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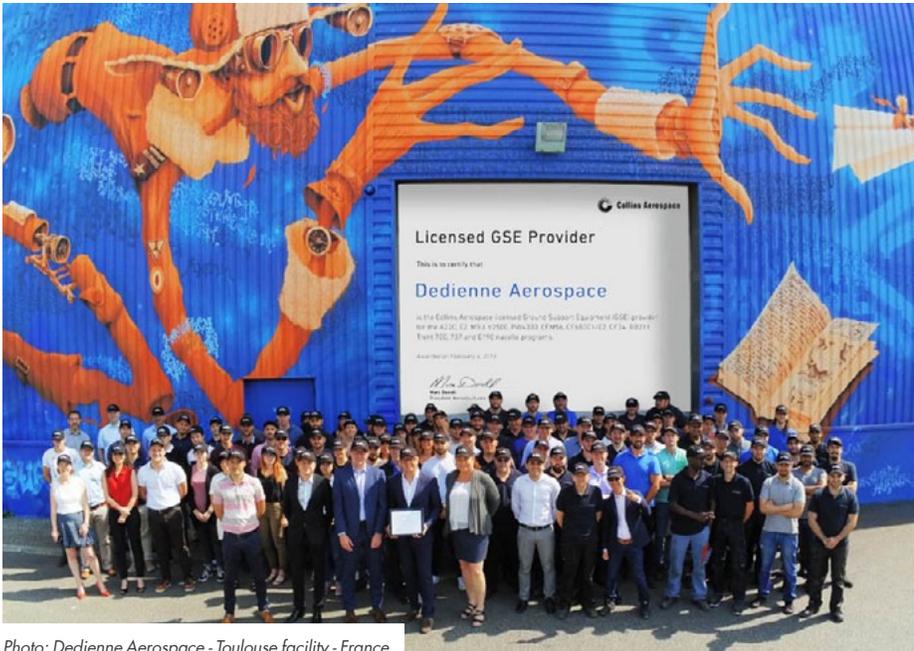


Photo: Dedienne Aerospace - Toulouse facility - France

Dedienne Aerospace signs new license agreement with Collins Aerospace for nacelle GSE

Dedienne Aerospace has signed a new license agreement for nacelle Ground Support Equipment (GSE) with the Aerostructures Division of Collins Aerospace, which includes sales, maintenance, calibration, leasing and services. This latest license agreement authorizes Dedienne Aerospace to provide GSE and related services on the A220, E2, E190, MRJ nacelle programs, as well as legacy nacelle programs V2500, PW4000, CFM56, CF680E1/E2, CF34, RB211, Trent 700, and B737. This license provides Dedienne Aerospace the opportunity to use its engineering expertise, while working closely with Collins Aerospace, to improve legacy GSE designs as needed, bringing them up to current design standards that improve safety and offer customers reliable and user-friendly products.

APOC Aviation moves towards expansion in China

APOC Aviation, the innovative aircraft and engines leasing, trading and part-out specialist, recently participated in a trade conference with Chinese Government representatives in Amsterdam. It is APOC's intention to expand its global footprint with a trading presence in Asia and it has signed an MOU with its Chinese partners to progress a far-reaching growth plan throughout the region. This is likely to include stock

hubs in designated parts of the Chinese mainland together with warehousing and AOG support offices in Hong Kong and Singapore. According to APOC's Founder & Managing Director, Max Wooldrik, who attended the trade conference with Barry Lemmers, Chief Financial Officer, APOC Aviation is pursuing a fast-growth strategy and a dynamic program of investment is already underway. The Company has just acquired three A320 airframes for part-out: MSN 712, 718 and 720 which were formerly acquired by CALC Group (China Aircraft

Leasing Group) from China Southern Air Leasing. "This was APOC's first significant deal in China" says Wooldrik. "The acquisition of these three A320 airframes heralds our intention to expand our business in Asia and using local tear-down specialists maximises cost-efficiency from the outset. We're retaining CALC Group's MRO joint venture, FL ARI Aircraft Maintenance & Engineering Company Ltd (FL ARI), to perform the part-out in CALC's aircraft recycling facility located in Harbin, China."

S7 Technics preps aircraft for Kazakhstan's first LCC FlyArystan

Air Astana has sent two of its A320s to S7 Technics' southernmost base, under a long-term contract for maintenance support the companies signed in 2018. The Mineralnye Vody aircraft painting shop painted the aircraft into FlyArystan's livery and at the Mineralnye Vody base, the S7 Technics team also reconfigured the cabins of both A320s, to fit FlyArystan's business model. Each aircraft was configured with 180 passenger seats in single economy class, increasing the seating capacity by more than 20%. FlyArystan, the LCC subsidiary of Air Astana, launched operations on May 1, 2019. Today the carrier operates two A320s on six routes across Kazakhstan. By 2022 the airline's fleet is expected to expand to at least 15 airplanes. The aircraft will be based at different airports around Kazakhstan.



A320 in FlyArystan's livery
Photo: S7 Technics

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FR1 Model 04
Photo: CRP Technology

CRP Technology welcomes cutting-edge Windform® FR1

CRP Technology has been changing the rules of additive manufacturing since the mid-90s, smashing records and setting models nowadays that apply to 3-D printing technology with polyamide materials. A clear sign of this continued performance is Windform® FR1 (FR stands for Flame Retardant), the newborn material from the Windform® TOP-LINE family of composite materials for additive manufacturing. It is intended to become a game-changing material in the field of 3-D printing for its uniqueness: it is the first flame retardant (UL 94 V-0 rated) material for additive manufacturing which is carbon fiber reinforced. It has also passed the FAR 25.853 12-second vertical and 15-second horizontal flammability tests as well as the 45° Bunsen burner test. This makes it suitable for aircraft and aerospace applications. Windform® FR1 is a halogen-free polyamide-based material that combines superior mechanical properties with excellent stiffness and light weight.

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Sonaca and thyssenkrupp Aerospace extend partnership
Photo: thyssenkrupp Aerospace

Sonaca Montreal opts for long-term partnership with thyssenkrupp Aerospace

Sonaca Montreal, specialized in the manufacturing of large aluminum aerostructures, has opted for a long-term partnership with thyssenkrupp Aerospace and has extended its contract, which has been in effect since 2016. Through 2023, thyssenkrupp's aerospace experts will be responsible for warehouse and supply chain management as well as comprehensive processing services for the just-in-time materials required for the Sonaca location in Mirabel, Quebec. In order to meet the increased requirements and ensure just-in-time deliveries on a daily basis, Sonaca has invested in additional storage space and processing equipment. At the heart of this is the new waterjet cutting machine, which enables aluminum plate to be cut exactly to customer specifications.

