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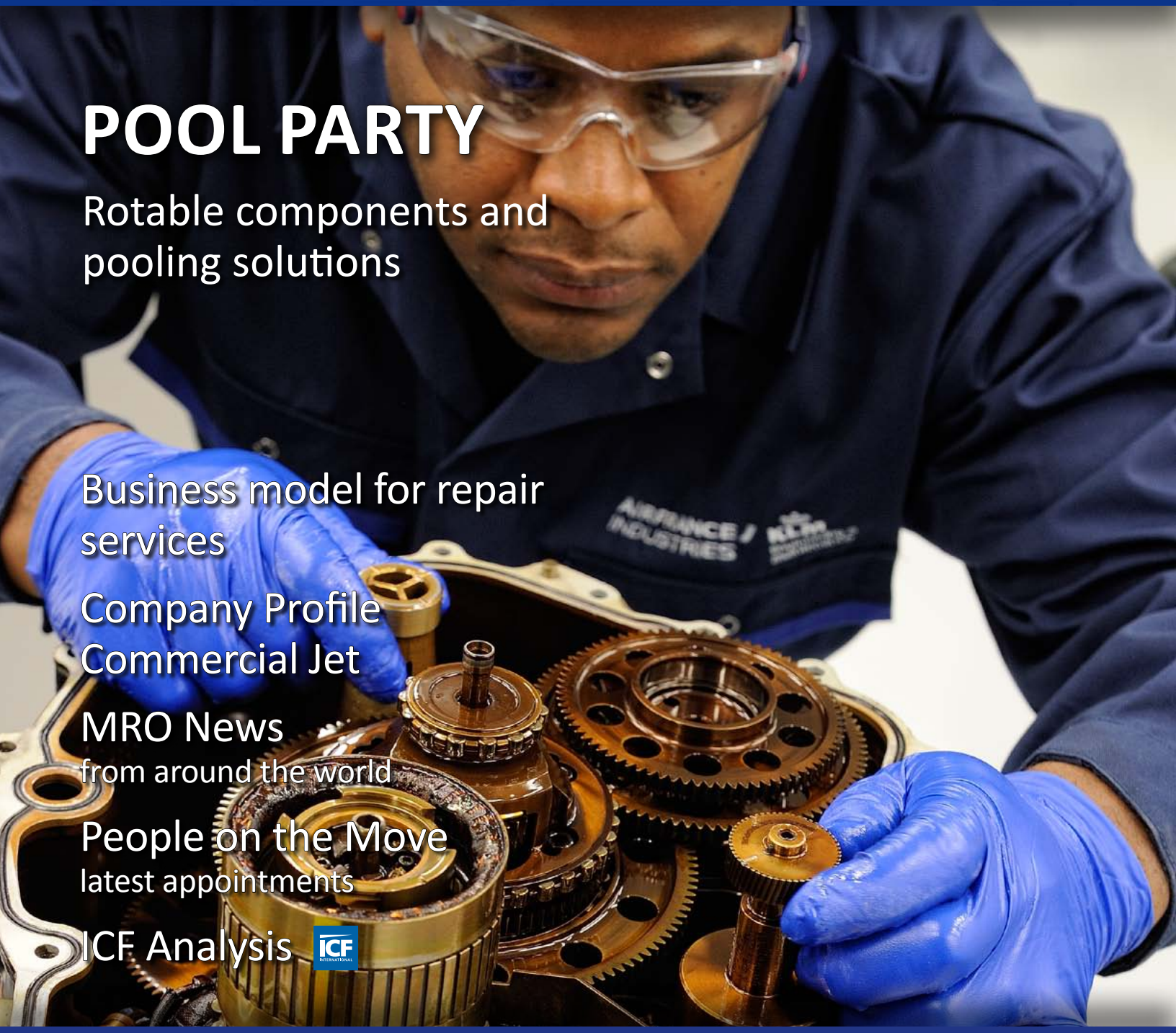

POOL PARTY

Rotable components and pooling solutions

Business model for repair services

Company Profile Commercial Jet

MRO News
from around the world

People on the Move
latest appointments

ICF Analysis

Just ‘plane’ stupid!

The climate change protesters known as “Plane Stupid” who disrupted operations at London Heathrow recently brought to light once again the ease at which unwanted forces can reach close vicinity to a runway and aircraft especially in light of the high security alert the UK and other parts of Europe are under.

A dozen activists cut through the wire perimeter fencing at 3:30 a.m. Monday July 13 before creating a human chain on Heathrow’s northern runway. The incursion comes less than two weeks after a government-backed study named Heathrow as the best option for a new London runway.

While airports should be considerate of environmental issues I feel these protestors are causing unnecessary disruption. Their attention seeking antics will result in nothing but added costs to airports, airlines and the travelling public – an industry the accounts for billions for most developed economies. Their reasoning was to target “frequent travellers and those that travelled for unnecessary reasons,” which is in itself is ridiculous.

The incursion is an embarrassment for Heathrow and security forces in the UK and now airports across Europe have been reassessing the protection of miles of fencing. Independent air transport consultant John Strickland said the protesters entered the runway when flights were restricted, but he added they must have known they would “have an impact when the airport opened”.

All very disturbing!

Keith Mwanalushi
Editor

Pooling of rotable parts is increasingly popular. *Photo: AF KLM E&M*

Contents

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Opinion

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V2500 disassembly and assembly hands-on training *Photo: Ameco*

Ameco's V2500 capability approved by authorities

Ameco's capability application on V2500-A5 series has been approved by CAAC, FAA and EASA. Thus, Ameco has been authorized to provide overhaul and modification on V2500-A5 series. The service on V2500-A5 series as a new product will help promote Ameco's market competitiveness and support it to serve more customers at home and abroad. The first engine for overhaul is scheduled for this month. In addition to V2500-A5 series, the Beijing-base MRO provider overhauls PW4000 series and RB211-535E4 series, also provides QEC kit and module change on CFM56 series.

ST Engineering's Aerospace arm secures US$920m worth of new contracts in 2Q2015

Singapore Technologies Engineering (ST Engineering) reported that its aerospace arm has secured new contracts worth US$920m in the second quarter (2Q) of 2015. These new orders involve projects ranging from airframe, component and engine maintenance, to engine wash and pilot training. The total contract value includes the recently announced component Maintenance-By-the-Hour contract worth over US$100m (approximately S$134.8m) awarded by Flybe, and the engine maintenance contract worth around US$350m (approximately S$472m) from Jet Airways. Included in the 2Q2015 contracts is a heavy maintenance agreement for six Airbus A319 aircraft belonging to an international airline. For component

Wheels Lufthansa Technik *Photo: Lufthansa Technik*

support, ST Aerospace secured several Boeing 737NG landing gear overhaul and exchange contracts for airline operators in Asia and Oceania. In terms of engine support, an agreement was inked for the heavy maintenance of six CFM56-7B engines for a low-cost carrier in Southeast Asia. Multiple contracts have also been sealed with customers in Asia Pacific, Europe and the US for EcoPower engine wash services. On pilot training, a three-year contract has been signed with Tigerair Singapore for the provision of simulator training services. In 2Q2015, the aerospace sector redelivered a total of 310 aircraft for airframe maintenance and modification work. In addition to airframe redeliveries, a total of 10,850 components, 34 landing gears and 50 engines were processed, while 1,008 engine washes were conducted for both commercial and military customers.

