ISSUE 1, VOLUME 12: FEBRUARY - APRIL 2020

ARABIAN AEROSPACE

THE MAGAZINE FOR AEROSPACE PROFESSIONALS IN THE MIDDLE EAST, NORTH AFRICA AND TURKEY

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End of an era as Sir Tim calls it a day

he news that Sir Tim Clark is to retire from his role as president of Emirates

Airline is noteworthy. With almost half a lifetime spent in the service of the Dubai carrier. it is well worth recognising the incredible impact he - and his multinational multicultural team - has played in changing the face of intercontinental aviation.

I remember him from his time at Gulf Air almost 40 years ago. He moved to Dubai in 1985 with a small group of colleagues for the start of the adventure to begin the amazing Emirates story, a start-up with two 'borrowed' aircraft from Pakistan.

Expatriate managers are sometimes accused of just dropping in for a fast financial reward but Sir Tim, with his incredibly

close relationship with the airline's chairman and chief executive. Sheikh Ahmed bin Saeed Al Maktoum, saw a team put together for the long game.

Now, as Emirates is established as one of the most respected airlines in the world, carrying more international passengers and undoubtedly setting the standards for passenger comfort, as well as firmly putting Dubai on the map and creating a global brand, Sir Tim will retire – although he is expected to



continue to act as an advisor and a sounding board for the airline and its management team.

I am sure the whole industry will join me in saluting this knight of the airline business and wish his successor the very best of luck in filling some very big shoes.

The region is also preparing itself for the next leg of its event season.

The very successful Dubai Airshow in November set the scene with a number of interesting developments and aircraft selection by the region's carriers.

Kuwait had its event just a few weeks back in January and, soon, Abu Dhabi will be hosting the **Global** Aerospace Summit, where some of the industry's top players will take to the stage to help shape the sector's future. This is an amazing

event and certainly one I am looking forward to.

The dates have also been set for the Aviation MENA summit, which will take place in June. I have a vested interest in this one as I shall be chairing the summit and look forward to talking on stage to some of the region's top CEOs.

I hope you will be there to see it.

Safe landings. Alan Peaford, editor-in-chief

COVER: SaudiGulf Airlines chief executive Abdulmohsen Jonaid. PICTURE: BILLYPIX

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usiness brief



Etihad launches heavyweight cargo control centre

Etihad Cargo has launched a state-of-the-art cargo control centre (CCC) at its head office in Abu Dhabi.

Launching a year after Etihad Cargo embarked on a far-reaching digital transformation strategy, the CCC is now the nerve centre for real-time monitoring, tracking and active management of all shipments, flights, and UAE road feeder services. It should enhance Etihad Cargo's delivery-as-planned (DAP) promise to its customers.

"The CCC shifts our modus-operandi from a historically reactive model to a truly proactive service delivery machine that strives to support customers' needs in every step of their shipment journey," said Andre Blech, head of operations and delivery at Etihad Cargo.

MAXimum safety

Boeing is recommending 737 MAX simulator training, in addition to computer-based training, for all MAX pilots prior to return to service of the 737 MAX.

Interim Boeing CEO, Greg Smith, said: "This recommendation takes into account our unstinting commitment to the safe return of service, as well as changes to the aircraft and test results. Final determination will be established by the regulators.

"Safety is Boeing's top priority. Public, customer and stakeholder confidence in the 737 MAX is critically important to us and, with that focus, Boeing has decided to recommend MAX simulator training combined with computerbased training for all pilots prior to returning the MAX safely to service."

Istanbul simulator

Alsim has sold an AL 250 flight simulator to Istanbul Flight Academy (IFA).

Firat Kose, CEO of Plus IFA said: "I chose the AL250 simulator after checking out the different products available on the market. I tested the simulator and was really impressed with the graphics and the real-life scenario options. "The positive experience from my team with Alsim's simulators, as well as the trustworthy company's reputation in Europe and the Far East markets, definitely convinced me to go for it."

Aden makeover

The Saudi Development and Reconstruction Program for Yemen (SDRPY) has launched phase I of a project to rehabilitate and upgrade Aden International Airport.

The airport will undergo full modernisation and expansion. For the first time, it will become a nonstop hub for international and domestic flights. "Laying down the first building blocks of development and strategic projects for Aden International Airport will contribute significantly to raising the standards of the airport and the quality of services available to the travellers and airlines," said Saleh Salim bin Nahid, president of the General Authority for Civil Aviation and Meteorology.

Blades of glory

Inmarsat has launched SwiftBroadband Helo (SB-Helo) X-Stream, a new system specifically developed for rotary aircraft. The tailor-made solution is designed to achieve advanced streaming performance on intermediate and high-gain antennas, alleviating the connectivity constraints traditionally caused by rotary blades.

Based on testing conducted last year, the helicopter-grade SB-Helo X-Stream service has been proven to achieve a 40% reduction in data packet loss compared to the standard background IP service, as well as delivering throughputs of up to 400kbps per single channel. Multiple channels can be aggregated, enabling enhancements in the overall performance of the system.

Punctual Etihad

Etihad Airways has been ranked as the most punctual airline in the Middle East and one of the best in the world by the global aviation analytics group, OAG.

OAG listed Etihad as the only Middle Eastern carrier in its top 20, ranking the UAE airline 17th among all full-service and low-cost operators.

On-time performance is defined by OAG as a flight departing or arriving within 15 minutes of its scheduled time – a standard measure within the airline industry, taking into account the large range of variable factors that can affect operations.



Airbus rolls out touchscreen cockpits

Airbus has begun deliveries of the first A350s equipped with pioneering new touchscreen cockpit displays. Specially developed for the A350 together with Thales, they will confer enhanced operational efficiencies, greater crew interaction, cockpit symmetry and smoother information management.

To date, around 20 airlines have selected the option for their new A350s.

Of the A350 cockpit's six large screens, three can now become touch-capable – the two outer displays plus the lower-centre display. These displays now offer touchscreen capability for the pilots when presenting electronic flight bag (EFB) applications.

This new method of input complements the existing physical keyboard integrated into the retractable table in front of each pilot and also the keyboard & trackball 'keyboard-cursor control unit' (KCCU) located on the centre console.

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Vertis adds G5000

Switzerland-headquartered Vertis Aviation is strengthening its ultra-longrange charter offering with the introduction of a Bombardier Global 5000 to its charter portfolio.

The latest addition to the Vertis charter management programme (VCMP) will be marketed exclusively for charter through the international Vertis network, including the Middle East.

Vertis COO, Catherine Buchanan, said: "There has been a distinct change in market behaviour as charter demand for business airliners has shifted to the large-cabin, long-range jets. The high levels of comfort, connectivity, and flexible performance capabilities, make these aircraft types a great alternative."

Cruising ahead

Emirates' first remote check-in terminal, away from the airport, has been launched to provide easy connections for cruise passengers.

The check-in counters, located at Port Rashid, will allow passengers disembarking from their cruise ships to check in for their onward Emirates flight at the same facility.

Mohammed Mattar, of Emirates Airport Services, said: "We are committed to provide a seamless and

Gulfstream's G500 delivery milestone

Gulfstream Aerospace had delivered more than 25 Gulfstream G500 aircraft to customers by the end of 2019 – a little more than a year after the aircraft entered service.

The aircraft's first delivery to a Brazilian customer had also taken place.

"When the first all-new G500 was delivered in September 2018, we knew customers were receiving a mature aircraft

hassle-free travel journey for our customers. With the increasing popularity of Dubai as a cruise tourism destination, we have ensured that every touchpoint in our customer journey for this important traveller segment is thoughtfully served."

Miles better

Etihad Airways has relaunched its loyalty programme, Etihad Guest.

The redesigned and upgraded reward scheme now offers its members significantly enhanced benefits, including members being able to pay with Etihad 'guest miles' for more travel ancillaries, using either their miles or a combination of miles and cash. The ancillaries include economy space, extra baggage and insurance.

Upgrades and related services, such as excess baggage and taxes, will also be available with miles.

Diamond deal

Oman Aviation Academy has signed a contract with Diamond Aircraft for the purchase of eight aircraft – including six single-engine DA40 NG and two twinengine DA42-VI – with an option to add 16 more. backed by Gulfstream's record of delivering on its promises," said Mark Burns, president, Gulfstream.

"Thanks to the research and development behind the G500, one of the most rigorous and robust flight-test regimens we've ever undertaken, and Gulfstream's advanced manufacturing, we are getting these amazing aircraft to customers with proven performance capabilities."

Abdullah Murad Al Bulushi, CEO, Oman Aviation Academy, said: "Our vision is to make OAA the future hub for aviation training in the region. This can only be achieved by providing the highest quality of training and using the best equipment. Therefore, we selected Diamond's DA40 NG and DA42-VI. because they are equipped with state-of-the-art technology and are recognised globally as one of the best aircraft types for pilot training."

Deliveries of the first aircraft will start in the very near future.