Transport Canada Civil Aviation (TCCA) successfully completes audit of AJW Technique

AJW Technique, the maintenance hub for the AJW Group's component repair and overhaul service, based in Montreal, has undertaken the Transport Canada Civil Aviation (TCCA) Process Inspection (PI) with zero findings and zero observations. In addition to a detailed review of the large number of work orders, the TCCA also audited the Oxygen Mask facility at AJW Technique and concluded that the facility, the work and records were of a high quality. TCCA approval is a pre-requisite for any organization in Canada to perform maintenance services on aircraft components

and to issue certificates to fly.

Diehl Aviation Gilching designates SR Technics as exclusive Authorized Repair Station in Asia Pacific

SR Technics has been selected as the exclusive authorized repair station for Diehl Aviation Gilching in Asia Pacific. Starting immediately, SR Technics will provide maintenance, repair and overhaul services for Diehl Aviation Gilching's Asian Pacific customers. As the exclusive authorized repair station, SR Technics Malaysia provides Diehl Aviation Gilching with an in-region repair facility to bring it closer to its customers in Asia Pacific. SR Technics is already a recognized MRO service provider in the region and can now support its customers with quality value-added services on Diehl Aviation Gilching components, with the backing of an OEM.

SR Technics signs exclusive inlet cowl maintenance contract with SWISS and Edelweiss

MRO service provider SR Technics has signed a five-year maintenance contract with Swiss International Air Lines (SWISS) and Edelweiss Air. The new agreement, which covers the entire Airbus A320ceo fleet of both SWISS and its sister airline Edelweiss, goes into effect on July 1, 2019. SR Technics has been a key partner to Switzerland's flagship carrier SWISS since its founding as a separate MRO firm over two decades ago. In its bid for this maintenance contract, SR Technics offered SWISS operational protection, engineering expertise and proprietary repairs for the A320ceo inlet cowl.

FACTEM and OEMServices sign worldwide AOG support agreement

Factem, an international leader in electro-acoustic products such as headsets, handsets, hand microphones and loudspeakers, for civil and military aviation applications, signed yesterday a worldwide AOG support agreement with OEMServices, leader in component, logistic and trading services for airlines and OEMs, to supply Factem's products to airline operators worldwide. Under the agreement, OEMServices will act as a representative for Factem products all around the world, using dedicated global service centres based in Paris, Dubai, Singapore and Atlanta and a 24/7 AOG hotline, committed to responding to operator needs within the hour. This network access through OEMServices will allow Factem to optimize worldwide transport and repair flows with Factem's main base in Bayeux, France. Based on this agreement, Factem and OEMServices are working close to develop and extended services on the upcoming release of Factem's Part 145.



NYCO and OEMServices extend their logistic services agreement to the Middle East
Photo: NYCO

Delta rolls out latest cabins to Europe and South America

Delta Air Lines will offer improved cabin experiences for customers starting this fall through the launch of its new business class seat offering more comfort and privacy, plus the expansion of its international premium economy cabin, Delta Premium Select, to new markets in Europe and South America. The new cabins will be fitted on the 767-400 fleet and bring all four branded seat products – Delta One, Delta Premium Select, Delta Comfort+ and Main Cabin – to this aircraft for the first time. The aircraft have initially been scheduled on select flights between Atlanta and London Heathrow starting November 12, 2019, followed by a number of additional European and South American markets. Select flights to London, Zurich and Brussels on this aircraft will be available for purchase starting this weekend with additional markets for sale in the coming weeks. Delta is investing millions of dollars in its wide-body long-haul fleet to give customers greater choice when they travel. The 767-400 refit follows the introduction



Upgraded Boeing 767-400s will have new Delta One business class seats
Photo: Delta Air Lines

of the Delta One suite and Delta Premium Select on its Airbus A330-900neo, Airbus A350-900 and Boeing 777-200 aircraft.



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S7 Technics launches engine repair facility at Mineralnye Vody

S7 Technics, Russian provider of maintenance, repair and overhaul (MRO) services, has launched Russia and the CIS's second repair shop for the CFM56 aero engines that power Airbus A320-family and Boeing 737 aircraft. The new amenity is located at S7 Technics' southern base at Mineralnye Vody Airport (IATA: MRV) and combines several facilities: an aircraft bearings inspection section, a dedicated zone for powerplant unit repairs, and a separate station for part cleaning of engines. The shop is equipped with a customized increased-durability overhead crane with lifting devices (telfers) for the disassembly and assembly of engines and their components. The 850-m² facility employs seven technicians and can simultaneously service up to four CFM56 engines. The first such shop, which S7 Technics launched at Moscow's Domodedovo Airport in 2016, is able to handle two engines at a time. So, with this new addition, the service provider has tripled its CFM56 repair capabilities in Russia and the



S7 Technics opens new MRO service center at Mineralnye Vody Airport
Photo: S7 Technics

CIS. Mineralnye Vody has already won its first contract, from freight carrier ATRAN.

The CFM56 engine was delivered to Mineralnye Vody by road.



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Saft delivers first EverSky battery systems to Boeing for all new 777 twin-engine airliners
Photo: Saft

Saft delivers first EverSky battery systems to Boeing FAL for all new 777 twin-engine airliners

Saft has delivered its first EverSky™ batteries to Boeing as part of a contract awarded in 2018 to fit new 777 and 777X airliners with onboard rechargeable nickel-based battery systems, comprised of ULM® (Ultra-Low Maintenance) EverSky batteries combined with a dedicated charger. The new Saft battery system is designed to offer 777-operators superior performance and lower total cost of ownership (TCO) by extending maintenance intervals. Customers can retrofit existing 777 airplanes with these new systems distributed by Boeing subsidiary Aviall. The Boeing 777 battery system provides onboard power for APU (auxiliary power unit) starting and backup for critical systems. It comprises a 60 Ah, 24 V ULM battery together with a charger. Two battery systems are fitted to each airplane. The 777 contract is Saft's first direct contract with Boeing as a first-tier supplier. Saft has been providing batteries to Boeing indirectly for more than 30 years working via integrators.