Monarch Aircraft Engineering secures line maintenance contract for Hainan Airlines

Monarch Aircraft Engineering Limited (MAEL) announced a line maintenance technical handling agreement with Hainan Airlines. The agreement, which commenced on 3rd July 2015 is to provide call out support to the Chinese operator's flying program into Birmingham Airport this summer. Hainan Airlines, headquartered in Haikou, People's Republic of China will operate twice weekly flights on a Boeing 767-300 aircraft, with 223 seats – 34 in the business cabin and 199 in economy. The flights will operate from Beijing to Birmingham each Friday and Monday to the end of August 2015.

Monarch Aircraft Engineering extends FAA approval at Birmingham and Copenhagen facilities

Monarch Aircraft Engineering Limited has extended their US Department of Transportation Federal Aviation Administration approval to their Birmingham and Copenhagen base maintenance facilities. Monarch Aircraft Engineering's FAA approval now covers Luton, Birmingham, Copenhagen and Manchester bases. Already maintaining US registered aircraft at Luton and Manchester, this will allow the UK based MRO to further extend their service offering to all their base maintenance facilities.

Start of construction of Lufthansa Technik AG's new wheel and brake workshop at Frankfurt's East Harbor

Lufthansa Technik broke ground on the construction side of the new wheel and brake workshop at Frankfurt's East Harbor. The company is investing just under €60m in the new production facility, which fulfills all requirements for lean production, an ergonomic working environment and sustainability in terms of how the building has been developed and will be operated. The new facility will be put into service at the beginning of 2017. It will enable Lufthansa Technik to continue to grow in the segment of wheel and brake overhaul. Lufthansa Technik is thus securing the 130 qualified jobs that already exist in Frankfurt and is also creating opportunities for further growth. The most recent figures showed growth rates at more than 3% per annum based on the volume of serviced wheels and brakes. An ultra-modern

workshop with a gross floor area of 14,500 m² will be built on a 35,000 m² plot. Thanks to optimized processes fully adapted to maintenance requirements, tailored logistics and state-of-the-art plant equipment, the new site enables the cost-effective supply of wheels and brakes for flight operations, for Lufthansa and numerous other European customers in the future.

SR Technics and AerFin to launch Beyond.Fleet.Services

SR Technics, a leading provider of technical services to airlines (Switzerland) and AerFin (UK), a specialist in providing end-of-life fleet solutions, have signed an MOU, which underpins their intention to manage and market a joint solution branded Beyond.Fleet. Services. This innovative bundle will extend the life of the aviation industry's maturing fleets of A340-200/300 aircraft by reducing their operational costs, including engines, airframe and component maintenance, as part of a flexible and comprehensive set of end-of-life managed services. Beyond.Fleet. Services is designed specifically to reduce the costs incurred by A340 operators as they seek to both maximize the life-span and revenue potential of their existing fleets, while they manage their eventual withdrawal from service. Beyond.Fleet.Services combines flexible leasing schemes and other attractive cost saving service options for managing engines, airframes, components and inventory challenges. It will guarantee fixed-priced engine and component MRO services. There is also going to be the option for operators to sell-and-leaseback aircraft and engines or for Beyond.Fleet.Services to commit to purchasing aircraft at the end of its lease or working life. As part of the partnership, SR Technics will provide the MRO services for CFM56-5C engines and AerFin Ltd the finance and leasing schemes. In addition, the two firms will cooperate to ensure that customers get a steady supply of components. Beyond.Fleet.Services' customized packaged solutions will be wrapped into one contract, which will provide customers with one single point of contact and will deliver an integrated and bespoke end-of-life solution. As part of its committed preparation for the launch of Beyond.Fleet.Services, AerFin recently secured eleven A340-300 aircraft, which will be disassembled to provide a comprehensive, cost-effective pool of components to its customers.

Ascent Aerospace awarded Airbus Beluga assembly line integration contract

Ascent Integration & Automation Group has been awarded a contract by Airbus for the Beluga XL Final Assembly Station. The Beluga XL is an A330 heavily modified to transport large, oversized aerostructure components from Airbus supplier facilities to the Beluga XL final assembly line in Toulouse, France. Under this contract Ascent Integration – European Operations, will manage the design, integration, build and installation of the equipment and tooling necessary to assemble this unique aircraft. Ascent Integration will be responsible for providing a "turnkey" integrated assembly system incorporating all the assembly jigs, work platforms, transport systems, laser metrology, and tools required to assemble the new Beluga XL. The project is unique in that, while only five aircraft will be converted, the assembly system must deliver the efficiency, accuracy and worker safety levels required by Airbus. The contract will conducted from April 2015 to November 2017.

Vision Systems opens new production plant dedicated to composite

Vision Systems, an international system supplier for the aeronautics, automotive and marine markets, already masters different industrial processes including Resin Transfer Molding, thermocompression, infusion, thermoforming and drape forming. This production know-how, in addition to that of mechanics and electronics, enables Vision Systems to offer complete functional systems with breakthrough features, most particularly solar protection solutions, helicopter doors and windows and cyclic sticks. Vision Systems' production comprises not only leading-edge composite technologies but also product and process know-hows such as design engineering, strength calculation, process engineering, prototyping, tooling and pre-series, before the launch of serial production. In order to better respond to the growing need of its customers in terms of composite products integration, Vision Systems is setting up a new production unit that will specifically produce composite parts. The new composite plant will come and reinforce Vision Systems' existing industrial facilities from drape forming to machining, thus strengthening the control of the product developments from beginning to end. A 1000 m2 dedicated area will see the light of day at Brignais's site (main site of the group) and will be fully operational by the end of the year.

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DELTA
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WHAT IT TAKES TO FLY.