Spatial contract

Ras Al Khaimah-based Spatial has been selected by Cheongju University to manufacture an A320 door trainer for use by Aero K, a new South Korean ultra-lowcost-carrier (ULCC) due to begin operations from Cheongju International Airport in 2020.

The state-of-the-art door trainer will enable the airline's cabin crew to become completely proficient in the safe operation of A320 aircraft emergency exits and doors, including procedures for normal, abnormal and emergency scenarios.

Gulf Air receives Dream delivery

Gulf Air received its seventh Boeing 787-9 Dreamliner at Bahrain International Airport in its special 70th anniversary livery, which showcases the airline's vintage design from the last century with a revamped look.

The new aircraft featured the Golden Falcon Lockheed TriStar livery, representing Gulf Air's iconic design from the 1970s.

With the arrival of the aircraft, Gulf Air also revealed its 70th anniversary logo, which will be used in the airline's marketing and promotional campaigns in 2020.



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Carbon decrease

IATA has published information confirming that carbon emissions per passenger have declined by more than 50% since 1990.

Much of the improvement has occurred because the industry has achieved an annual fuel efficiency improvement of 2.3% over the period since 2009 – some 0.8 percentage points ahead of target.

The progress is a combination of investments in more efficient aircraft and operational efficiencies.

"From 2020, we will cap net emissions. And, by 2050, we will cut emissions to half 2005 levels," said Alexandre de Juniac, IATA's director general and CEO.

Whale of a time...

The BelugaXL has entered into service, providing Airbus with 30% extra transport capacity in order to support the on-going production ramp-up of commercial aircraft programmes.

The aircraft, which is an integral part of Airbus' industrial system, made its first operational flight on January 9.

The aircraft is the first of six BelugaXLs to begin work alongside the BelugaST predecessors, with the additional aircraft being introduced between 2020 and 2023.

...Beluga power

The Rolls-Royce Trent 700 engine has received certification to power the Airbus BelugaXL.

Adair Swan, Rolls-Royce, Trent 700 programme director, Civil Aerospace, said: "Certification marks another milestone in an incredible Trent 700 journey. We are very proud that the engine will power what will be a deeply loved aircraft, supporting the delivery of parts to Airbus' assembly lines in Europe."



Jet Aviation's new 600sqm facility within the shared FBO terminal at Riyadh's King Khalid International Airport is being re-designed and enhanced for customer comfort.

The company expects the newly refurbished facility to be operational in the next few weeks. Jet Aviation currently operates the largest FBO network in the Middle East. "We look forward to moving to our newly refurbished FBO," said Khaled Al-Ghamdi, general manager of Jet Aviation in Saudi Arabia. "The more spacious facility is designed to accommodate future traffic volume increases in Riyadh, while continuing to ensure the highest safety, comfort and design standards."



DHL Express invests \$99m at Abu Dhabi

Abu Dhabi Airports Free Zone Authority (ADAFZ) has signed a 27-year agreement with Middle East General Enterprises (MGE) to facilitate the presence of DHL Express.

DHL Express will serve as a key client within ADAFZ's express integrator cluster and, in close collaboration with MGE, will invest up to AED 365 million (\$99m) in the new facility. The DHL expansion will cover 30,000sqm and aims to be operational by the fourth quarter of 2021.

Sheikh Mohammad Bin Hamad Bin Tahnoon Al Nahyan, chairman of Abu Dhabi Airports, said: "This signing is a testament to Abu Dhabi's position as an international gateway for trade and commerce throughout the Middle East, as well as the long-standing relationship between Abu Dhabi Airports and DHL. E-commerce in transforming the retail landscape throughout the region."

Bahrain upgrade

The Bahrain Ministry of Transportation and Telecommunications' (MTT) and the Civil Aviation Authority (CAA) have selected Frequentis to modernise the Bahrain International Airport voice communication infrastructure.

The area control centre (ACC) and airport towers will be equipped with the latest Frequentis VCS3020X, replacing the existing Frequentis system, which has been in use by MTT for more than 15 years.

The airport is the nation's gateway, managing more than 100,000 flight movements per year, supporting in excess of eight million passengers.

Gender agenda

Pegasus Airlines CEO and IATA board member, Mehmet T Nane, has signed a pledge for the company as part of the voluntary '25by2025' campaign for IATA member airlines. This aims to improve female representation in senior or under-represented roles by 25%, or up to a minimum of 25%, by 2025.

Nane said: "Gender equality is a very important and ongoing issue for us. By signing IATA's '25by2025' initiative, we are now pledging to improve gender balance in our workplace. We are proud to be among the first airlines in the world to have taken this pledge."

Joramco boost

Joramco, the Amman based MRO and the engineering arm of Dubai Aerospace Enterprise (DAE), has extended its UAE GCAA approval to include the Boeing 777 and the Airbus A320neo aircraft types.

Joramco CEO, Jeff Wilkinson, said: "The addition of these aircraft types to our GCAA approval is part of our strategic roadmap to enrich our capabilities and is completely in line with the vision of our majority owner, DAE."











Oman MRO deal

Rolls-Royce and Oman Air have agreed a five-year contract for engine maintenance, repair and overhaul services for eight Trent 700-powered Airbus A330 aircraft.

The agreement will see Rolls-Royce provide Oman's national carrier with its flagship TotalCare long-term aftercare service solution, which is designed to provide predictive maintenance planning and maximise aircraft availability.

Abdulaziz Al Raisi, CEO Oman Air, said: "We have a long-standing relationship with Rolls-Royce, and I am delighted to extend it by selecting TotalCare for the engine servicing of our Trent 700-powered A330s.

Baghdad support

Serco Middle East has been awarded an extension of its air traffic control services to continue providing support on the ground for the General Company for Air Navigation Services (GCANS) at Baghdad Airport.

Serco will continue to provide operational support and on-the-job training instruction, including the certification training and examiner duties, looking at area, approach and tower control.

Serco's remit also includes management mentorship programmes in safety, quality assurance and air traffic control training, along

Strata and Leonardo strengthen cooperation



Sign here: Ismail Ali Abdulla and Giancarlo Schisano put pen to paper.

with management support to all areas of air navigation services.

Tunisair lay-offs

Tunisair is reportedly preparing to lay off 1,200 workers to ease the financial difficulties that have led to flight delays and the grounding of aircraft due to lack of spare parts.

Tunisair has a fleet of 30 aircraft, employs a staff of 8,000 people, and is a stateowned company

Chief executive, Elyess Mankabi, told Reuters, Tunisair is suffering from major financial difficulties because of the high number of workers and its wage bill. "We've proposed to lay off 1,200 workers and we await the government's approval for this programme, which will help us get out of this crisis," he is reported to have said.

Suite success

CAE and Emirates have announced the sale of two Boeing 777X full-flight simulators and associated training suites of the CAE XR series models. The carrier also has options for four additional training suites.

Security boost

Bahrain Airport Company (BAC), the operator and managing body of Bahrain International Airport (BIA), has signed an agreement with Gulf Aviation Academy (GAA) to provide civil aviation security training to hundreds of airport-stationed Ministry Strata Manufacturing (Strata) and Leonardo have extended their 10-year association by signing a memorandum of understanding (MoU) to collaborate on the development and fabrication of composite aero-structure components for major OEM programmes.

The agreement will see Strata and Leonardo work to expand their presence in the global aero-structures sector by leveraging their collective engineering experience and production capabilities to spearhead new technology development.

"Strata's main goal is to ensure that the company delivers high-quality components to the world, reflecting the value of the 'Made with Pride in UAE' brand," said Ismail Ali Abdulla, CEO of Strata.

Giancarlo Schisano, Leonardo's aerostructures division managing director, said: "Our engineering capabilities and advanced technology processes will be a key success factor to capture new business opportunities in a win-win cooperation scheme.

of Interior (MOI) personnel each year.

The officials, who will serve in airport police and customs roles, will be needed to accommodate the expanded security requirements at the airport's new passenger terminal.

Fired up to help

Emirates has announced it will be donating 10% of all EmiratesRED sales on every flight from January 17 until February 16 and matching this dollar-for-dollar in an effort to help alleviate the devastation caused by the recent fires raging across Australia.

The proceeds will go towards the recovery and rebuilding efforts taking place in the communities affected.

Dnata shares coup

Dnata, has signed an agreement to purchase the remaining 50% of its UK inflight catering joint-venture, Alpha LSG, from the LSG Group. The acquisition expands Dubai-based Dnata's international portfolio, and will make it the sole shareholder of the biggest in-flight catering, on-board retail and logistics company in the UK. The transaction is now subject to regulatory approval.

Batkin steps up

Güçlü Batkın has been appointed chief executive officer of Turkish airports company TAV Operation Services. He has taken various management roles at TAV Airports since 2005.

Tunisair Express fleet is boosted with arrival of first ATR 72-600

ATR has delivered the first of three ATR 72-600 aircraft to Tunisair Express. The Tunisian airline will use these aircraft to renew its regional fleet, providing passengers with essential connectivity, both domestically and internationally.