Collins Aerospace secures more than US\$1.5 billion in maintenance agreements from worldwide customers

Collins Aerospace has been awarded more than US\$1.5 billion in tailored agreements for components spanning its Power & Controls and Aerostructures business units—across multiple commercial platforms with global commercial customers. These recent agreements include Collins Aerospace's first MRO agreement with Africa's largest carrier, Ethiopian Airlines. The agreement, valued at approximately US\$500 million over a 25-year period with Collins Aerospace's Power & Controls business, will enable the airline to service components such as heat exchangers, air management systems and fuel metering units for its fleet of 60 Q400 aircraft. This deal further expands Collins Aerospace's global MRO network to include East Africa as part of the company's strategy to grow its presence on the continent. With the world's second-largest and youngest population, Africa is an important market for Collins Aerospace. Additionally, Collins Aerospace's Aerostructures business signed new long-term FlightSense® Nacelle agreements on 787 and A320 aircraft

platforms, amounting to over US\$900 million including options with multiple IATA II customers spanning a 25-year period. Collins Aerospace has developed a culture of speed and ease by combining excellent product lifecycle management with timely customer service and ease of interaction. As one of the world's leading nacelle OEMs for commercial aircraft, the company leverages its deep technical expertise, product knowledge and globally available assets to provide world-class MRO services and support. Two Asia-Pacific airlines, including Japan Airlines, have both signed FlightSense® agreements with Collins Aerospace. Japan Airlines signed a multi-fleet FlightSense® Onsite Support agreement allowing Collins Aerospace to manage its MRO supply chain, providing the airline with onsite inventory, competitive rates for OEM-quality parts and improved shop efficiency. Additionally, an undisclosed airline in the region has signed a FlightSense® Predictable agreement in its effort to improve reliability and reduce downtime with advanced exchanges during critical repairs to its 777 fleet.

ST Engineering's A321P2F conversion solution gains traction with new order LOI

ST Engineering's A321 passenger-to-freighter (P2F) conversion programme gained traction among operators and lessors looking for a viable P2F solution in the narrowbody category when its joint venture with Airbus, Elbe Flugzeugwerke (EFW), secured a Letter of Intent (LOI) for an A321 converted freighter from BBAM, a global leader in aircraft lease management. The LOI was inked at Paris Airshow 2019. The A321 passenger aircraft will be inducted for conversion into a 14-pallet cargo configuration in mid-2020, and is scheduled for redelivery in end 2020. The order by BBAM follows a launch contract that was announced in 2018.

Finance News



Dassault Falcon 50, Geneva

Photo: RUAG

RUAG sells business aviation sites in Geneva and Lugano

As part of its new strategic alignment, RUAG, the international technology group, is selling its Swiss business aviation sites. The buyer of the sites at the Geneva-Cointrin and Lugano-Agno airports is the French aerospace group Dassault Aviation. The successful sale of

RUAG Business Aviation AG is the first step to realign the portfolio of RUAG. Dassault Aviation will acquire all shares of RUAG Business Aviation AG and the purchase includes all 73 members of staff at the Geneva site as well as the 14 members of staff at the Lugano site. The successful sale of RUAG Business Aviation AG is the first transaction undertaken by RUAG International, following the strategic decision of the Federal Council. The Geneva and Lugano sites offer a wide range of maintenance, repair and overhaul (MRO) services, as well as upgrades for selected private and business aircraft from manufacturers such as: Dassault Aviation, Piaggio, Bombardier, Embraer, Pilatus and Hawker Beechcraft. The maintenance facility at the Lugano-Agno site enjoys a unique position as the only provider of MRO services for business jets at the airport. The sites are both certified maintenance organizations in accordance with EASA Part 145. Also, in Lugano and Geneva, VIP passengers, pilots and crew members enjoy in-house

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AerCap leased, purchased and sold 82 aircraft in the second quarter 2019

AerCap Holdings N.V. has published its major business transactions during the second quarter 2019: AerCap signed lease agreements for 48 aircraft, including four wide-body aircraft and 44 narrow-body aircraft, and purchased 11 aircraft, including six Airbus A320neo Family aircraft, four Boeing 787-9s and one Embraer E2. AerCap executed sale transactions for 23 aircraft, including nine Airbus A320 Family aircraft, three Airbus A330s, four Boeing 737NGs, one Boeing 737 Classic, one Boeing 777-200ER, one Boeing 777-300, two Boeing 747s and one Boeing 767 from AerCap's owned portfolio and one Airbus A300 from AerCap's managed portfolio. The company signed financing transactions for US\$1.5 billion in the second quarter 2019.

Astronics to sell Airfield Lighting product line

Astronics Corporation has signed a definitive agreement under which Hughey & Phillips, LLC, will acquire the Airfield Lighting product line from Astronics. The transaction, subject to customary closing conditions and adjustments, is expected to close on or before July 12, 2019. Peter J. Gundermann, Chairman, President and Chief Executive Officer, commented, "As we continue to build and grow our business, the Airfield Lighting product line comprised less than 1% of our 2018 revenue and no longer fits within our core offerings. This transaction allows us to focus our efforts and drive more profitable growth across our organization." Hughey and Phillips (H&P) is one member of a conglomerate of companies serving the aviation, transportation, security and medical markets from its headquarters in Urbana, Ohio. H&P is a global leader in obstruction and airport lighting products and has been serving the safety needs of the transportation industry since the 1930s.

AerSale acquires Qwest Air Parts

AerSale®, a global supplier of aircraft, engines, used serviceable material (USM), and maintenance, repair, and overhaul (MRO) services, acquired aircraft parts distributor Qwest Air Parts, Inc. Based in Memphis, Tennessee, Qwest is a recognized leader in aircraft dismantlement, and the refurbishment and resale of USM. Qwest has disassembled over 200 aircraft, offers 24/7 AOG service, and operates a teardown facility in Crestview, Florida. Gary Jones, Qwest's founder, President and CEO, will continue to lead Qwest, which will operate as a stand-alone independent subsidiary of AerSale. The acquisition of Qwest will add scale and reach to AerSale's already significant airframe USM offerings. Furthermore, Qwest's recently certified repair station, Q2 Aviation LLC, will supplement AerSale's growing MRO platform.

Falko Regional Aircraft raises US\$650 million for second fund

Falko Regional Aircraft, an aircraft operating leasing and asset management company, has reached a final close on Falko Regional

Aircraft Opportunities Fund II with total commitments of US\$650 million. The Fund will make investments in regional aircraft leased globally. Falko significantly surpassed its original target of US\$600 million and received commitments from a diverse group of institutional investors, including public and private pension plans, insurance companies, wealth managers, endowments, family offices, a fund of funds and a sovereign wealth fund, from across North and South America, Europe, the Middle East, Asia and Africa. The hard cap for the Fund was set at US\$650 million. Falko has already made its first investment from the Fund with the purchase of a portfolio of 19 current-generation Embraer and Bombardier regional jet aircraft with leases attached, representing an equity investment in excess of US\$100 million.