Airbus A330 Completion and Delivery Centre to be built in Tianjin *Photo: Airbus*

Airbus and Chinese partners agree on wide-body cooperation

Airbus and its Chinese partners, namely the Tianjin Free Trade Zone Investment Company (TJFTZ) and the Aviation Industry Corporation of China (AVIC), have signed a framework agreement on setting up an A330 Completion and Delivery Centre (C&DC) in Tianjin, China, taking the partnership between Airbus and China a further step forward following the successful establishment of an A320 Family Final Assembly Line and Delivery Center in the Chinese city. The framework agreement firms-up the Letter of Intent signed by the three parties last year. The A330 C&DC Tianjin will be located near the site of the Airbus A320 Family Final Assembly Line in Tianjin. The C&DC will cover the aircraft completion activities including reception, cabin installation, aircraft painting, engine run and flight test, as well as aircraft delivery and customer flight acceptance. Under the project, the A330 Family aircraft to be completed at the A330 C&DC Tianjin will be assembled in Toulouse but will be painted and have their cabin furnished and installed in Tianjin. On the same occasion, Airbus has also signed a Letter of Intent with AVIC on cabin development cooperation and procurement frame contract with Zhejiang Xizi Aerospace Fastener Co., Ltd for design, development, manufacturing, and supply of standard fastener parts.

First A350 XWB for Cathay Pacific is taking shape

Assembly of the first A350-900 for Cathay Pacific Airways is progressing well at Airbus' A350 XWB Final Assembly Line (FAL) in Toulouse, France. Following the fuselage section joining phase, the wings, the horizontal and vertical tailplane as well as tail cone have been joined to the fuselage. Following this, the aircraft will move to the next assembly station for structural completion, ground testing and start of cabin installation. The aircraft is scheduled for delivery early next year and will be the first of 48 A350 XWBs acquired by Cathay Pacific. Cathay Pacific's A350 XWB fleet will include 22 A350-900s and 26 of the larger A350-1000s, for operation on long- and medium-haul services.

Vietnam Airlines signs first Airbus Flight Hour Services (FHS) agreement for A350 XWB

Vietnam Airlines has selected Airbus to provide Flight Hour Services (FHS) for its new fleet of 14 A350-900s on order. With this contract, Vietnam Airlines becomes the first A350 XWB operator to select Airbus FHS. The agreement, which will run for 12 years, provides an extensive scope including A350 line replaceable units (LRUs), guaranteed spare parts availability through a pool access service at Vietnam Airlines' main base and selected outstations. The signature of this FHS agreement took place on the occasion of the arrival of the first A350 XWB for Vietnam Airlines in Hanoi. Mr. Nguyen Tan Dung, Prime Minister of Vietnam and a number of European Ambassadors were present at the ceremony.

STG Aerospace responds to customer demand with new US facility in Miami

STG Aerospace, a world leader in pioneering aircraft lighting technologies, has opened a new US manufacturing and warehousing facility in Miami. Located adjacent to the Miami International Airport runway, the new building has double the space of the company's previous US premises. This significant investment in expansion reflects growing demand throughout the Americas for STG Aerospace products and has been specifically designed to serve quickly and more efficiently. The new facility will also ensure that STG Aerospace can manufacture its latest product innovations within the US as well as the UK.

Alcoa reports solid second quarter 2015 profits

Lightweight metals leader Alcoa reported solid second quarter 2015 results as the Company's transformation showed strong progress. Profitability from Alcoa's growing aerospace and automotive businesses increased year-over-year as mid and downstream investments delivered positive impact. In the upstream, the Primary Metals business was resilient in the face of market headwinds and the Alumina business delivered its strongest first half results in eight years. Alcoa reported second quarter 2015 net income of US$140m including US$143m in restructuring-related charges, primarily to optimize the Company's upstream portfolio. Year-over-year, second quarter 2015 results compare to net income of US$138m in second quarter 2014. Excluding special items, second quarter 2015 net income grew to US$250m up 16% from US$216m in the year-ago period. Second quarter 2015 revenue rose to US$5.9bn, from US$5.8bn in second quarter 2014, up 1% year-over-year. Organic growth in aerospace, automotive and alumina, combined ith acquisitions, grew second quarter revenue by 12.7%. This profitable growth more than offset an 11.7% decline in revenue caused by closing and divesting lower-margin businesses and market headwinds.

Rolls-Royce updates 2015 guidance

Rolls-Royce updated its 2015 guidance, including a preview of its expected half-year results. In Civil Aerospace, Rolls-Royce continues to expect 2015 underlying revenue and profit within the guided range provided in February of £7,000m to £7,300m and £800m to £900m respectively. However, the company now expects the impact of reduced Trent 700 deliveries to be greater than initial estimates, reflecting further adverse developments in the demand for OE and spare engines and related pricing. In addition, lower-than-expected demand for engines to power business jets and a softening regional aftermarket will also adversely impact profit. These market headwinds should be balanced by good growth in its widebody aftermarket and a larger-than-expected benefit from the reversal of a balance sheet provision on the Trent 1000 launch, as a result of an expected significant improvement in operating performance, and by improved retrospective TotalCare contract profitability. The value of the provision release and contract profitability are expected together to contribute around £200m, somewhat more than previously expected. Rolls-Royce continues to expect 2015 underlying profit before tax to be phased more to the second half than in 2014, led principally by Civil Aerospace and Power Systems. As a result, first half underlying profit before tax is expected to be between £390m and £430m, or around 30% of the full year, compared with roughly 40% in 2014. Free cash flow is expected to be between £(570)m to £(620)m compared with £(347)m in the first half of 2014.

PPG completes acquisition of Cuming Microwave

PPG Industries has completed its previously announced acquisition of Cuming Microwave Corporation based in Avon, Massachusetts, and its wholly-owned subsidiary Cuming-Lehman Chambers, based in Chambersburg, Pennsylvania. Financial terms were not disclosed. The acquisition enhances PPG's portfolio of aerospace coatings with specialty coatings and materials that absorb microwaves and radio waves such as radar. The products are used for military aircraft and also have applications in electronics, telecommunications, medical and automotive end-uses.

Other News

Airbus plans to build a second plant in China after winning an order for at least 45 jets that underpins its production goals for the widebody A330, said chief executive Fabrice Bregier. Airbus has been negotiating for about 18 months to establish an A330 'cabin completion centre' in China alongside an existing final assembly plant for smaller A320 jets in Tianjin.

Elbit Systems regional turboprop aircraft manufacturer ATR signed an agreement for integrating ClearVision Enhanced Flight Vision System (EFVS) with the **SKYLENS** wearable display onboard the new ATR-600 series. The system can also be offered as a retrofit to other ATR '-600' aircraft already in service. Enhancing flight safety, the new system will also contribute to the operational availability of turboprop aircraft may require operating from airfields lacking sophisticated infrastructure. Suitable for day and night operations and in all weather conditions, the system provides head-up information while minimizing the dependency on airport instrumentation. Equipped with the new ClearVision EFVS and SKYLENS wearable display, aircraft are capable of take-off and landing in low visibility conditions and in locations that non EVS-equipped aircraft previously could not approach. According to the agreement between the two companies, Clearvision EFVS will be introduced as an option for both ATR 42-600 and 72-600 models. ATR will be the launch customer for SKYLENS, which comes in substitution of the traditional Head Up Display (HUD) in this configuration. Certification is planned in 2017.