The latest generation ATR 72-600 burns 40% less fuel and emits 40% less CO2 compared to a similarly sized regional jet.

Tunisair Express director general, Yosr Chouari, said: "We are looking forward to introducing this new ATR aircraft with the latest comfort and technology to our passengers, with this first delivery marking an important step in our fleet renewal. Regional aviation provides essential connectivity for Tunisia and the unbeatable economics of the ATR 72-600, together with the best cabin, make it perfect for both our domestic and international operations."



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SaudiGulf Airlines chief executive, Abdulmohsen Jonaid, tells Martin Rivers that the boutique carrier is laying the foundations for a bigger, brighter future.

Jonaid's private thoughts...

SaudiGulf Airlines, a boutique carrier based in Dammam in eastern Saudi Arabia, has only a modest slice of the kingdom's fast-expanding aviation market.

Owners, Al-Qahtani Group, a family-run conglomerate, undoubtedly hoped to spread their wings faster when they were granted an operating licence in 2016.

But, for chief executive, Abdulmohsen Jonaid, who joined the airline after heading up Saudia, the country's much larger flag-carrier, quality is more important than quantity at this stage of SaudiGulf's development.

"There is a small statement that we use in the company," he said. "What we've been doing for the past three years is putting down a very strong foundation. Our statement is that we can use this foundation to build a skyscraper.

"If the stakeholders want to bring 100 aircraft now, we can take that – at any moment – because we have the systems in place. We can take the challenge, we can see it through, and we can operate safely and in a very efficient and optimised fashion."

Tough market conditions

Jonaid's confidence echoes that of his predecessor, Samer Majali, who told *Arabian Aerospace* in 2017 that Al-Qahtani Group's investment could support an "operation several times the size of what it is today". However, tough market conditions have not helped either chief executive make the most of those capabilities.

The airline's current network centres on a primary hub in Dammam, with spokes extending to four domestic cities (Abha, Jeddah, Medina and Riyadh), plus four points in Pakistan (Islamabad, Karachi, Lahore and Sialkot).

Scheduled flights are also operated from Riyadh to Jeddah; Amman in Jordan; and Dubai in the UAE.

Oversupply is the main stumbling block to growth, with two other new airlines – Flyadeal, a low-cost subsidiary of Saudia; and Nesma Airlines, a regional carrier based in the north – entering the market around the same time as SaudiGulf.

Alongside fleet expansion by both the flagcarrier and Flynas, the country's second largest airline, this glut in capacity has hit profitability across the sector.

"Our five-year business plan was put together at a time when the assumptions were significantly different," Jonaid admitted. "So, what we're doing is we're revisiting our business plan, going more towards a transformation plan. And I think the time is right. We have three solid years of understanding and data and knowledge to revamp our business plan.

"Three years as a private company, with no subsidies, has given us a lot of insight – real insight – into behaviour; into the way things have changed."

Jonaid tacitly acknowledged that the airline is loss-making at an operational level but said Al-Qahtani Group is "determined to make sure it stays alive and prospers".

Asked how to achieve that, he added: "It can't be anything except growth. If you don't grow, you get eaten alive."

Expansion will get under way this year with the delivery of three brand new A320neos in February, March and June – all drawn from the order-books of supplying lessors. Management are also working to source another three A320s or A321s on the secondary market.

That could, potentially, lift the narrow-body fleet to 12 aircraft, though it is likely that two wet-leased units currently deployed on the Pakistani routes will be withdrawn.

Jonaid did not outline delivery targets for 2021 or 2022, but the company has previously said it aims to grow "at the rate of six to eight aircraft annually".

Any older units sourced in the near future will likely start being phased out in 2023, when a direct order with Airbus for 10 A320neos comes on-stream. The commitment includes options for another 10 units, plus the ability to convert to A321neos.

Although board member, Abdalmalik Al-Qahtani, has set his sights on a fleet of 70 aircraft by 2026, Jonaid restricted himself to a shorterterm forecast of 20.

That would mean SaudiGulf remains a minnow in the local aviation sector: at the time of writing, Saudia had 147 passenger aircraft in service plus firm orders for 65 more; Flynas operated a 32-strong fleet with 71 firm orders; and Flyadeal deployed 14 aircraft with plans to take 30 units from Saudia's backlog.

Small size is not necessarily a problem for SaudiGulf, given its positioning as a boutique carrier. It consistently achieves the highest customer satisfaction rating of any airline in the kingdom, distinguishing its service with leather seats, in-flight entertainment (IFE) systems and complimentary hot meals.

However, with market-wide pressure on yields showing no sign of abating, Jonaid is looking for ways to balance this high-end service with better economics.

Economy-only layout

Customers will notice one compromise when the A320neos arrive in Dammam this year: all three units have been configured in an economy-only layout. That contrasts with the airline's existing four owned A320s, which feature a "BusinessFirst" cabin with 16 seats.

"We're not abandoning the full-service model that we have," Jonaid stressed, pointing to the IFE systems and generous seat pitches on the new aircraft.

"We will be adjusting. We are repositioning. We know that we have managed to identify routes that will sustain this boutique product, and around that we're building for, let's say, not 'low-cost' but 'smart boutique'."

As well as refining its cabin configurations, SaudiGulf is paying close attention to the government's Vision 2030 plan – a macroeconomic initiative that aims to reduce Saudi Arabia's dependence on oil in favour of developing other public service sectors.

Religious tourism is a cornerstone of the plan, with officials aiming to attract 30 million Umrah pilgrims from abroad by 2030 – triple the

SAUDI ARABIA

number that visited during the last season.

"The opportunities that Vision 2030 is actually bringing can take away a lot of the negatives," Jonaid predicted. "The government has done its part. This vision has put things in perspective. And now it's really for the investors, the entrepreneurs to actually move forward and take advantage."

Encouraged by the liberalisation of the Umrah visa regime, SaudiGulf will be playing its part in bringing more pilgrims to the kingdom.

The airline is preparing to add narrow-body

charter flights from Medina and Jeddah (near Mecca) to the Iraqi cities of Baghdad, Erbil and Sulaymaniyah. Civil unrest in the country delayed a planned launch last year, but Jonaid insisted the flights are "definitely" going ahead.

Religious charters to Pakistan are also being targeted for 2020, with management planning to dry lease an A330 in order to maximise loads.

The decision to source an Airbus wide-body might raise evebrows given SaudiGulf's wellpublicised memorandum of understanding

Three years as a private company, with no subsidies. has given us a lot of insight - real insight - into behaviour, into the way things have changed. 🔊 ABDULMOHSEN JONAID

(MoU) with Boeing, which covers up to 16787s and 777s. Majali had predicted that eight of those units would be firmed up in 2018 with deliveries starting in 2021 - but little has been heard of the deal since.

Understandably, Jonaid kept his cards close to his chest when talking about the MoU, saying only: "These discussions are ongoing. We are meeting with Boeing continuously."

He was more forthright about the fate of SaudiGulf's founding order for 16 A220-300s originally marketed as Bombardier CSeries CS300s. Although the commitment is still listed in Airbus' order and delivery report, he confirmed it has now been "dropped completely".

Asked about scheduled network development, Jonaid said Cairo in Egypt and Khartoum in Sudan are still front of the pack for new services as the fleet grows.

Legitimate target

Europe is also a "legitimate target" further down the road, with the chief executive hinting at possible route launches to London Gatwick and Milan from 2023 onwards. However, despite calling the UK a "must" for SaudiGulf's longterm vision, he said market conditions will need to be evaluated closer to the time.

British Airways became the third European network carrier to serve Dammam in December, when it added daily flights from its London Heathrow hub via Bahrain.

Amid stiff competition at home and abroad, SaudiGulf's management team is playing the long-game with a conservative growth trajectory and an unwavering focus on safety and customer service.

Though progress has been slower than expected, the strategy gives Al-Qahtani Group the best possible chance of securing its future in Saudi Arabia's lucrative skies.

"One thing that we cannot escape is the mandate from our chairman, Sheikh Tariq Al-Qahtani, to ensure that we deliver good service," Jonaid concluded. "His belief is that the Saudi public deserves good service."



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AIR TRANSPORT

LOW-COST CARRIERS



Progressive Jaz...

Kuwaiti hybrid carrier, Jazeera Airways, foresees a list of potential new long-haul destinations in the coming years as it takes delivery of Airbus A320neos. **Alan Dron** *found out more from CEO, Rohit Ramachandran.*

ondon's airports see plenty of daily arrivals from the Middle East but, until last October, none had taken the form of a single-aisle airliner operated by a lowcost carrier.

Kuwait's Jazeera Airways was the airline involved, using the longer range of its new Airbus A320neo to create what it says is the world's longest scheduled service for the A320's new-generation model.

The service into London Gatwick is, nevertheless, close to the A320neo's maximum range and Jazeera has to accept a 12-passenger payload penalty to reach the UK airport. However, it has succeeded in 'monetising' this handicap by blocking off the middle seats of rows and selling those on either side of them as premium economy, giving their occupants extra elbow room.