Astronics acquires Freedom Communication Technologies

Astronics Corporation has acquired Freedom Communication Technologies, Inc. (FCT), a developer and manufacturer of communication test equipment for the land-based mobile radio test market, providing innovative solutions to Long-Term Evolution (LTE) high-speed wireless communications customers globally. Astronics has acquired 100% of the equity of FCT for US\$22 million in cash. Based in Kilgore, TX, FCT was founded in 2015 and offers communications analyzers for testing and maintaining Land Mobile Radio (LMR) communications systems. FCT also provides an extensive range of capabilities, including automated radio testing and alignment, coverage mapping, and interference analysis.

TAT Group sells majority interest in its subsidiary Sabena technics

TAT Group has sold its majority interest in its subsidiary Sabena technics, one of the European leaders in the field of aircraft maintenance and modification, to the funds Sagard, Bpifrance and TowerBrook. This shareholder evolution is an important step for Sabena technics' development by reinforcing its growth opportunities while accompanying it in the successful implementation of its strategic plan. This development will also give the Group significant resources to expand its offer through external growth, with the constant goal of better serving its customers using skills or locations that complement its own. TAT Group will remain a minority shareholder and its current chairman, Rodolphe Marchais, will take over the presidency of Sabena technics' supervisory board. Philippe Rochet will become the executive CEO and shareholder of the Group alongside the Group's senior executives, Jean Marc Schaefer, Gilles Foutier, Philippe Delisle and Fabrice Dumas, all confirmed in their positions. Evolving in a dynamic market and at the heart of all civil and military aircraft operators' challenges, Sabena technics' Group has always been able to transform and adapt itself to the evolutions of this sector in order to put three key fundamentals back to its center strategy: customer satisfaction, industrial performance and economic performance. The company generated a turnover of approximately €450 million (US\$504 in 2018 with 2,800 employees). With the support of its new shareholders, each contributing to a specific expertise that is useful for the Group's future growth, Sabena technics will be able to pursue this voluntary development policy which has recently translated into the creation of the Toulouse painting facility for Airbus aircraft as well as the opening of the ATR and Airbus aircraft component repair facility, in partnership with Air France and more recently the acquisition of a new facility in Perpignan.

Alcoa to divest minority interest in rolling mill to Ma'aden

Alcoa Corporation, a global leader in bauxite, alumina, and aluminum products, has amended its joint venture with the Saudi Arabian Mining Company (Ma'aden) in which Alcoa holds a minority 25.1%. The joint venture was created in 2009 as a fully integrated aluminum complex in the Kingdom of Saudi Arabia, comprised of three entities: the Ma'aden Bauxite and Alumina Company (MBAC; the bauxite mine and alumina refinery), the Ma'aden Aluminium Company (MAC; the aluminum smelter and cast house), and the Ma'aden Rolling Company (MRC; the can and auto sheet mill). As a result of the amended joint venture agreements, signed June 26, 2019, and expected to close by month end: Alcoa will transfer its 25.1% interest in MRC to Ma'aden. Alcoa will make a contribution to MRC in the amount of US\$100 million paid in two installments: 1) US\$34 million paid on June 17, 2019 to fund its 25.1% share of MRC's current cash requirements, and 2) US\$66 million paid at closing. Alcoa is released from all future MRC obligations, including Alcoa's sponsor support of approximately US\$295 million of MRC debt and its share of any future MRC cash requirements Alcoa will avoid future capital contributions in any MRC debt restructuring and recapitalization. Alcoa and Ma'aden further defined MBAC and MAC shareholder rights, including the dividend policy. The parties will maintain their commercial relationship, which includes Alcoa providing sales, logistics and customer technical services support for MRC products for the North American can sheet market. The Company will retain its 25.1% minority interest in MBAC and MAC, and Ma'aden will continue to own a 74.9% interest.

Rolls-Royce to acquire Siemens' eAircraft business to boost electrification strategy

Rolls-Royce has entered into an Agreement to purchase Siemens' eAircraft business responsible for electric and hybrid-electric aerospace propulsion. Expected to complete in late 2019, Rolls-Royce sees this as a strategic move to enable the engine manufacturer to play a leading role in the 'third era' of aviation. Siemens' eAircraft business is located in both Germany and Hungary and has been developing a range of electric and hybrid-electric engines – the two companies have previously worked together on Rolls-Royce's E-Fan X demonstrator that is of the scale required to power regional aircraft. Rob Watson, Director – Rolls-Royce Electrical, said: "Electrification is set to have as dramatic impact on aviation as the replacement of piston engines by gas turbines. We are at the dawn of the third era of aviation, which will bring a new class of quieter and cleaner air transport to the skies." "We have already made significant strides in realising our strategy of 'championing electrification' and this move will accelerate our ambitions in aerospace by adding vital skills and technology to our portfolio. It brings us increased scale and additional expertise as we develop a product range of hybrid power and propulsion systems. I look forward to welcoming our new colleagues into Rolls-Royce and working with them to pioneer new technologies and solutions."

Other News

ATR officially presented **ENAC** with an FFT-500 flight simulator, in the presence of ENAC director, Olivier Chansou, ATR's General Secretary, Frédéric Torrea, the Managing Director of the ATR Training Center, Christian Commissaire, and the teams that worked on this project. This donation consolidates the close relationships between ATR and this training school for pilots, air traffic controllers and engineers in the various domains of civil aviation. The simulator will complement ENAC's training and research tools. It will initially be used to study human factors, and particularly to improve interactions between air traffic controllers and pilots, then in the long term to improve human-machine interactions. After its installation in the ATR training center in 2005, this simulator was used to help train hundreds of ATR pilots before being replaced by Full Flight Simulators (FFS), the latest generation of dynamic flight simulators. This donation will give the simulator a second life. Its role is now to promote ATR turboprops to ENAC students, thereby ensuring the representation of the company and its products. It will give future generations of pilots a glimpse of the great career opportunities open to them if they choose to fly using an ATR aircraft.

From airport checkpoints to counter terrorism to future medical imaging devices, the use of x-ray 3D imaging is the cornerstone

of many of the applications that are critical to security and medical markets. Notably, airport checkpoint technology is facing an immediate challenge, with global passenger numbers on track to double by 2030 (source: IATA). The evolving technology requirement for checkpoints is to process far more passengers per hour than the current industry average of 200. Faster screening with improved threat detection are the holy grail. Similarly, compact and agile systems with 3D imaging are major technology advancements the medical market can use to deliver improved patient diagnosis and outcomes. To anticipate these needs, Australian-based **Micro-X**, a global leader in cold-cathode x-ray technology, and Thales, leader in security and medical imaging, have combined forces in a multi-faceted collaboration to develop X-ray imaging systems based on X-ray sources that use Carbon NanoTubes (CNT) cathodes at their heart. CNT is a crystalline variety of carbon with properties that improve the efficiency of x-ray imaging by orders of magnitude. By combining this revolutionary technology, developed by Micro-X with Thales's 60 years' experience in x-ray devices, the two organisations will initially collaborate on the design of novel, miniaturized X-ray sources. These sources will be produced by **Thales** and manufactured in Moirans, France, and will power both Thales and Micro-X's future roadmap of innovative x-ray products for medical and security markets.