Elbit Systems and ATR sign agreement for the Integration of ClearVision EFVS *Photo: ATR*

Blackbird, a full solution designer and developer of aviation wheel and brake specialty tooling's, reported that its newest aviation paint kits are available for **Boeing, Airbus, CRJ, Embraer, McDonnell Douglas, Beechcraft, Cessna, Gulfstream, Hawker, Lear & Piaggio** for main wheels, nose wheels and brake assemblies. With Blackbird's unique patented maskings, an aircraft wheel or brake can be masked or unmasked in less than two minutes – a dramatic savings in both time and expense over the current method of wheel and brake painting. The masks snap on easily and are manufactured to the industry's highest standards, ensuring product consistency. The paint maskings meet OEM specs detailed in the overhaul manuals and have been tested and specifically engineered for aircraft wheels and brakes. Using Blackbird's paint maskings eliminates the potential for personal injury, overtime costs, waste and excessive disposable tape purchasing. All of Blackbird's products can be custom-manufactured to a client's specifications. Blackbird's maskings are currently used in Aviall, Honeywell, Aerolineas Argentinas, Safran and Messier-Bugatti's repair maintenance facilities.

Pool-ing power

The flow and planning of rotable or repairable components for parts pooling is seen to be more complex compared to traditional parts, but do the methods really differ? ***Keith Mwanalushi*** looks at the process.

It might be more economical to replace versus repair in some market conditions. *Photo: Iberia*

Repairable parts inventory involves a string of well-orchestrated activities. In repair environments, parts rotate from the aircraft, into repair, and back to the aircraft in a cyclical process. Such parts are normally known as rotables or repairables.

In terms of the complexity of dealing with rotables, Harmen Lanser, components group director for component product development and logistics at Air France KLM E&M believes the flow of rotable components is more complex than traditional service parts.

"This has several reasons," Lanser declares. "Firstly, due to the high cost of the rotables a much more critical planning is essential to have a cost effective solution. Too high stock leads to high costs of capital, too low stock leads to high costs of AOG services."

Lancer says the repair supply chain is much less stable than the new parts supply chain and variations on demand (removal flow) and on works to be performed on the rotable leads to fluctuations in production. "As a consequence, the required inventory to guarantee the service level is then higher than for a very stable supply chain."

He also says reliability management to manage and increase the MTBR "Mean Time Between Removal" is critical to optimise the stock level and availability level of the rotables. "The supply chain of rotables is a double loop. The first loop is acquiring and supplying the serviceable component to the aircraft, the second loop is to have the unserviceable returned component repaired and stored serviceable on stock. Traditional service items only have the first loop," Lanser explains.

Stephane Senechal, VP for supply chain services at Vector Aerospace Engine Services agrees that rotables are more complex. "In our case the variety of different configuration, models and SB (Service Bulletin) status contribute greatly to making this process more complex than simply repairing or replacing."

"Planning an inventory of spare parts begins with calculating the demand," adds Larry Montreuil VP, asset management and business development at Werner Aero. "Doing so for traditional service parts for a manufactured item considers the breakdown rates, the number of units in service, the cost and supply of those parts. The planning process for a pool of rotable aircraft parts considers these and many other variables that makes the model much more complex for an individual supplier. One important consideration is the commonality of parts within the pool that can be used by different operators. The pool operator must manage configuration control and strive for standardisation of work scopes across different customers operating the same aircraft. This will yield greater synergies and lower costs for the MRO," Montreuil analyses.

Alejandro Ceballos, manager, AOG and customer support at Iberia Maintenance echoes some similar views. " Stock level of this kind of components has to be calculated with accuracy due to its price. This analysis adds complexity to the material planning. It involves a lot of variables as current and future fleet size, reliability of each individual part number, airline strategic plans and so on."

Also, the surplus market, depending on the fleet model, moves quite fast in terms of price. "This adds even more complexity, since repair

Larry Montreuil VP, asset management and business development at Werner Aero

and surplus prices have to be continuously monitored to decide if units are beyond economical repair," Ceballos continues.

Tom Covella, group president at STS Component Solutions has a slightly different view –"The flow of rotable components, in my opinion, has not drastically changed over the years," he says. "I believe most of the same principles still apply, and the planning process that controls the flow of rotable components should not be any more challenging, or complex, than traditional methods."

To scrap or repair a rotable component is driven by several factors *Photo: AF KLM E&M*

Ultimately, Covella sees the reliability of the components as well as the MTBR and "Mean Time Between Failure" (MTBF) as two driving factors that impact the MRO planning process. He says the MTBR involves how the component is established within the airlines' maintenance planning schedule. He questions if this a "hard-time" component that is removed during scheduled cycle or hourly intervals, or is this monitored "on condition," whereby the component is only removed on failure or inoperable status?

"With the technology improvements that are constantly being introduced in the latest generation aircraft, I do not see this process becoming any more challenging," Covella states.

> "However, over the years, the airlines have done a very effective job of offsetting these costs to either the OEM's or PBH suppliers."
> Tom Covella, group president at STS Component Solutions

Deepak Sharma, chief technical officer at the AJW Group adds: "This may be complex, but the basic fundaments remain the same," Sharma contributes. He continues: "The complexity of any plan is understanding the volume flow as we start migrating into new platform equipment such as the A350, B787 A320 NEO or 737MAX.

"Predicting accurate flow is always challenging because of the reliability factors, as well as the diverse solutions open to customers in this competitive market place. Having more choices in their hands of where to place or route the MRO work," says Sharma.

Considering the above opinions, it becomes crucial to decide the right time when to scrap and remove the rotable item from the pool programme. "A decision of scrapping an existing component is made when it's not reliable and if the unit has fundamental design problems, as well as safety concerns," Sharma indicates.

Lanser from AF KLM E&M observes two reasons to remove a component from the pool. Firstly, he says if the cost of repair exceeds the value of the component (Beyond Economical Repair) BER. Lanser explains that this BER limit is set by prices and availability of the rotables on the surplus market. For aircraft with high surplus availability he feels it might be interesting to replace it by a surplus component instead of repairing.

"Also, when the stock level is higher than the needed stock level the first next unserviceable component will be removed from the supply chain to ensure no cost for repairs are made and the stock level is corrected to the right level. This can be caused by increased MTBR as result of performing modification to the component. This can also be caused by a decreasing fleet size. Dependent on the market value of the rotable it will be scrapped or put to surplus," Lanser says.

At Iberia Maintenance, the decision to remove a unit from a pool programme is taken only when there has been a major modification or a retrofit programme that makes the part obsolete and if the maintenance costs have significantly increased due to a review of the maintenance procedures.