Other new destinations taking advantage of the neo's range are to the east of the Gulf – Chittagong (Bangladesh), Kathmandu (Nepal) and Osh (Kyrgyzstan).

Closer to home, new destinations include Dammam and Abha in Saudi Arabia, plus Al Ain in the UAE. The latter is "a very good, empty airport and we have tremendous support from the Government of Abu Dhabi to operate in there", said Ramachandran.

As Jazeera's route network expands, it is increasing its fleet correspondingly. In 2018, it had seven A320s. By the end of 2019, that had risen to 13; 16 are expected by late 2020 and there could be 23 by 2022.

"It's significant growth, but we don't want to make the same mistake as some of our friends in the region, who placed large orders [for aircraft] and now don't know what to do with them," said Ramachandran. "We prefer to be half an aircraft short rather than have half of one extra."

Neos are starting to replace the earlier A320s as the leases on the latter expire, with four neos scheduled to be in service as *Arabian Aerospace* was going to press. Given the steady increase in passenger numbers, something a little larger may be required. The company is in what the CEO describes as "early discussions" with Airbus over taking A321neos, but these will be for the medium term.



 We prefer to be half an aircraft short rather than have half of one extra.
ROHIT RAMACHANDRAN "If they do join our fleet, it won't be before 2023 at the earliest. We've had offers from lessors for long-range (LR) models from 2020 onwards, but we believe we have to exploit routes closer to home before we can do justice to these long-range aircraft."

Jazeera has a strong home market. "Kuwaitis have the highest propensity to travel among the Gulf Cooperation Council nations," he noted and, combined with high salaries, this means that yields are relatively high compared to elsewhere in the region.

Jazeera has been adept at tapping into the digital realm to increase its sales. Kuwaitis, said Ramachandran, welcome technology, and "a shade less than 50%" of the company's ticket sales are now online. By contrast, some major carriers in the region still sell only a single-digit percentage over the internet, as opposed to more traditional means, such as travel agents.

There remains, however, the problem of over-capacity. Ramachandran noted that there are no fewer than 11 daily flights into Kuwait from the UAE, while a full-service airline from the region operates six daily services into the emirate – one of them using an Airbus A380.

Is there enough business to justify this scale of servicing? "Certainly not. But if you have aircraft sitting on the ground, you need to fly them."

Maximising the use of its aircraft assets is obviously essential to bring extra revenue, so Jazeera has outsourced the management of its belly hold capacity to World Cargo Solutions (WCS).

"Cargo is never going to be the first priority for a lowcost carrier; our overwhelming focus is on passengers. But every flight has 1.5 to 2 tonnes of payload available." WCS now has responsibility for filling that underfloor space and pays Jazeera for the privilege, bringing in an additional revenue stream.

With London being a favourite leisure and shopping destination for Kuwaitis, and many of the emirate's young people studying in the UK, the flights to Gatwick could soon be full below-deck, as well as above it.





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raditionally, airlines grow by expanding their route network. However, Kuwait Airways' CEO, Kamil Al-Awadhi, believes that it will be more important to focus on increasing frequencies on those routes that are guaranteed to make a profit.

"We are at a crossroads right now," he said. "Our original plan asks for depth and to only go for breadth if you have really good justification; if you're going to make a lot of money. There may be a reduction in destinations and more focus on the depth part of it in 2020, even though we're getting more aircraft.

"I'm not going to operate a route just to break even," he added. "It's a waste of time, energy and resources."

Kuwait Airways' current fleet consists of 10 Airbus A320ceos, five A330-200s and 10 Boeing 777-300ERs, with most of these aircraft being the result of a wave of new arrivals around five years ago. A second re-fleeting exercise is under way, with 15 A320neos, five A350-900s and eight A330-800s on order.

The re-engined A320neos will replace the previous generation A320ceos and Al-Awadhi said there is "a very high probability" that at least seven of the neos will be upgraded to the larger A321neo version. A decision on this is likely to have been taken by the time this issue of *Arabian Aerospace* appears.

The A321's greater capacity brings down the seat-cost of the flight, helping Kuwait Airways compete against low-cost carriers, said the CEO.

Delivery delays

Like most airlines, Kuwait Airways has suffered from delivery delays at Airbus and received only three of the five A320neo deliveries planned for last year. The problems with the CFM International LEAP engine have been welldocumented. Al-Awadhi , however, is looking on the bright side of choosing the US-French engine: "Thank God we did, because Pratt & Whitney have even bigger problems."

However, as the existing A320s – which are all leased – come to the end of their contracts, they will be steadily replaced by the A320neos. This year, three ceos will give way to neos.

Some eyebrows were raised in the industry when the airline opted for the A330-800, which has not proved popular in the marketplace. However, Kuwait Airways believes that the aircraft's long range and capacity makes it a good stepping stone as routes mature.

Once demand on a route starts to outgrow the capacity of an A320, previously the route would have been taken over by the Boeing 777-300ER.

Kuwait Airways is undergoing a second major wave of aircraft replacements and looking at ways to handle its increasing passenger numbers. Alan Dron reports.

KUWAIT AT THE CROSSROADS...

However, that is so much larger than the A320 that load factors dropped dramatically.

Instead, if the A321 is chosen and once the A330-800 starts to enter service, the airline has a more graduated capacity gradient that can handle increasing passenger demand. "It allows me to grow the market without having a high load factor to compensate for the operating cost," said Al-Awadhi. "And its range is incredible."

The company is mulling over the possibility of putting the A330-800 on the New York run: "That would be a very, very cost-effective flight."

The airline has to be nimble in its scheduling, said the CEO. It receives projected loads seven days, three days and 24 hours before a flight operates. If, for example, it becomes apparent seven days before a flight to Beirut that the planned A320 is already full, the aircraft can be swapped for larger equipment.

The company is now studying its fleet mix; it is still relatively small and it is possible that, with the arrival of the A330-800s and A350-900s, it will have too many types. Where does that leave the Boeings?

Al-Awadhi would only say that the company was studying its options for the 777-300ERs and, more generally, the mix of types in the fleet. The US aircraft are highly popular with passengers and, unusually, are still outfitted with the original, roomier nine-abreast economy-class cabin, rather than the 10-abreast more frequently used today. However, they are expensive to operate.

Behind the scenes, one factor that has dogged Kuwait Airways for the past decade has been the on-off-on question of whether the state-owned airline should be privatised. The issue has been raised several times by the emirate's government or members of its parliament. The effect has been to stifle the company's activities, as everyone waits to see how the issue will play out. The subject has been raised again recently, but Al-Awadhi believed that it was unlikely that it would succeed. Kuwait's politicians are split virtually 50-50 on the issue.

The airline is still loss-making. Overall revenues in 2018, the last year for which figures are available, were estimated at KD 330 million (\$1.09 billion), up from KD 298 million in 2017. If revenue and cost figures continue to follow their present trajectories, the airline is targeting break-even in 2024.

Too many staff

One major cost is the number of personnel – considerably more than would be normal in a European or North American carrier. "We do have too many staff," admitted the CEO, but there were several reasons for this.

One is that Kuwait Airways employs many people – such as ground-handling, security, baggage-handlers and cleaning staff – who would usually be outsourced in other airlines. Another is that a new generation of staff is being trained up: "I'm rotating out the staff that are over 60," said Al-Awadhi, "and I need an overlap period where I bring in new staff.

"Plus, I had prepared for five additional aircraft this year. The staff are plugged-and-played and ready to go: it's just the aircraft that didn't make it."

Although aircraft deliveries were behind the curve last year, Kuwait Airways' operational performance was well ahead of it. One reason for this was Kuwait International Airport's Terminal 4, which the airline built so its own passengers could escape the congestion in the main terminal.

"We're expecting 4.7 million passengers in our own terminal this year. I think that's probably already pushing it to its limits. Next year's target is 5.5 million."

To make maximum use of its own terminal, Al-

KUWAIT



 I'm not going to operate a route just to break even.
It's a waste of time,
energy and resources.

Awadhi and his team are looking at rescheduling some flights: "The way our waves operate now, the number of passengers are far in excess of the capacity of the airport. I have a team right now working on rethinking the schedule to optimise flow so I don't have too many aircraft on the ground at the same time."

A new main terminal "is supposed to be available in 2023; if I had to make a guess, I would say 2025. If that's the case, I have to re-think what we're doing with Terminal 4, because by that point [passenger] numbers will be around 7 million."

For the moment, however, Terminal 4 has helped improve the utilisation of aircraft and staff: "Because your aircraft are all parked next to each other, distances are shorter and the transfer of staff and equipment from aircraft to aircraft is much easier.

"In general, our overall performance has improved dramatically. Before I took over, our average on-time performance (OTP) was 57%. Last year, we were above 90%, month over month. We're the best Arab airline for OTP."

Might the dedicated terminal be extended? "That's one of the options on the table. Should we extend it? If we do, it will be at our own expense.