CAPABILITY™



GA Telesis MRO Services has the ABILITY to support 737NG aircraft. We understand the importance of quality and take the time to ensure that we operate using the highest industry standards and best practices, every day.

It's no wonder the largest airlines in the world trust us to support their **Engine Nacelle Systems**, **Flight Control** and **Radome** requirements.

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Spare engine anyone?

Spare engines must be closely managed.
Photo: AerFin

Airlines have traditionally maintained their own inventory of spare engines or choose to avoid the capital expenditure by relying on engine lessors. **Keith Mwanalushi** examines the current market for spares engines.

Due to the high capital value of aircraft, commercial airlines generally maintain spare engines to ensure aircraft are not grounded when engines are removed for normal maintenance, or for other reasons.

When compared to the airframe, engines require more intensive technical management and since engine overhauls are one of the largest airline operating cost segments, each overhaul must be closely managed.

Craig Welsh, SVP and Chief Commercial Officer, Americas and Asia at Willis Lease Finance Corporation says the key to optimising cost versus availability is carrying as few spare engines as possible on a full-time basis, and bringing in additional engines when and as needed, for example, to support a cycle of scheduled shop visits.

"All the engine OEMs have historically recommended a minimum level of full-time spare engines based on a simple spare to installed engine ratio," states Welsh.



Craig Welsh, SVP & CCO, Americas and Asia, Willis Lease Finance Corporation

He warns that this has proven to be a very expensive proposition as less than half of these engines are utilised at a rate that justifies their carrying costs from an investment standpoint, whether they be financed by debt or sale-leaseback, or even owned outright.

Willis Lease has a number of optimisation programmes such

as 'ConstantAccess' and 'ConstantThrust' which Welsh believes can save airlines millions by employing an on-demand availability principle that allows airlines to own only those spare engines required full-time by their operations (as opposed to by a contractual delivery schedule) while accessing the portfolio of over 300 assets for any remaining requirements.

"The underlying economics of these programmes are very compelling and are poised to drive significant savings across rapidly growing fleets."

Obviously, leasing engines is a popular choice for airlines and operators looking to release capital. Andrea Luebke, Managing Director at MTU Maintenance Lease Services says the spare engine ratio for in-production engines is proportionally lower as opposed to more mature engine types.

"Airlines used to have about 15% of spare engines of their installed engines. This figure is now down to 10% and, according to our estimations, will further decrease to about 7 or 8% for newer engine types. This comes along with a higher OEM coverage of the aftermarket, which typically includes spare engine support," Luebke tells.

Spare engine support is also included in MTU Maintenance's customised MRO solutions, such as PERFORMPlus, for newer engines, as well as SAVEPlus,



Andrea Luebke, Managing Director at MTU Maintenance Lease Services



Engines require more intensive technical management.
Photo: S7 Technics

for mature engines. "Further, highly customised and expert fleet management, also provided as part of these services, can increase the availability of spares. We also can lease out idle spares on behalf of customers as part of our solution for asset owners."

Furthermore, Luebke explains that airlines can manage spare engines more efficiently through the many options on the spot market like the solutions offered by MTU Maintenance Lease Services B.V. "We provide short-term leasing, stand-by arrangements, engine pooling, as well as asset management. We plan to grow and develop with this market and continue investing in spare engines as well as innovating our product portfolio."

"Maximising aircraft and engine availability while minimising downtime is the main objective of any airline," mentions Abed Fakh, Technical Manager at Royal Aero. He sees a few factors that will need to be considered when optimising spare engine availability.

"An accurate prediction of the time on wing of engines is usually a great starting point."



Abed Fakh, Technical Manager at Royal Aero

He says this could be either the airline's specific data based on their operation, fleetwide data or using some of the robust prediction tools available on the market, such as the Royal Aero MIDAS-severity app. "This would allow the airline to predict how long their engines would last on wing. A set number of unscheduled events will also have to be factored in to give the fleet more protection."

The second aspect is the length of the maintenance cycle, in this case the shop visit Turn Around

Time (TAT) – "The number of shop visits and the total downtime should allow the airline to accurately forecast how many spare engines are required."

With the reliability of engines increasing through their life cycle, a good stagger programme is also another strategy which could be followed to optimise spares and cost. Fakh continues: "This is a strategy where airlines elect to remove some of their engines early and put them through the repair cycle, to avoid a period where they will require multiple engines in the shop at once, and hence minimise the number of spare engines required."

"Some small operators with leased aircraft tend to insert spare engine clauses as part of their lease, where the lessor is responsible for providing a leased spare during periods when the engine is in the shop."

It is anticipated that new aircraft types will drive the requirement for new spare engines. These new engines have greater predictive maintenance capability.

Kevin Poulin, Director, Customer Programmes StandardAero reckons the avoidance of certain MRO events using engine health-monitoring for predictive maintenance will inevitably have some impact on spare engine management, as will the continual improvement in time-on-wing associated with advanced engine materials and design.

"However, there will always be unscheduled engine removals caused by unpredictable events such as foreign object damage for instance, which will continue to drive spare engine requirements."



Kevin Poulin, Director, Customer Programs at StandardAero.



Mariano Longo Chief Business Officer, Aerojet

Likewise, Poulin adds engines sent in for service but found to be beyond economical repair (BER), for example due to operation in harsh environments, will also require that airlines have a reliable source of spare engines when required.

"Predictive maintenance will reduce downtime for new engines, but sudden issues and faults cannot be completely controlled, for instance bird strikes or weather issues," comments Mariano Longo Chief Business Officer, Aerojet Limited. Also, he cites hostile environments and pilot's performance that will have an impact on the life of the LLP of the engines.

Christopher Whiteside, President and CEO, AJW Group feels the market for new and high value engines is largely controlled by the OEMs who offer total care and flight hour agreements packages that provides airlines with additional comfort but is charged at a premium.

"We are seeing increasing numbers of airlines opting for this approach as it, in effect, transfers the full risk of engine maintenance to the service provider. The typical cover of a such total care packages includes guaranteed spare engine availability and provisioning for both scheduled and unscheduled engine removals," comments Whiteside.