Clearly the decision whether to scrap or repair a rotable component is driven by the repair cost as a function of the replacement cost. Montreuil from Werner Aero elaborates: "Once again, the BER threshold is usually 65% of the replacement cost. Other factors include the desired inventory level for that component in the pool. If inventory is adequate to cover demand, it may make sense to avoid a high cost repair and scrap the part, even if no replacement will be sought. The mod status of the part should also be considered as this can affect the market value at a serial number level."

The repair supply chain is much less stable than the new parts supply chain. *Photo: Iberia*

Senechal from Vector Aerospace adds that when it [rotable] is obsolete, and when the repair LT for the component meets the TAT requirement of the work being performed, the cost of the repair becomes too close to the replacement cost or if there is an abundance of used/serviceable replacement available.

Covella notes that in some cases, if there is excess of surplus components in the market and it is more economical to replace versus repair due to current market conditions, then this avenue can be explored. In another scenario, whereby the component is seeing an increase in unscheduled removals and an erosion of reliability, he states one must examine if the increase costs to repair the component can be offset by the replacement of the rotable component.

"This 'life-cycle cost analysis' should be performed on rotable components to determine what it will cost to operate and or maintain over specific time intervals. This analysis will impact the decision on whether to remove the component from pools and replace with a new component. This is a very important process and something we work closely with our OEM business partners, airline and MRO customers so that we are all achieving the most effective life-cycle costs on components," Covella stresses.

Seemingly, it's also important to understand the role or impact routable items play in the pooling of components and what impact this has on the cost of rotables. Covella observes that rotable components play a large role in inventory pooling and will impact costs for airline operators.

"However, over the years, the airlines have done a very effective job of offsetting these costs to either the OEM's or PBH suppliers," Covella continues. "The airlines have demanded that OEM's take a more aggressive approach in the warranty periods of rotable components [up to five years, in some cases] and establish PBH or pooling programmes that are heavily focused on rotable component support. As this shift of ownership has taken place over the years, the cost of rotables still exists in the market but the airlines have been able to transfer this cost of ownership to the OEM's and PBH providers," he further states.

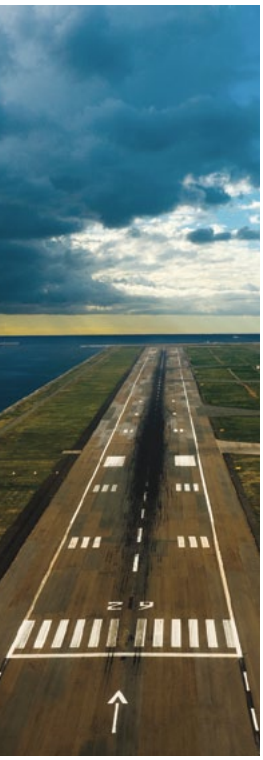
At AF KLM E&M they observe that pooling is getting more and more necessary to economically manage rotables. Lanser says the fleet size needed to justify a stock of rotables for an aircraft has increased from 25 aircraft for the 747 to over 100 aircraft for 787 and A350. "This has to do with on one side the increased cost of rotables and on the other side the increased MTBR of the components which increases the number of slow moving components."

On the same issue Sharma from AJW reminds that rotable components are a commodity for an airline or an MRO. He explains that It is a commoditised product and the market is consistent in seeking competitive pricing on each area whether it is material or labour. "What has the most impact is when non-asset programme businesses have a surplus of these commodities which is sold at a throw away price, which in turn triggers an alarm in the market place and that is the significant impact the markets see," Sharma adds.

Equally crucial is determining when to place repair orders versus when to place orders for new items from suppliers. Caballos from Iberia concludes and reminds that the surplus market is continuously moving and it's a constant work for the responsible department to monitor the difference between surplus and repair price.

"Depending on the type of contract with the providers, either fix price or based on time and material basis, you can decide to issue a repair order before or after receiving a quotation," he states.

In some cases Caballos highlights that the decision on placing a repair order or ordering a new item depends on the work that has to be done. "For example, some unit's test or repair prices are within the limits of what we consider economically feasible, but the overhaul of those units could be considered beyond economical repair, if the market price is lower. In that case, the decision is always taken after the findings report."



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Commercial Jet specialises in heavy maintenance and modification services, complete airframe inspections, freighter conversions, interior modifications and avionics upgrade programmes.

The completed B737-400SF passenger-to-freighter conversion seen in the state-of-the-art, purpose built wide-body Commercial Jet Dothan, Alabama paint hangar.

According to market research reports, forecasts for airframe heavy maintenance are predicted to be in the range of 3% - 5% annual growth rate over the next 8 to 10 years. Commercial Jet believes the figure to be closer to 3% annual growth rate. Commercial Jet is well positioned both physically and geographically to service the growing maintenance needs of passenger and cargo airlines, aircraft owners, lessors and special operations. Due to the substantial cost often associated with ferrying aircraft, our overall focus is on the North and South American markets as well as the Central American and Caribbean regions. In addition to this Commercial Jet offers lessors efficient locations to perform transition maintenance and painting for aircraft transiting to or from other markets.

Commercial Jet currently operates two centrally located facilities, one in Miami, Florida and the other in Dothan, Alabama. Both locations offer full scheduled and unscheduled heavy maintenance as well as modification work including freighter conversions, interior modifications and avionics upgrade programmes. Additionally, the Dothan, Alabama facility has a full service modern paint facility.

Commercial Jet is well known in the industry as a top tier provider of passenger-to-freighter (P-F) conversions. This type of modification is often linked to heavy maintenance requirements reducing shop visits and allowing for time efficient modification of an aircraft. Having converted over 150 aircraft to date, most including heavy maintenance, Commercial Jet has enacted a number of efficiency gains - translating into real savings and convenience for our customers.

As the company continues to reflect on changing market needs, Commercial Jet now offers maintenance and once the modification is certified, P-F conversion services, for the Bombardier Regional Jet. From Commercial Jet's perspective, economic drivers like the availability of used CRJ's, affordable fuel prices and continued economic recovery will drive the continued use of these aircraft in both passenger and freighter markets.

In summary, the company believes that the inherent capacity constraints of an airlines' in-house MRO results in a general need to grow outsourced portions of their maintenance for existing aircraft in order to accommodate fleet growth.

Commercial Jet is accredited in the United States, European Union and other international regulatory certifications.

Proximity to Aerospace Manufacturers: The new business model for repair services

Aerospace manufacturers look to speed repairs while reducing costs by working with international repair services that offer full service locations in close proximity

Given the increasing cost of ongoing maintenance and repair at any industrial plant, many aerospace manufacturers are discovering the value and advantages of working with a repair service that not only has the size and expertise, but also is as nearby as possible.

Proximity, after all, has many advantages for the manufacturer. First and foremost, having a repair service company in close proximity means repairs can be completed faster and the maximum possible uptime maintained. Today, most manufacturing plants need replacement parts quickly.