"I have to convince the government if there is enough return on investment to do this because, obviously, it's going to take time to do it and if we're moving in five years' time to a new terminal, is it worth the investment?"

Sometimes, of course, even the most meticulous plans cannot take account of nature. In November 2018, heavy rain flooded the airport: "It locked in six or eight of my aircraft; I couldn't get half my fleet out of the terminal. It caused four days of disruption."

As it approaches that crossroads, the airline will be hoping that the road ahead is not blocked by something as unpredictable as the weather.

AIR TRANSPORT

DE JUNIAC: WHY WE MUST TACKLE

IATA director-general and CEO, Alexandre de Juniac, took advantage of the Arab Air Carriers Organization (AACO) annual meeting to voice his views on a series of topics, including airspace, infrastructure and security in the region. He spoke to Alan Dron.

he two main challenges we face in this region are the geopolitical uncertainty, with restrictions on airspace, wars and conflicts," according to IATA director-general and CEO, Alexandre de Juniac.

"It's a big problem. It restricts the attractiveness and effectiveness of airlines in the region," he added.

A major problem in the Gulf for several years has been constricted airspace, with the area's militaries blocking off large areas of airspace for their own purposes. "I see no progress on airspace," said de Juniac.

If anything, the situation had worsened with the diplomatic stand-off between Qatar, on one side, and its neighbours, Saudi Arabia, Bahrain and the UAE, on the other. "The blocked-off Qatari airspace has not eased the situation."

This was all the more disappointing given the investment that several states had put into easing the log-jam in the air lanes above the Gulf, especially over the UAE.

Ideally, he said, the situation would have been solved under the authority of the Gulf Cooperation Council, which incorporates the six nations on the

western side of the Gulf, but this had been eroded as a result of the row between the countries.

While airspace is a continuing problem, "the region has done well on airports. Airport capacity is at the right level, compared to some SE Asian centres that are far more congested."

Perhaps the most significant issue facing the airline industry is the increasingly urgent need to reduce emissions of greenhouse gases. At present, the schedule mapped out by ICAO, the United Nations' aviation body, calls for absolute quantities of emissions to be cut to 50% of 2005 levels, but only by 2050. This has been heavily criticised as "too little, too late" by environmental campaigners.

Ambitious targets

"We're working on that, to see whether or not it's possible to have more ambitious targets," said de Juniac. "We don't want to set targets that are not achievable. This industry is serious. When we make a commitment, we stick to our commitment."

However, he said that the proposed ICAO reduction was certainly not negligible:



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REGION'S AIR BLOCK

"Reducing our carbon emissions by 50% in 2050 compared to 2005, when you take into account the growth in traffic, is an incredible target." While there were some scientific and industry issues yet to be solved: "We think we will make it."

A major factor in achieving that target will be through the use of sustainable aviation fuels (SAF) that create significantly lower emissions than fossil fuels. At present, the quantities of SAF being produced are only around 0.1% of the airline industry's needs. Several producers are racing to scale up production, but will they ever be large enough to make a significant difference to the quantities of emissions produced by airliners? De Juniac believes so, if certain conditions are met.

"Provided governments help us, first of all in developing mass production and then to develop efficient distribution networks."

That governmental support should include incentivising SAFs, but not imposing taxes for allegedly green reasons. "When governments have put on taxes, they've failed; when they've incentivised renewable energy, it has worked." That could take the form of subsidising SAFs, or investing in the technology to produce them.

Almost invariably, taxes that have been announced for supposedly environmental reasons go straight into the general tax pool and not into environmental measures; national treasuries like having the additional revenue stream but hate the idea of ring-fencing it for a particular purpose.

Those fuels will be needed. Like most observers, de Juniac believes that practical hybrid-electric-powered airliners in the 50-seater class will take 10-15 years to materialise and that it will be two decades before fully electrical aircraft appear: "Before that, forget it."

IATA has been pushing the idea of 'One ID', with a single token – possibly a biometric document – replacing passports, identity cards and boarding cards. Asked if this would mean passengers having to hand over more personal information, with the inevitable risk of security breaches, he agreed that this was a fair point but "When we question passengers, 75-80% would be ready to give some data to airlines or government agencies to ease their journey on the ground."



Alexandre de Juniac: "I see no progress on [constricted] airspace."

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AIR TRANSPORT



HOW YEMENIA FLIES IN THE FACE OF WAR

For four years, Yemen Airways has attempted to keep services running during the country's civil war. The company's chairman, Ahmed Masood Alwani, explained to Alan Dron how it's been done. e have a lot of problems, but we're OK." So said Yemen Airways' chairman, Captain Ahmed Masood Alwani, when asked how his company has coped with more than four years of strife in its homeland.

The war has raged over the entire country, making it impossible at times for the airline to fly from the capital, Sana'a, and the southern commercial centre of Aden.

At present, Yemen Airways has five aircraft in its inventory. "Two are old-generation Airbus A310s that are difficult to maintain because of spares etc, so they are grounded," said Alwani. One is parked in Aden, the other in Cairo: "We have to phase them out this year." The three operational aircraft are A320s.

Remarkably, given the ferocity of the fighting over the past four years, none of the airline's fleet has been damaged by military action. This is partly due to the fact that the company has moved its main operating bases to Cairo and Amman, rather than keeping the aircraft in Yemen.

"However, Aden airport was severely damaged by fighting and, at one point, was closed for three months, with our ground equipment heavily damaged," said the chairman.

Yemen Airways continues to operate daily flights to Aden from the Egyptian capital and three times weekly from Amman. It also operates five times a week between Aden



Ahmed Masood Alwani: "As Yemen Airways, we are working for the Yemeni people." Above: The company currently operates three Airbus A320s and hopes to pick up another on the used aircraft market.

and Jeddah, as well as fortnightly to Riyadh and Khartoum, and weekly to Mumbai. Additionally, it operates daily from the central Yemeni city of Seiyun to Cairo, as well as twice weekly to Jeddah and weekly to Amman.

Many passengers, especially those flying to Cairo and Mumbai, are travelling for medical treatment. Others simply want to get out of Yemen for a while, to have a break from the tension. And, with large numbers of Yemenis resident elsewhere in the Gulf and the US, there is a constant flow of people visiting family in their native country.

Providing services into Yemen is made more difficult as the company does not have a fixed schedule. Its operations depend on permission given to it on a daily basis. Services in and out of Yemen are limited to a 10-hour daily window, between 06.00 and 16.00.

Yemen Airways can sometimes obtain extensions to this window, but it makes operating a schedule extremely difficult.

Sense of duty

Keeping the airline flying has been entirely due to the efforts of staff and their sense of duty in maintaining links to the outside world, said Alwani: "As Yemen Airways, we are working for the Yemeni people."

No other airline has been willing to take the risk of flying into Yemen during the conflict. This means that the carrier's staff have felt the weight of responsibility in keeping open links to the outside world.

"We accept the risk and continue," said Alwani. "We accept the risk and the benefit of the risk."

The continuing conflict makes it difficult for the airline to renew its fleet. It has an agreement with Airbus for 10 A320s; it has taken two, but the remaining eight are outstanding.

"We have an agreement with Airbus, but with this war we cannot commit ourselves to continue. We can't finance new aircraft," said the chairman. Instead, Yemen Airways is looking at the used aircraft market and plans to acquire another A320.

Keeping the existing fleet in the air would be even more difficult if the company did not have a pool agreement for spares with the German airline, Lufthansa.

Alwani and his team can only hope that a peace agreement will be signed soon. Until then, they will ensure that Yemen Airways remains a lifeline to the outside world.

YEMEN / EGYPT

New domestic services, new branding and – hopefully – new aircraft will make 2020 a significant year for FlyEgypt, its CEO tells Alan Dron.

A brand new way forward for FlyEgypt

t's not only major airlines that have suffered from the grounding of Boeing's 737 MAX. Small Egyptian hybrid carrier, FlyEgypt, was on course to take the first two of an order for four MAX 8s in time for summer season 2019 when the latest model of Boeing's popular single-aisle jet was grounded in March 2019.

That was a major problem for FlyEgypt's CEO, Captain Ehab El Tahtawi, and his team. A "very promising" summer 2019 season had been in prospect, with contracts having been signed with several European tour operators for flights to Egypt's holiday destinations.

"In March 2019, everything went in the wrong direction, as you know," Tahtawi said. "We've been suffering actually."

The sudden loss of planned capacity required FlyEgypt to renegotiate agreements with European customers and to shrink operations for the season. However, with goodwill on both sides, some contracts were halted, others deferred until this year.

Assuming that the MAX returns to service as anticipated (it was being mooted at the time of writing), Tahtawi is hopeful that the first two new aircraft will arrive in Q2 this year, although he is not yet sure when the second pair will appear: "We're still in talks with the lessors," he explained.

The airline's current fleet consists of five Boeing 737-800s, plus two of the smaller -700 variant. The introduction of the MAXs will probably be the last additions until after the airline's current medium-term plan ends in 2024.