Christopher Whiteside, President and CEO, AJW Group

Due to the rapid evolution of technologies in the aviation industry, particularly aircraft and engine technologies, the standard ratio estimated by lessors of one spare per 10 operational engines is broadening, observes Ahmed Zafar, Manager, Asset Management at ACC Aerotask.

He says new engines being developed, such as the Rolls-Royce Trent XWB, offer greater reliability, leading to less frequent engine replacements. "The data provided by next-generation engine sensors will allow improved monitoring of in-flight engine

performance. Combined with better use of analytics, this will help to reduce the number of unplanned removals, thereby lowering the volume of spares required.

"The vast volumes of quantitative and qualitative data, combined with powerful analytics capabilities, will allow manufacturers to monitor and communicate precise forecasts of engine removals and enhance the reliability of their active engines to a level that will probably lessen spare engine coverage requirements over time," explains Zafar.

Anca Mihalache Vice President of Engine Trading at Apoc Aviation observes that the greater predictive maintenance capability of new engines may have a knock-on effect on the leasing market and the offer and demand of spare engines – "This will be further influenced by the spares market, MRO capability and slots booking. This does not mean that older engines will be retired in the short and medium term, merely that we will see two different trends in the market."

The volume of new aircraft to be delivered over the next few years is very significant and the "promised" reliability is improved over existing fleets, contributes Cliff Topham, SVP Sales and Business Development, Werner Aero. "However, many new programmes have significant infantile problems and the engines they are replacing are extremely reliable, therefore there will take a wait and see approach to see if the planned lower investment of spare engines is achieved," he states.



Ahmed Zafar, Manager, Asset Management at ACC Aerotask

Some in the industry feel competition in the spare engine leasing market is driving more innovative services [or the lack of].

Topham feels that undoubtedly, competition is driving enhancements in the marketplace and pushing OEMs to up their game. "Ultimately airlines seem to be driving to a usage and availability metric."

With the constant pressure to reduce costs, airlines are demanding more comprehensive solutions from their service providers, remarks Welsh from Willis Lease. "Engine leasing is no longer about who has the cheapest cost of money, but which providers are delivering the most value and driving cost savings through long-term programmes and innovative solutions."

For example, Welsh states that the Willis Lease ConstantThrust programme couple's engine leasing with aircraft fleet retirement plans, to avoid expensive engine shop visits, saving airlines money as they transition into newer technology aircraft. "We offer a full platform of capabilities – including leasing, technical and asset management services, surplus material and custom programmes – to our customers, rather than only offering a financing product."

Nowadays, Longo has seen that competition in MRO is driving to a continuous improvement in the business (LEAN) as it has been in the automotive industry for many years. "Innovation is the main tool to become an MRO 4.0: Go digital, paperless, focus on FOD, ergonomics, tool traceability, new capabilities [work on several products/manufacturers], strong engineering support and so on."

"Healthy competition is good in any market, as it keeps services competitive," comments Luebke of MTU. "Innovation can take place in terms of digitisation; we have recently introduced systems to manage our own fleets for instance and this is part of our TAMS offering in order to extract the best value out of assets."

Luebke says this is particularly helpful for engines entering their final run, as different price structures such as flat rates are being increasingly used in the market, as opposed to classic pricing structures.

Luebke continues: "We always focus on customer needs and



Cliff Topham, SVP Sales and Business Development, Werner Aero



The engine lease market is buoyant.
Photo: S7 Technics

try to predict and respond to them instantly. Say for instance a lease agreement of a mature engine is coming to an end. The asset owner might want to dispose of the asset from their portfolio through a sale, while the airline might still want to operate the aircraft. But the capital expenditure to acquire it and to maintain the engines through its remaining life might not be in their best interest. This is where MTU steps in. It acquires the engines from the current owner and leases them to the airline for the remaining green time. Furthermore, to allow the aircraft to fly for the duration of its economical service life, MTU can replace any unserviceable engines with serviceable engines from its pool as an alternative to MRO solutions."

When it comes to the supply and demand dynamics with older generation used spare engines, James Bennett, Director Sales and Marketing at AerFin points out that though each engine is different, there are two key factors influencing both supply and demand of older generation engines.

On the demand side he says operators expect a surfeit of 'green-time' engines on the market as has typically been experienced, however supply is impacted by on the one hand ongoing low fuel costs. Lower fuel costs = lower fares which makes legacy equipment more attractive.



James Bennett, Director Sales and Marketing, AerFin

"That's having a direct impact on availability of spare engines in the market."

Secondly, as he indicates, is the entry into service challenges of the newer engine/aircraft types – "Operators who were targeting delivery of new aircraft to

replace older have been hit with significant delays which has meant prolonged operation of the planned retired fleet, again impacting the availability of spare engines hitting the market.

"Whilst we would expect both of the above conditions to change in the medium to long term it will continue to have an impact on the short-term market opportunities for operators," Bennett notes.

Although each engine type has its unique features and should be considered a market with its own supply and demand dynamics, fuel price will have an impact on all used engines, mentions Zafar from Aero-task. He says the operation of old single-aisle aircraft by some of the operators make them capable of securing "green time" engines most of the time. "These engines are available at very low values and lessors are capable of offering these engines into the spot market at competitive short-term lease and utilisation rates."

He adds that should the oil price remains low; airlines may decide to retain some of its older-generation fleet in-service for a longer period. "This also means that the number of aircraft retiring for part-out will decrease, reducing the number of 'green time' engines entering the market."

StandardAero's Poulin concludes that for many older legacy aircraft, airframe values do not support the investment associated with zero time. "As a result, part-life engines are becoming more popular for owners of such aircraft."

Poulin argues that the cost advantages of part-life engines are driven by availability: "Where there is a ready supply of aircraft being retired and parted-out, part-life engines become an attractive option. However, if the pool of available engines is limited, owners may find themselves bidding up market prices for the few good-quality part-life powerplants available, which may in turn lead to operators parking their aircraft and switching to newer, more supportable platforms."

In the hot seat.....

Craig Wright, President, AerSale

AviTrader MRO: Briefly, what is your job function at AerSale?

Wright: As President, I am primarily focused on expanding AerSale's global markets and customer base. This involves everything from strategic acquisition of aftermarket flight equipment (aircraft, engines, and inventories), to efficiently bringing them back to market configured for their highest demand for both AerSale and our customers. It also includes returning them to service for outright sale, lease, exchange, or allocation to one of AerSale's MRO divisions in support of both aircraft maintenance and component-level service operations.