Proximity means faster service and reductions in shipping costs.

For plant maintenance departments, the savings achieved by being close to a reputable repair service companies impacts the balance sheet by extending the life of plant assets and keeping them in production.

Considering the vast range of parts that need servicing in any given plant - such as drives, PLC's, servo motors, CNC machines, spindles, ballscrews, hydraulic components, robotics, material handling components, valves, safety curtains, pumps, actuators, and torque tools - the cost savings can amount to millions.

As an example, K+S Services works with United Technologies (UTC), a provider of high-technology systems and services to the building and aerospace industries.

As is the case in many manufacturing plants, there is ongoing maintenance of equipment like motors, spindles, and actuators. To minimise manufacturing downtime, UTC uses nearby K+S Services for some of its repair services. The fact that they are located within miles of each other helps the repairs get done quickly.

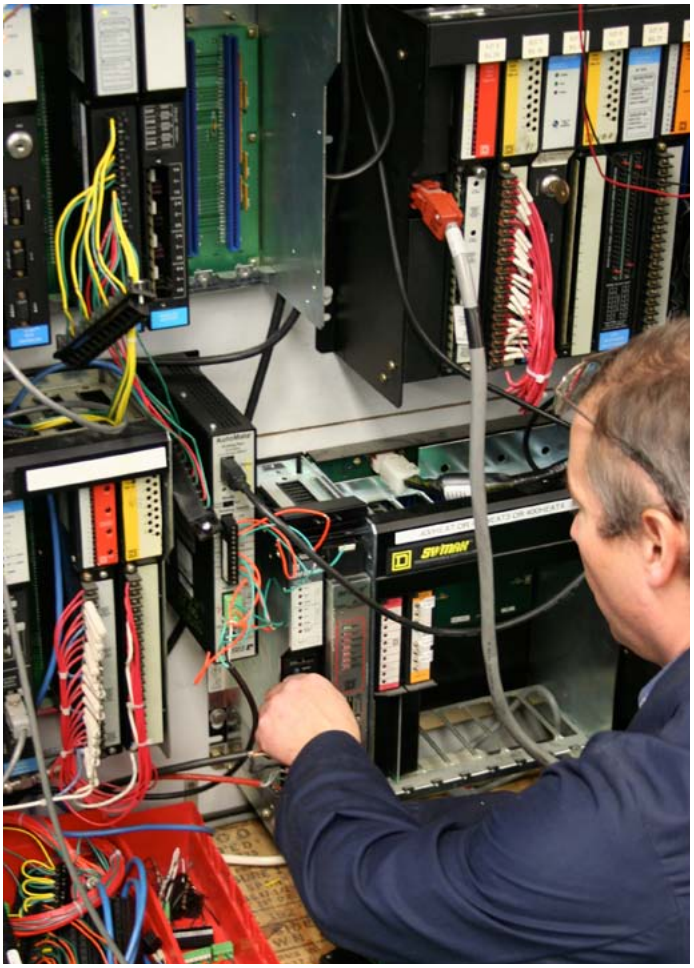
From a logistics standpoint, turnaround time is minimised by the close proximity. In some instances a part has been picked up in the morning, fixed, and returned that same afternoon.

Headquartered in Southgate, Michigan, K+S Services, Inc. is unique in the repair service business as it pursued a strategic model of expansion by opening new locations in close proximity to existing major plants, as well as geographic regions that attract and support U.S.-based manufacturing.

The company now operates eleven facilities across the globe, including the U.S., Mexico, Canada, and Europe. More than just a store front with a lone representative that coordinates with a larger office, these repair facilities are fully functioning shops with managers, technicians and spare parts at every location.

This business model not only delivers all the benefits of high quality repair services, but provides these services in close proximity to where they are needed.

Building on a strong relationship and performance, K+S was recently awarded UTC Supplier Gold status by demonstrating "best in class" quality and delivery performance, implementation of a lean culture, and overall strong customer satisfaction. Achieving Competitive Excellence, or ACE, is the UTC operating system for promoting quality, delivery, efficiency and customer satisfaction. UTC Supplier Gold is a programme that facilitates and accelerates supplier performance improvements which recognises suppliers who have achieved exceptional performance.



Having a repair service in close proximity means repairs can be completed faster and the maximum possible uptime maintained.

"K+S received many customer feedback responses and high customer satisfaction scores," said Stephen Bohlman, Director of Supplier Performance, UTC." This is a good indication that K+S Services is satisfying their primary users by operating at best-in-class service levels."

If physical proximity in terms of location has its benefits, there is no relationship closer than having a repair service representative stationed within the plant itself.

In K+S' Smart Total Asset Management Programme (STAMP), customers are

Considering the vast range of parts that need servicing in any given plant, such as servo motors, the cost savings of having a close repair service can amount to milllions.

assigned a full-time, on-site account manager to serve as a one-stop facilitator and manager of all repairable assets within a specific plant.

This includes tracking all repairs, expediting when required, shipping or delivering to and from the nearby repair facility, maintaining database integrity, streamlining and stabilising procedures, generating a wide variety of reports and keeping the customer informed throughout the process. The facilitator works with the plant to establish min and max levels to ensure effective lead-time fulfillment of repairs and uptime.

When the part arrives at the repair facility, technicians conduct an evaluation to identify the probable cause of failure, and then repair and test the part per the manufacturing test procedures. After being repaired the item is tested with the associated closed loop test system for the specified duration. The part and its associated documentation are then sent back to the plant.

Proof of the success of this business model rests with the number of corporations ascribing to it. Major companies such as, Continental, GM, Fire Stone, Ford, Goodyear, GE Air, Chrysler, and UTC are current STAMP customers. K+S successfully services well over 800 manufacturers.

This success points to a very good reason why the local repair-service model should see even greater adoption by more aerospace manufacturers in the immediate future.

The long march of the Middle East titans

By Jonathan M. Berger, *Vice President – Aerospace & MRO Advisory – ICF International.*

On a recent business trip, I had a last-minute itinerary change and found myself needing to travel from Kuala Lumpur to Buenos Aires. The travel search engine came up with only a single one-stop option: Emirates via Dubai. And the price for a business-class seat was very reasonable given the three day advanced notice. Once onboard, the quality of the product was impressive; a 20" TV monitor, electric window shades, spacious fully lie flat seat – perhaps this grueling 20+ hour journey was not going to be so bad after all. The meal choices read like a fine dining menu - a myriad of options with something for all global palates. The in-flight entertainment (IFE) system boasted over 2,000 channels of movies, TV shows, music and games, on demand and in multiple languages (I was not only able to catch up on a few episodes of Mad Men, I binge watched a full three seasons!) As I changed planes in Dubai, I was directed to the business class lounge that was itself the size of most airport terminals. Throughout my subsequent connecting flight to Buenos Aires, I kept thinking to myself "how can any airline compete with this"?