FlyEgypt's network is an unusual blend of 70% charter flights from Europe plus 30% scheduled services. The charter sector offers considerable opportunities, as Tahtawi estimated that only 8 to 10% of holidaymakers heading to Egypt are carried by the country's airlines.

This is more than double the figure of five years ago, when only 3% of tourists were carried by Egyptian airlines, but still leaves considerable potential for expansion. Tahtawi believes that Egyptian companies' lower cost bases make them competitive with European rivals when carrying tourists to Egypt.

Since its origin in 2015, FlyEgypt has expanded swiftly. In its first year of operation, it carried 90,000 passengers. In 2018, that had risen to 750,000 and last year, despite the problems, the airline looked likely to "join the one million club", as Tahtawi put it.

Those numbers are set to grow further this year, as the airline has now launched a domestic route network, with flights from Cairo to five Egyptian destinations.

Fresh look: The company's Nubian traditions, is seen

"Launching the domestic network has been a key component of our long-term growth plans, and we're very excited to be finally seeing this milestone come to life," he said as he announced the new services in late October. "Not only is it important for us as an airline, but we believe that it helps support tourism and rural employment, which are both critical for Egypt's national economy."

FlyEgypt will operate scheduled services from Cairo International Airport to Hurghada, Sharm El Sheikh, Marsa Alam, Luxor and Aswan. "We'll be building up our domestic capacity early this year," added chief commercial officer Karim Baky.

The launch of the new domestic network was a major factor behind the decision to rebrand the airline, just five years after its launch.

"Originally, we were only transporting Europeans to Egypt," explained Tahtawi.

"It was a brand that was known in Europe, but not in Egypt. Now we're approaching Egyptian customers, we wanted to have a fresh livery."

The company has chosen a combination of colours and arcs, reminiscent of Nubian culture, that will be immediately familiar to domestic passengers.

The company will offer both an economy and premium economy option on its domestic flights, a reflection of its positioning as a hybrid carrier.

"We're not a pure low-cost carrier," Tahtawi said. "We don't sell each and every service." Additionally, FlyEgypt is taking under its own control certain services that a low-cost carrier would outsource, such as its own ground-handling, which it discovered it could do more economically than paying EgyptAir for the service.

So, 2020 holds the promise that 2019 did a year ago. All FlyEgypt needs now is those MAXs.



new livery, which draws from here on one of the two Boeing 737-700s in the fleet.

Captain Ehab El Tahtawi: "Launching the domestic network has been a key component of our long-term growth plans."

AIR TRANSPORT

The low-cost market in the Middle East, already simmering gently with recent arrivals such as Flyadeal and SalamAir, will soon have a new player. Alan Dron reports.



India Spices up UAE's LCC

longside the recent news that both Sharjah-based Air Arabia and Hungary's Wizz Air plan to set up new low-cost carriers (LCCs) in Abu Dhabi, fastgrowing Indian LCC, SpiceJet, aims to create a new hub at Ras Al Khaimah International Airport (RAKIA).

New Delhi-based SpiceJet initially plans to base Boeing 737s in the UAE's most northerly emirate, before setting up a separate airline there. It is likely to use 737 MAXs when the model returns to service.

The new airline, which is expected to be owned 49% by SpiceJet and 51% by a local partner, then plans to fly to European destinations, both to bring tourists to RAK, but also to use the emirate as a connecting hub for passengers between India and Europe.

RAKIA's CEO, Sanjay Khanna, detailed the airline's plans. "There are three steps in development that will happen. Firstly, SpiceJet will connect RAK to New Delhi immediately; secondly, a SpiceJet team is already working with our team to file for an air operator's certificate (AOC) from the UAE; and, thirdly, they have aspirations to have direct connectivity to Europe. We have a lot of tourists from Europe."

That tourism is expanding, notably from Europe and the CIS. RAK attracted more than one million holidaymakers in 2018 and a new target market this year is the Nordic nations.



Upping capacity: The airport is scheduled to make significant increases to its passenger capacity.

"RAK is growing, not only in tourism, but also on the business side. There are a lot of businesses opening and investing here, and that's increasing. More than 3,400 Indians have invested in RAK. That gives SpiceJet a big captive audience," said Khanna.

SpiceJet, India's second-largest airline, "will initially start with two 737s, but is thinking of basing five, plus two freighters", added Khanna.

RAKIA already has a relationship with SpiceJet in the cargo sector; since the start of 2019, the Indian carrier has operated around 85 flights into the airport using dedicated 737 freighters. "It wants to create a hub here from India to Africa," he explained. The initial cargo services have mainly involved live animal shipments of sheep and goats to RAK, but the airport is also working with freight consolidators to expand the airline's loads into other types of cargo. Unlike some other Gulf airports, the relatively lightly used RAKIA has no slot constraints, adding to its attractions as a base.

These factors all make RAK "a very apt location for making a hub".

RAKIA does not publish information on the number of passengers it can handle annually, but Khanna said that considerable refurbishment has been carried out on the airport's airside. "We are now in the process of a two-phase project to increase capacity in passenger-handling."

LOW-COST CARRIERS

Hotting up: RAK International Airport is currently home to an Air Arabia presence. SpiceJet's arrival will bring a second low-cost carrier to the northern emirate.



market

This plan will initially consist of

refurbishment of the existing terminal that will boost capacity by two million during the course of 2020. In 2021, work will start on a new terminal that will have an annual capacity of four to five million passengers. Construction will take 24 to 36 months.

RAKIA, of course, is already home to an Air Arabia presence, with two Airbus A320s based there.

The Sharjah-based LCC was designated as RAK's national carrier after the 2014 demise of RAK Airways.

Business as normal

Asked at the Arab Air Carriers Organization annual meeting in Kuwait about SpiceJet's arrival, Air Arabia's CEO, Adel Ali, was relaxed at the prospect. "For us, it's the status quo. We'll continue with business as normal."

Khanna described the incumbent airline as "a most resourceful and valuable partner" but added: "We need to continue to build our airport and routes, based on the business and tourism requirements of RAK. Air Arabia favours a lot of destinations in the Middle East and surrounding region. Both these airlines, we hope, will complement each other."

There seems little doubt that low-cost competition in the region is about to heat up further.

FLYDUBAI GOING 'ABOVE AND BEYOND' AFTER RUSSIAN TRAGEDY

Dubai hybrid carrier, Flydubai, has introduced a number of precautionary measures to go above and beyond international standards following the fatal crash of its flight FS981 at Rostov-on-Don in Russia three years ago, writes Alan Peaford.

Reacting to the release of the final report by Russia's interstate aviation committee (IAC) in November, the airline released a statement acknowledging its conclusions and recommendations.

It said it was fully compliant with all regulatory requirements at the time of the accident and that it took its obligations "seriously" and had implemented "a number" of precautionary measures since 2016.

"The airline made proactive operational enhancements to both simulator and classroom training to reinforce awareness and enhance understanding of spatial disorientation," the statement reads.

"Furthermore, Flydubai made additions to the manufacturer's standard operating procedures and manuals. All pilots have been trained on these enhancements, which exceed regulatory requirements."

The IAC investigation said that the Boeing 737-800 had flown from Dubai to Rostov on March 19, 2016, but was unable to land due to harsh weather conditions. After the second attempt to land, also not successful, the aircraft was expected to head to another airport. However, during the second go-around, it hit the ground, killing all seven crew and 55 passengers on board.

In its final report, the IAC said the main conclusion was incorrect aircraft configuration and crew piloting, which resulted in the pilot in command losing situational awareness and running the aircraft into the ground.



Ghaith Al Ghaith: CEO praised in the immediate aftermath of the crash.

Eight of the 26 safety improvement

recommendations outlined in the final report were addressed to the airline. The report said Flydubai's own operating manual lacked instructions of the manoeuvre type specification at the go-around callout. The first officer also did not recognise the captain's psychological incapacitation in time, the report said.

Flydubai and its CEO, Ghaith Al Ghaith, were praised in the immediate aftermath of the crash and in the intervening three years have settled the majority of claims.

"Flydubai's aim has always been to fairly compensate those who have been affected by the loss of loved ones following the accident involving FS 981," the airline's statement reads. "We recognise this is a poignant moment for the families and our long-term care team remains available for as long as they need."

ABU DHABI POISED FOR TWO NEW LCCS

Two new low-cost carriers (LCC) are expected to be slugging it out from Abu Dhabi this year, opening up more options for travellers, writes *Marcelle Nethersole*.

In October, Etihad and Air Arabia announced that they would launch Air Arabia Abu Dhabi, which will operate from Abu Dhabi International Airport.

Tony Douglas, group chief executive officer, Etihad Aviation Group, said: "Abu Dhabi is a thriving cultural hub with a clear economic vision built on sustainability and diversification. With the emirate's diverse attractions and hospitality offerings, travel and tourism play a vital role in the economic growth of the capital and the UAE. By partnering with Air Arabia and launching Abu Dhabi's first low-cost carrier, we are serving this long-term vision."