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

Wright: Given that AerSale participates in a broad spectrum of aftermarket products and services, our various business units frequently compete for assets once AerSale has acquired them. For example, the aircraft leasing group may want to lease the same aircraft that our engine leasing group is hoping will be removed to enter our spare engine pool, while our MRO and Used Serviceable Materi-

als (USM) groups (airframe and engine) may want to turn the whole aircraft and its engines into parts to support their customers. It's conflict by design, that ultimately leads to finding the best path forward. However, satisfying the interests of all our divisions is a never-ending challenge.

AviTrader MRO: What is the most rewarding part of the job?

Wright: Finding solutions to everyday problems is the most gratifying, whether it's providing a quick aircraft reconfiguration to meet a service-entry deadline, drop-shipping an engine or part to save a grounded aircraft, or locating the ideal asset for acquisition to feed our business units. It makes a win-win for both AerSale and our customers, and what has brought AerSale to the forefront of the aviation aftermarket during my tenure here.

AviTrader MRO: AerSale is focusing on the mid-life aircraft and engines aftermarket. Why this particular sector?

Wright: The aircraft and engine OEMs largely control aftermarket support of their



Craig Wright, President, AerSale

"in production" platforms through various warranty, fixed cost, and flight hour support programs. As these aircraft and engines age, they typically move from first-tier operators to smaller second-tier operators that sometimes lack the balance sheet or technical capabilities to optimise such aircraft. This is where we come in with a full spectrum of lease-versus-own options, bundled with full maintenance support programs. Being able to provide a single-source solution for smaller operators enhances customer satisfaction while fostering loyalty.

AviTrader MRO: It's been just over 10 years of operations. What has been the biggest achievement in the last decade?

Wright: I would say that combining MRO services with our flight equipment leasing services and USM business units was the quantum leap for AerSale. It's taken us from a green-field operation 10 years ago to leading the mid-life aircraft aftermarket support sector in scale and breadth of offerings today.

AviTrader MRO: Why was AeroTurbine sold in 2006?

Wright: AerSale's founders, Nicolas Finazzo and Bob Nichols, were also the founders of AeroTurbine. Their decision to sell AeroTurbine was based on its planned merger with AerCap.



The older a fleet type gets, the more challenging the demand for technical expertise.
All photos: AerSale



There is surprising demand for legacy models like the 757.

AviTrader MRO: Which aircraft types are you seeing demand for in the supply of aftermarket services?

Wright: At AerSale, we are experiencing robust demand across the spectrum of commercial aircraft variants. There are the obvious narrow-body darlings B737NGs and later-model A320s for leasing, engines, parts, and MRO. There continues to be surprising demand for legacy models (B747s, B757s, B767s, A330s, A340s) for aircraft MRO, en-

gines, and parts. While the B777 airframe USM has softened significantly, there remains good demand for serviceable “green time” engines and certain parts categories (landing gear, APUs, etc.), which is typical for all aircraft types. It’s hard to imagine that even at this late date we are running an MD80 heavy modification line (firefighter tanker conversions) out of Goodyear, Arizona.

AviTrader MRO: What challenges are you seeing in the mid-life aftermarket segment?

Wright: By definition, the mid-life space is a challenging market. Generally speaking, the older a fleet type gets, the more challenging the demand for technical expertise, engineering development, asset risk management, and flexible customer support to meet ever-evolving needs. Done well, this requires an ever-expanding base of specialized experts to manage these assets in a rapidly growing organization. Not surprisingly, in the current tight labor market, it makes recruiting additional professionals and technicians our biggest challenge today.

AviTrader MRO: What’s next in the pipeline?

Wright: At AerSale, we are continually looking to expand into new markets with additional services. Going forward, look to see AerSale continue to expand its product and service offerings, through both organic growth and increasing acquisitions. In the near term, we are primarily focused on expanding our MRO services capabilities and Engineered Solutions such as AerSafe® (fuel flammability mitigant) and AerTrak® (ADS-B out solution).

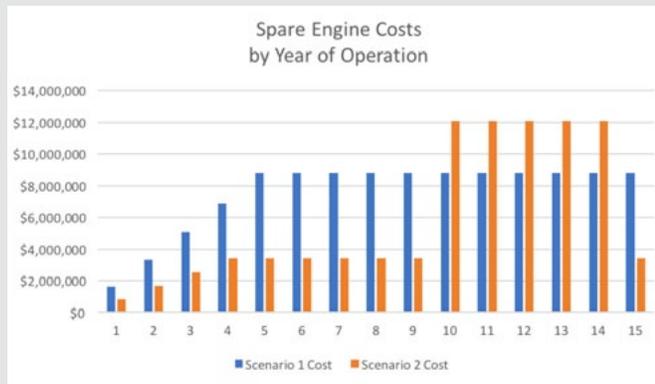


The company provides a single-source solution for operators.

The industry deserves a more efficient spare engine market

A sharing economy is premised on collaborative consumption. The notion that it is more efficient for a group to use an asset than for each member of the group to own its own asset.

Brian Hole, President of Willis Lease Finance Corporation, believes that, in aviation, the spare engine market is ripe for these 'sharing economy' efficiencies. Why do airlines need to own so many spare engines if they can borrow (lease) a safe, reliable engine whenever needed?



The engine OEMs' business model, however, depends on selling spare engines (and parts) at big margins to make up for the installed engines they sell at a loss. OEMs therefore developed the 'minimum spare engine ratio,' which historically has meant an airline must purchase 1 spare engine for every 10 installed engines delivered to it. If the airline does not maintain whatever minimum ratio is required, it risks losing OEM guarantees, and perhaps even power by the hour coverage, promised to support its fleet.

A minimum spare engine ratio calculated on an airline-by-airline basis, however, creates inefficiencies that cost money. On a fleetwide basis, forcing airlines to purchase new spare engines according to a delivery schedule negotiated before the airline has even taken

delivery of its first installed engine, and regardless of the airline's then current operational requirements, means some airlines that don't need an engine will be forced to buy one while others that do have a current need go without.

As for capital, as the charts show, a hypothetical airline taking delivery of 50 Boeing 737NG aircraft over 5 years would need to purchase 10 spare CFM56-7B engines (the red line) to satisfy a 10% minimum spare engine ratio during that 5-year fleet introduction phase despite that the airline needs only 4 engines (the blue bars) to support the first 9 years of actual operations, assuming published unplanned removal rates and average operating characteristics. Simple math suggests that this hypothetical airline could save US\$25 million to US\$40 million, over 15 years of operations, if it were to purchase only the engines it needs to support operations and borrow any additional engines, on a shorter-term basis, when required. These are the inefficiencies that Willis Lease's ConstantAccess™ and Constant-Thrust™ programs are designed to eliminate.