I must admit, early on I was skeptical of the business models of the big three Middle East titans: Emirates, Qatar, and Etihad. I recall attending the 2003 Paris Air Show when Emirates announced the acquisition of 23 A380 and 26 Boeing 777 aircraft on top of its order for 22 A380s and 25 777's just one year prior. Etihad and Qatar made similar purchases worth billions of dollars. My business instincts could not accept the viability of three mega-carriers with hubs in small cities that are geographically so close together that it would be equivalent to the Florida cities of Miami, Tampa, and Jacksonville (or Hamburg, Berlin, and Dusseldorf) all starting their own global airlines. It just didn't add up. A decade later, it is clear that my trusted instincts failed me, as the three Middle East titans have all seen spectacular growth and become a force to be reckoned with in the highly competitive global aviation industry.

Interestingly, the three titan's business models have evolved differently as they each have carved out their own respective growth strategies. Abu Dhabi-based Etihad Airways has taken the M&A route, strategically leveraging its cost of (and access to) capital to acquire major equity holdings across a network of distressed airlines. Over the past few years, Etihad has acquired stakes in Air Berlin, Alitalia, Jet Airways, Virgin Australia, Air Serbia, and Air Seychelles to name a few. Doha-based Qatar Airways is the only titan to have joined one of the powerful global airline alliances, oneworld, which provides access to passengers and destinations aligned with partners British Airways, American Airlines, LATAM, Japan Airlines, and Cathay Pacific among others. Dubai-based Emirates Airlines with a fleet plan that includes over 140 A380s and 300 Boeing 777s has elected to go it alone. In 2014, its Dubai hub became the world's busiest international airport ahead of London's Heathrow. Emirates clearly aspires to remain the dominant carrier in the Gulf region.

While their growth strategies are clearly different, the titans do share the same core business model; leveraging their geographic location to connect Asia to the world – all on a convenient, time saving one-stop basis, utilizing the most modern aircraft, with high quality service and in-flight amenities. Given the growth of Asia's emerging economies and population, with tens of millions moving into the middle class every year, it appears that the business model is indeed sound.

Berger - Middle East titans are on a long, patient march to an airport near you.

More importantly, the titans share another key attribute – they take the long view. In hindsight, the blind spot missed by the skeptics, myself included, is the time horizon and patience that the titan's shareholders have to achieve a satisfactory financial return on invested capital (ROIC). The Gulf carriers' primary goal is to support the development of their national economies, and therefore think about ROIC in terms of decades rather than fiscal quarters. Lastly, unlike their global competitors, the Middle East titans are not just creating competitive air carriers - they are building lifestyle brands exemplified by their sponsorships of elite marquee sporting events like Formula 1 racing, professional soccer/football, and even public transport (e.g. London's "Emirates Air Line" cable car). The ubiquitous Gulf carrier branded jerseys are worn by children from virtually every youth soccer pitch from Brazil to China. And today's FC-Barcelona-jersey-wearing kids are tomorrow's potential business travelers.

As a major global aviation consultancy, my employer ICF is continually asked by the investment community if the Gulf carriers pose an existential threat to legacy European, Asian, and US airlines. My response begins with an emphatic "yes." However, before the wolves of Wall Street have a chance to liquidate their positions in the legacy carriers, I add that I also believe that legacy carriers pose an existential threat to the Gulf carriers as well. In the highly competitive global aviation battlefield, any carrier who doesn't feel threatened by their competitors and loses focus on innovation and efficiency is doomed to fail.

That said, legacy carriers possess numerous arrows in their quiver with which to compete effectively with the Middle East titans, not unlike their adaptation to the previous "existential threat" posed by the fast growing low cost carriers (LCCs). For example, never underestimate the power of home carrier frequent flyer programs. Much like

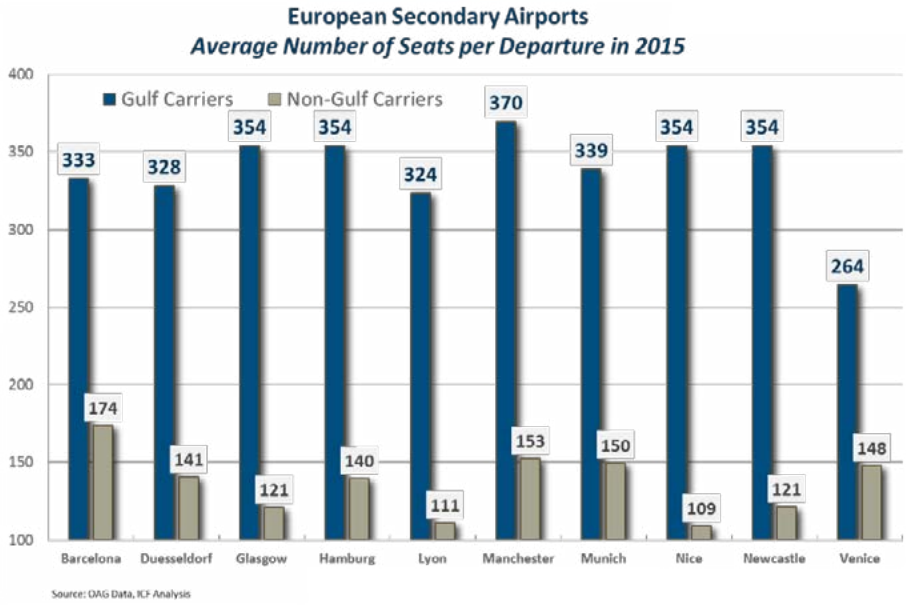
In terms of MRO, the major Middle East carriers each have forged a different path forward. *Photo: Boeing*

the face-painting sporting fan zealots blindly loyal to their hometown clubs, nationalism and the desire to achieve elite loyalty program status remain powerful airline marketing tools. In addition, legacy airlines have the ability to further grow their alliances and JVs with Asian carriers to overfly the Gulf mega-hubs.

From a competition standpoint, the titan's natural first targets were the struggling European carriers. Unlike their US counterparts, European carriers have been slow to restructure and consolidate. Further, fast growing European LCCs (e.g. Ryanair and easyJet) continue to capture ever-more market share. Now that the titans have secured a presence in most of the major European airports, it's fascinating to watch how they are deploying their newly delivered wide body aircraft. As we all know, profit margins in the airline business are razor thin, often with the sale of just one or two business class seats making difference between a flight's profit or loss. Hence it's intriguing to see the titans now targeting secondary European airports in an attempt to poach the connecting business class traveler from the national carriers. It is difficult to imagine that the cities of Manchester, England and Munich, Germany could consistently fill an A380. But much to the European national carriers chagrin, Emirates appears to have these, and other secondary airports, in their cross-hairs. According to a recent article in the Economist magazine, Lufthansa's Frankfurt hub has lost nearly a third of its market share on routes between Europe and Asia since 2005, with more than three million people now flying annually from Germany to other destinations via Gulf hubs.