Adel Al Ali, group chief executive officer, Air Arabia, said: "Home to the first low-cost carrier in the MENA region, the UAE has developed over the years to become a world-leading travel and tourism hub. We are thrilled to partner with Etihad to establish Air Arabia Abu Dhabi, which will further serve the



Adel Al Ali: "We are thrilled to partner with Etihad to establish Air Arabia Abu Dhabi."

locally and regionally, while capitalising on the expertise that Air Arabia and Etihad will be providing." The two UAE airlines have yet to

growing low-cost travel segment

share the launch date or the destinations for the new carrier.

Meanwhile, Air Arabia Abu Dhabi could be beaten to the LCC punch by Wizz Air, which recently announced it plans to establish a subsidiary airline in the emirate – Wizz Air Abu Dhabi – in the second quarter of this year.

The Hungarian airliner's service into the emirate could signal a huge increase of European visitors into the Middle East market.

The subsidiary airline, which will be 51% Abu Dhabi-owned, will have a fleet of three new Airbus SE A321neos, increasing to 50 aircraft over 10 years.

Wizz Air CEO, József Váradi, said: "Wizz Air Abu Dhabi will be an incremental path of growth for Wizz Air, built on our successful ultra-low-cost business model, bringing affordable travel to ever more customers. We believe the new airline has the potential to be a significant player in the region. "

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TRAINING

More capability: More than 250 new fighters have been ordered by air forces in the Middle East region, with Bahrain signing up for 16 Lockheed Martin F-16 Block 70s. PICTURE: LOCKHEED MARTIN.

New aircraft... now the race is on to train enough people

Alan Warnes looks at air forces throughout the Middle East and explains why personnel training has now become an urgent priority for many of them. uring the latter stages of the last decade, many Middle Eastern air forces bought big, with the focus on multirole fighters. The full package saw more than 250 new combat aircraft contracted with governments in France, Italy, the UK and the US.

Bahrain (16 Lockheed Martin F-16 Block 70s), Egypt (36 Dassault Rafales), Kuwait (28 Eurofighter Typhoons and 28 Boeing F/A-18E/F Super Hornets), Qatar (24 Eurofighter Typhoons, 36 Dassault Rafales, 36 Boeing F-15QAs) and Saudi Arabia (48 Eurofighter Typhoons), are all aware of the increased threats from outside forces.

For Bahrain, Kuwait and, particularly, Qatar, the acquisition of these new jets is stretching the skills of their training planners. None currently have the numbers of aircrews and ground personnel to cope with such a large influx of new aircraft, with the situation exacerbated by the small populations.

The threat from Iran and its state-sponsored terrorism are the biggest security concerns in the Middle East, as the Tehran government fights a number of proxy wars in Iraq, Syria and Lebanon. The killing of the commander of Al Quds,

General Qasem Soleimani, by a US Army MQ-9B Reaper in Baghdad on January 3, and the subsequent political and military fall-out that it brought, has highlighted the size of the threat, if we ever needed it.

Tehran has, for many years now, been seeking more Iranian influence by supporting militias in the Middle East.

Major General (Ret) Khaled Al Bu Ainnan Al Mazrouel, who formerly commanded the UAE Air Force and Air Defense, told me at the Dubai International Air Chiefs Conference in November: "Iran's menace has risen in recent years and its policy now is to fight proxy wars, not with its own military, but with the likes of Hezbollah and the Houthis. Iran is transferring high-tech capabilities to these militias and training them."

Any war with Iran would see the US working with its allies in the region. Interoperability in the Middle East

has come a long way since the first

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DEFENCE

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Gulf War in 1991 and these new fighters and tactics will play a significant role, although right now that might be too early for most of them.

Remodelling its fighter fleets has meant a large investment into the training of personnel associated with flying these new aircraft – not just pilots and weapons system operators but ground crews too.

The air force commanders would have had to ensure they had enough resources to train the increased number of young pilots for the new fighter programmes.

The Royal Bahraini Air Force (RBAF) commander, Major General Hamad bin Abdullah al Khalifa, acknowledged the need in November 2018, six months after a deal had been done for 16 Lockheed Martin F-16C/D Block 70s. "The selection process is now under way; we started preparing for the arrival of the new F-16s two years ago," he explained.

In July 2018, the Bahraini Government signed a \$2.18 billion foreign military sales (FMS) deal with its US counterpart for 14 new Block 70 F-16Cs and two dual-seat F-16Ds and their support. The commander is looking forward to their arrival in 2022. "These new F-16s will add to our current capability and will be integrated with the assets of other allied air forces," he said.

Baulked at the \$1.1 billion price

Lockheed Martin had aspirations to upgrade the RBAF's existing 20 F-16C/Ds to a similar standard as the new Block 70s, known as the F-16V. But the RBAF baulked at the \$1.1 billion price. "Our priorities lie with the 16 new Block 70s. Our current fleet has been modernised to a very high standard and [the aircraft] are extremely capable until the Block 70s arrive. What happens after that we don't yet know." said al Khalifa.

Not too surprisingly, there has been an increase in the number of pilots being recruited to cope with the doubling of the F-16 fleets.

Although the RBAF does operate three Slingsby T-67M Firefly basic training aircraft, they are regularly grounded, which meant a more reliable option was needed. This led to RBAF student pilots being sent to the UAE (Sheikh Khalifa bin Zayed Air College Flying Training School at Al Ain), or Saudi Arabia (King Faisal Air Academy at Riyadh-King Khaled Air Base) or Egypt (Air Force Academy at Bilbeis Air Base).

Students coming from Egypt fly the Grob 115s and then the Hongdu K-8 Korakoram before heading back to the RBAF's Isa Air Base to fly the F-5s and then progress to the F-16s. However, those coming from Saudi or the UAE will only have flown turboprop PC-7s and PC-21s before heading back to Bahrain to fly the BAE Hawks and the Hawk simulator at Isa Air Base, then progressing to the F-5 and the F-16.

It's unclear why the RBAF prefers its pilots training in Egypt to progress to the K-8s.

At least one F-16 and one F-5 pilot have been sent to the US to work with the new F-16s, which boast the new AN/APG-83 radar.



Above: A UK RAF Typhoon FGR 4 flies in formation with a QEAF Mirage 2000-5 on November 26, 2017, during a deployment to Al Udeid Air Base, Qatar. The QEAF is set to receive the first of its 24 Typhoons in 2021. PICTURE: MOD CROWN COPYRIGHT/SGT NEIL BRYDEN.

Top right: The QEAF has purchased eight Super Mushshaks, the Royal Saudi Air Force is expected to upgrade its fleet with Garmin glass cockpits, while Oman is already operating eight aircraft. PICTURE: ALAN WARNES.

Right: The Leonardo T-346A has been used for lead-in fighter training at Lecce-Galatina with the Italian Air Force 61 Stormo. PICTURE: LEONARDO.

The Bahrain Ambassador to the US, Abdullah bin Rashed Al Khalifa, paid a visit to the new F-16 production line at Greenville in South Carolina on December 17, where the first F-16 Block 70 is now being built and should be delivered in 2021.

Egypt signed a €5.2 billion (\$5.77bn) deal with the French Government in February 2015 for 24 Dassault Rafales (16 two-seat DMs and eight single-seat EMs), which led to Egyptian Air Force (EAF) pilots being sent to Istres Air Base, near Marseille, to be trained.

The first three dual-seat DMs were subsequently delivered in July 2015 with EAF instructor pilots on board, who are now training the new batches of pilots coming from Mirage 2000s and F-16s.

It is unclear if there are any ab-initio pilots coming straight from the academy yet.

First combat mission

The Rafales flew their first combat mission in May 2018 and, in March 2019, Rafales from both the French Air Force and Egyptian Air Force were involved in their first joint exercise, indicating that the aircraft and their crews were now fully operational.

Another 12 Rafales were subsequently ordered in January 2019.

Egypt, which operates one of the biggest F-16 fleets, currently appears none-too-keen to acquire more US fighters because of the many conditions imposed on sales and the threat of possible sanctions.

It has, however, also acquired up to 24 Sukhoi Su-35s and 50 MiG-35s, although interoperability with the GCC countries and the US will, obviously, be a problem.

The Kuwait Air Force (KAF) has 28 Eurofighter Typhoons and 28 F/A-18E/F Super Hornets on order.

The €8 billion (\$9 billion) deal for Typhoons was signed on April 5, 2016, for 22 single-seat and six twin-seat aircraft. An intergovernmental agreement between Kuwait and Italy's Leonardo also includes three years of logistics and operational support, plus training of an initial eight Kuwait Air Force instructor pilots, together with ground personnel. Delivery of the first aircraft is expected in September this year.

With no training aircraft because the Shorts Tucano and BAE Hawks have been grounded for several years, despite offers by BAE Systems to get them airworthy, KAF pilots have been sent to the likes of France, Italy, Pakistan and the UK.