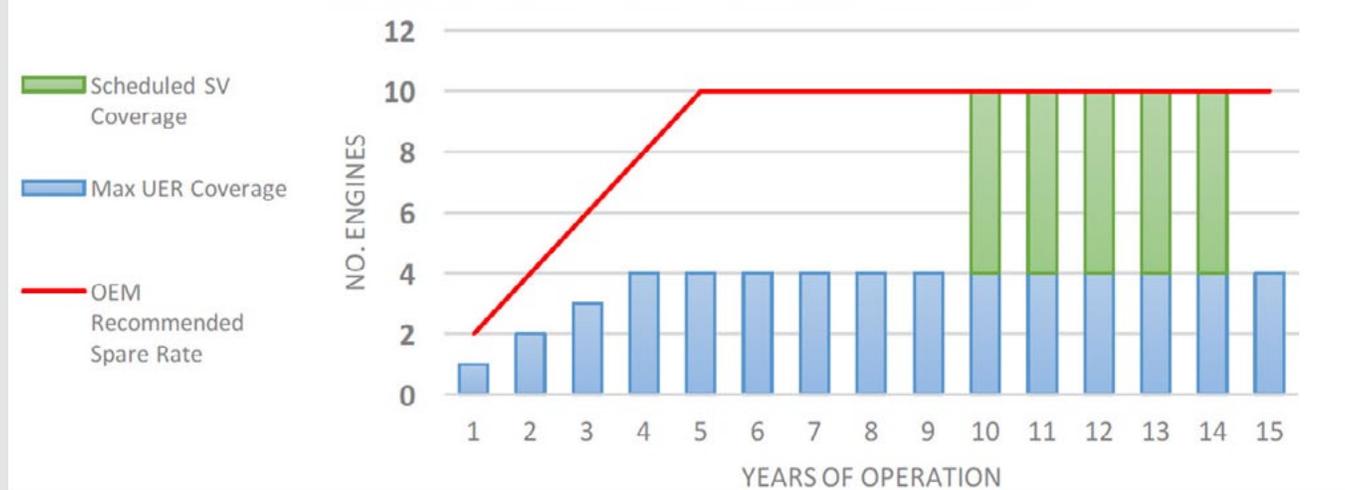


Brian Hole, President of Willis Lease Finance Corporation

The world may not necessarily need fewer engines, but the engines produced must be made available based on operational need rather than preconceived contractual delivery schedules.

Willis Lease is focused on planning and maximising utilisation of assets by having them in the right place, in the right condition, at the right time for our customers worldwide. If we can guarantee an engine for our customers, why should they be required to buy another spare engine instead? Cost efficiency is our mission and we believe the industry can save millions by adopting this approach.

15 Year Spare Engine Requirement Snapshot





John O'Donnell

Effective July 1, 2019, **John O'Donnell** has been named Chief Executive Officer of Safran Aerosystems. O'Donnell started his career in 1987 at Air Cruisers, successively holding the positions of design engineer, manufacturing engineering supervisor and Vice President of Engineering. In 2008, he was named President of Air Cruisers Company (now Safran Evacuation Systems). From 2015 until this latest appointment, O'Donnell was CEO of Zodiac Aerosafety Systems (now Safran Aerosafety). At the same time **Sébastien Weber** has been named Chief Executive Officer of Safran Passenger Solutions. Weber started his career in 1996 at ECE (which later became Zodiac Aero Electric). He held several different positions before moving to the Services branch in Hong Kong, and then created Zodiac Services Asia in Singapore in 2008. He moved to the Cabin branch in 2011 as business development manager, working with airlines. In 2012 he joined Zodiac Water & Waste Aero Systems in Carson, California. From 2016 until this latest appointment, he was CEO of the Fluid and Water & Waste Division. O'Donnell and Weber also become members of the Safran Executive Committee.



Sébastien Weber

Lease Corporation International (LCI), the helicopter lessor and aviation division of the Libra Group, has appointed **Mark Stevens** and **Alejandro Kerschen** to its advisory board. The board, which was first established in 2013, is made up of senior industry executives with long and proven track records in the helicopter and other related industries. It advises LCI's senior management team on its long-term strategy, business performance, and major developments such as aircraft acquisitions and placements. Mark Stevens previously served as Managing Director of Shell Aircraft, with responsibility for the safe delivery of the Shell Oil Group's global aviation operation comprising 100 fixed- and rotary-wing aircraft operating in 26 countries. Alejandro Kerschen is the Founder and Managing Partner of Atlantic Alliance, which provides corporate finance advice, capital markets solutions, research, market intelligence and business development services. He has over 30 years' experience working with asset managers, financial institutions, corporations, private banks, independent wealth managers and family offices.

United Technologies has appointed **Christopher T. Calio** to become president of Pratt & Whitney, effective upon the retirement of **Bob Leduc** in early 2020. Chris Calio will assume leadership of Pratt & Whitney after serving as president of its commercial engines business since 2017. As president of Pratt & Whitney's commercial engines business, Calio is responsible for the development,

program management, sales, customer support and aftermarket services of the company's portfolio of large commercial engines, including the P&W GTF engine family. Previously, Calio served as chief of staff to UTC Chairman and CEO **Greg Hayes**. He joined United Technologies in 2005 and served in positions of increasing responsibility across the corporation.



Hervé Rousselle

Corporation, and Dover Corporation.

Universal Avionics (UA), has appointed **Hervé Rousselle** to the position of Regional Sales Manager for Europe. Based out of Lyon, France, Hervé is responsible for UA's product sales and overall market growth in France, Luxembourg, Italy, Belgium, and French-speaking areas of Switzerland. Hervé brings over 20 years of business and general aviation sales experience to UA and prior to joining the company, he held various sales positions at GE Aviation, Parker Hannifin

IBA Group, the independent aviation advisory, valuation, and consulting firm has expanded the remit of Chief Operating Officer, **Dr Stuart Hatcher**, to include the role of Managing Director – Aviation Services where he will steer IBA's principal business divisions of Valuations, Advisory and Asset Management. In addition, the organization has brought in respected industry expert, **Terry Dawson**, as Managing Director – Digital, to lead data intelligence services and develop the business strategy for IBA.iQ. This intuitive and comprehensive online platform provides essential Fleet, Valuation and Trend market intelligence to the global aviation leasing, operating, finance and MRO community.



Dr. Thomas Wittmann
©Jürgen Mai

Dr. Thomas Wittmann will take over as one of two CEOs of Lufthansa Systems as of July 1. In this role he will be responsible for all production and technology issues in the company and the close collaboration with the IT organization of the Lufthansa Group. He will lead the company together with CEO **Olivier Krueger**, who has held his CEO position since 2015. Dr. Wittmann is succeeding **Stefan Auerbach**, who took on a new position at Eurowings on May 1.