With statistics like these, it's no wonder the major US carriers have banded together to file a complaint with the US Department of Transportation accusing the Gulf carriers of violating the bilateral Open-Skies agreement. The US majors are hoping to halt the titan's US expansion plans until a level playing field is achieved. Similar to the decades-long subsidy dispute between Boeing and Airbus, it seems that for the time being, the tit-for-tat accusations between the Gulf carriers and their US counterparts will continue to play out in the court of public opinion. For example, Delta Air Lines CEO Richard Anderson recently gave a speech at the Detroit Economic Club where he compared the situation of US carriers to the "unfair trading practices" that devastated the Big Three auto manufacturers in the 1980s and 1990s. Regardless of which side of this corporate drama you believe has merit, the real winners of this politically charged dispute will be the respective PR firms, lobbyists, and lawyers.

That said, a very interesting wrinkle worth noting is how Qatar Airways responds. Qatar is not



only a oneworld partner with American Airlines, but also a shareholder in IAG, whose oneworld member airlines British Airways and Iberia have, perhaps begrudgingly, publicly sided with Gulf carriers, stating that "To shield US airlines from their competitors would be to grant them the biggest subsidy of all.". Qatar has already threatened to leave the alliance, and given Emirates' successful go-it-alone strategy, there is good reason to believe that they are not bluffing.

On the MRO front, the titans each have forged a different path forward. While they leverage their volume and scale to negotiate competitive support agreements with the OEMs for engine and component maintenance, no airframe MRO has the capital required to build facilities capable of handling Emirates' wide body fleet. Therefore, Emirates had no choice but to go-it-alone for its airframe heavy maintenance requirements. Accordingly, and in classic Dubai fashion, Emirates has erected a massive complex of A380-capable hangars to perform its airframe heavy checks in-house. In contrast, Qatar has elected, at least for the time being, to outsource its airframe heavy maintenance (while also outsourcing its engines and components).

Etihad on the other hand, or more appropriately its owner Mubadala, the investment vehicle of the Government of Abu Dhabi, has charted a different MRO course. In 2006, Mubadala acquired the full service global MRO leader SR Technics and a year later assumed control of Gulf Aircraft Maintenance Company (GAMCO) that was rebranded as Abu Dhabi Aircraft Technologies (ADAT). Most recently, in 2014, the airframe heavy maintenance business of ADAT was transferred to Etihad to become Etihad Engineering. Today, Etihad relies on its in-house Etihad Engineering for airframe maintenance support, on SR Technics for the majority of its component support, and on engine OEMs and the Mubadala-owned Turbine Services & Solutions (TS&S) for engine support.

Given the growing technological complexity of maintaining new generation aircraft (e.g. A350 and Boeing 787), the transition of metal aircraft to composites, analogue instrumentation to digital avionics, and bespoke interiors and IFE systems which require the craftsmanship of a Swiss watch maker to maintain, it will be interesting to watch how Etihad's relationship with sister company SR Technics continues to evolve.

Like it or not, the Middle East titans are on a long, patient march to an airport near you - regardless of the continent where you live. And they will continue to disrupt the traditional home-court advantage enjoyed by the world's national carriers; complacency is the enemy, and innovation the solution. As a frequent international business traveler, I look forward to continue reaping the benefits brought on by the competition that Middle East airline titans are injecting into the global airline industry.

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Global Eagle Entertainment, a market-leading media and connectivity company to the travel industry, has completed the acquisitions of Western Outdoor Interactive ("WOI") and certain assets from **RMG Networks Holding Corporation**. Together these deals strengthen and increase the scope of GEE's offerings in the digital media and content services markets, providing GEE with a more integrated solution to meet the needs of the airline and maritime industries. Through the acquisition of WOI, based in Mumbai, India, GEE has expanded both its digital media development expertise and its already strong presence for apps and games to the inflight entertainment (IFE) market. WOI brings over 30 years of experience and deep relationships with leading airlines and aviation hardware providers in bringing infotainment and specialized software to the airline industry. In addition, its engineers and creative services provide design, web and app development expertise that augments GEE's already strong platform. GEE expects to realize synergies from this acquisition through customer relationships, a broader development platform and integration across its content, connectivity and digital media platforms. The second acquisition includes certain assets from RMG Networks, bolstering GEE's already strong presence for inflight advertising and sponsorship. By acquiring the rights to certain technologies and onboarding key personnel, GEE now offers airlines and advertisers a more robust foundation from which to serve advertising and sponsorship opportunities via digital media, in either a connected or offline environment, seatback screen entertainment and digital signage in airline lounges.

People On The Move

Jeremy Remacha

SR Technics (SRT) Board of Directors announced the appointment of **Jeremy Remacha**, Senior Vice President from Mubadala Development Company, the shareholder of SRT, as its interim Chief Executive Officer, taking over from **Andre Wall** who has decided to take a new opportunity in the aviation industry. Remacha and Wall have worked side by side for over six years as Remacha has played an active role in supporting the company and the Board as the Asset Manager.

Thomas Chapman

C&L Aerospace has hired **Thomas Chapman**, formerly of Gulfstream and Bombardier Aerospace, as Senior Vice President of Corporate Aircraft. In his new role, Chapman will oversee C&L's growing corporate aircraft platform featuring MRO, aircraft sales, management and charter.

Intrepid Aviation, a privately held commercial aircraft lessor, named **Gerry Aubrey** to Senior Vice President – New Aircraft Programs. Mr. Aubrey joined Intrepid in 2007 and has held a variety of roles, most recently as VP Contracts, moving over to VP Aircraft Programs last year to concentrate on new orders and building/maintaining Intrepid's relationships with OEM's.

GA Telesis UK released that **Carsten Holm** has been appointed vice president of technical services. Mr. Holm joins the company after serving as vice president – technical at Star Air, where he was responsible for all maintenance contract and lease negotiations as well as developing engine and airframe ultimate life forecasts. Prior to this position, Mr. Holm served as Star Air's director of engineering and managed engine parts purchasing and engine leasing. In his new role at GA Telesis, Mr. Holm will work in support of the company's Asset Management Group and will oversee all technical operations for its fleet of leased commercial aircraft and engines.

The Boeing Board of Directors has elected **Dennis A. Muilenburg** the company's 10th Chief Executive, succeeding **W. James McNerney,** who held the position for the past 10 years. Muilenburg, who has served as Boeing President and Chief Operating Officer since 2013, becomes President and CEO on July 1st. Muilenburg is a 30-year company veteran. Along with Boeing Commercial Airplanes President and CEO **Raymond L. Conner**, he also has served since 2013 as Company Vice Chairman.

Dennis A. Muilenburg