The Italian Air Force's 61 Stormo (wing) at Lecce-Galatina has been training KAF student pilots in recent years on both the MB 339 (Phase II/III) and Leonardo T-346A (Phase IV), with 17 cadets flying the latter in the lead-in fighter training (LIFT) course.

With an eye on the Middle East market, which Leonardo believes has a requirement for 150-200 advanced jet trainers between 2019-2028, the Italian company has teamed up with the Italian Air Force to launch the International Flight Training School (IFTS). Set to open in 2021, IFTS will offer the new Leonardo T-345 lightweight trainer to assume the roles of the elderly MB339s at Lecce-Galatina, while the T-346s currently there will move out to Deci, Sardinia.

TRAINING



Currently, 61 Stormo works with an impressive M345/346 integrated training system concept at Lecce, where ground-based training systems (GBTS), like the real-time monitoring system (RTMS), are linked up to a full mission simulator (FMS), flight-training device (FTD) and a mission planning/debriefing system (MPDS). The instructor operating station (IOS) is linked to them all and is able to inject different scenarios into the training flights.

Ability to connect

What makes the whole system more valuable is the ability to connect everyone working in the GBTS with the M345 and/or M346 in the air via the live virtual constructive (LVC) and embedded tactical training system (ETTS) network.

The KAF agreed a foreign military sale (FMS) worth \$1.16bn with the US Government in early 2018 for 28 Boeing F/A-18E/F Block III Super Hornets to replace its F/A-18C/D Hornets.

To train pilots, Kuwait has ordered two tactical operational flight-trainers (TOFTs) – one legacy system modified for the Super Hornet and one new unit. Boeing will provide training for an initial batch of 26 pilots.

The first TOFT will be delivered to a US location to support initial aircrew training, which is scheduled to begin in the first quarter of 2021.

The first aircraft are expected to be delivered in 2022.

Qatar has bought the biggest number of new fighters – 24 Eurofighter Typhoons from BAE Systems, 36 Dassault Rafales and 36 Boeing F-15QA – and undoubtedly faces the biggest headache over pilot training.

After signing the £5 billion deal for 24 Eurofighter Typhoons on September 17, 2017, the UK Royal Air Force (RAF) re-established No 12 Squadron on July 24, 2018 as a joint Qatar Air Force-RAF Typhoon training unit at RAF Coningsby.

RAF personnel will train Qatar Emiri Air Force (QEAF) aircrews and ground personnel, up to the Typhoons being delivered in 2022.

Six RAF/1 Squadron Typhoons deployed to Al Udeid Air Base in late November as part of Exercise Epic Skies III, which finished on December 19, 2019. The deployment provided personnel from 12 Squadron with the chance to develop a closer working relationship, ahead of the first QEAF flight crews joining the unit early this year.

The QEAF is also set to acquire nine Hawk advanced jet trainers (AJTs), which should be delivered in 2021. It seems a low number of AJTs for a fighter fleet that will balloon from 12 jet fighters (Mirage 2000-5EDA/DDAs) to 96, and it is likely more will follow at some point. The Leonardo M346 was evaluated by the QEAF in November 2018.

An original €6.3 billion (\$7.8 billion) order for 24 Rafales, including six dual-seaters, was signed on May 4 2015, and included weapons and training provision. Dassault carried out the latter at Istres Air Base.

An additional 12 Rafale fighter order was signed off on March 27, 2017. The first five of the 24 Rafales were officially handed over at Dunhon Air Base on June 4, 2019.

It is unclear if the French Air Force will opt to work the same way as the RAF. Neither the French Air Force or Dassault responded to requests for more information.

Boeing announced on June 14, 2017, that the QEAF was set to purchase 36 Boeing F-15QA (Qatar advanced) Strike Eagles, a variant of the F-15E tailored to Qatari requirements. The \$12 billion deal, which was updated with a \$6.2 billion undefined contract, also includes USbased lead-in-fighter-training for the F-15QAs.

Boeing expects to start delivering the 36 F-15QAs in March 2021 through to early 2023, but if options for another 36 are exercised it would stretch production by a further three years to 2026.

In late August, the US Department of Defense (DoD) announced a \$500 million contract had been awarded to begin training of QEAF pilots and maintainers on the F-15QA in St Louis, Missouri. This will continue into next year, when training will relocate to Qatar and run to August 2026.

Qualified flying instructors

Qatar decided to step up its pilot training with the acquisition of eight Super Mushshaks for primary flying training, which were delivered in two batches of four by the end of 2018. The Pakistan Air Force positioned technical and operational teams, including qualified flying instructors, at the Air Force Academy at Al Udeid to conduct, supervise and carry out all the functions and services required.

The 260hp Super Mushshak is already flown in the region by the Royal Saudi Air Force (20) and Royal Air Force of Oman (8) to fulfil primary training roles.

The eight QEAF Super Mushaks have taken some of the training away from the 24 Pilatus PC-21s for cost reasons, and there is speculation that there will be a follow-on order for eight more.

Meanwhile the Royal Saudi Air Force is looking at upgrading its Super Mushshaks with new Garmin glass cockpits.

The Saudis have a big enough fighter force to be able to handle the induction of another 48 Typhoons, and the training needs are being handled by BAE Systems, a major player in the desert kingdom.

A second batch of 22 Hawk Mk 165 advanced jet trainers was announced in February 2015 to augment the 22 already delivered and the 55 Pilatus PC-21s flying at the RSAF's King Faisal Air Academy. he new company is a commercial entity, wholly owned by the Government of Abu Dhabi, established to develop disruptive solutions for defence and beyond.

Its stated aim is to bring innovative technologies and services to market with greater speed and efficiency, and with a priority on national security.

It is doing this by consolidating more than 25 existing companies, including subsidiaries from the Emirates Defence Industries Company (EDIC), Emirates Advanced Investments Group (EAIG), Tawazun Holding, and other independent organisations.

The new group already employs more than 12,000 people and enjoys an annual revenue of \$5 billion, offering expertise in five core clusters – platforms and systems; missiles and weapons; cyber defence; electronic warfare and intelligence; and mission support.

His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, inaugurated the company in front of an invited audience of CEOs, VIPs and international media.

Proven expertise

Edge is led by His Excellency Faisal Al Bannai, CEO and managing director, who has proven expertise in both start-up companies and emerging technologies.

Al Bannai was the founder of Axiom Telecom, a \$2.2 billion company established in 1997, that is today official regional distributor for some of the most prominent electronic consumer brands in the world. He was also founder and managing director of DarkMatter Group, an international cyber security organisation.

Speaking at the Edge launch, he said: "We have consolidated these companies in order to deliver a few key objectives. One is to help the UAE achieve national sovereignty on critical defence solutions, and to be able to protect itself; two, is to be an anchor piece of the UAE's strategy of moving to a Edge, a new UAE-based defence and technology company, launched in Abu Dhabi on November 5 with a suitably explosive, bigh-tech and bigh-profile reveal. Jill Stockbridge reports.

World-class start-up gives UAE nationals the Edge...

knowledge economy, so we are ready for the last barrel of oil coming out of the country.

"We will play a pivotal role in building local capability, which will be able to bring UAE nationals into the advanced tech sector, and also attract the brightest minds from around the world.

"The third objective is to build a national organisation that can play on the world stage when it comes to advanced technology, and be an exporter in this domain. By pulling all of these companies under one roof we give it critical mass, we give it focus and we give it the ability to be able to plan much more strategically, rather than in small silos or businesses."

The component companies have been taken from a number of different entities in the emirates, either wholly government-owned or joint ventures. The goal is to accelerate the research and development of new technologies by eliminating duplication, sharing knowledge and increasing specialisation. Al Bannai explained: "As a general philosophy, our strategy in bringing all of these companies under one roof, and by grouping them into their specialised domains, is to help the CEOs and the cluster heads to better synergise how to leverage all the capabilities we have. So, if entity A has X capability and entity B has Z capability, rather than trying to duplicate similar efforts, we look at how we can make them more specialised. The aim is to leverage everyone's capabilities to dramatically accelerate our capability growth, and that is one of the key strategies to be implemented among the clusters."

While Al Bannai acknowledged that procurement in the defence sector is often slow and bureaucratic, he feels that this is changing within the UAE, and even in older defence markets, due to the influence of advanced technology.

He emphasised he would be concentrating on
TECHNOLOGY



what he can influence and finding new ways to speed development of defence technologies.

"For sure, procurement is a big hurdle globally in this industry. I think, as a country, we are determined to dramatically accelerate the decision process," he said.

"The key is what are we going to do and what is in our hands as a company? There will be many technologies that we need to create from scratch and many that we have to develop, but we can also look to the fast-moving commercial world.

"Recently, products that are commercially available and cost less than \$10,000, were bought, assembled, and used to attack one of the largest oil developments in this region [Saudi Aramco] and affect the global economy. I mention this because, as an organisation, we will be ultra-productive in finding commercial solutions already available that we can take in. We will releverage what is out there, and not reinvent things. "The commercial world moves fast compared to the large defence industry, and we want to adopt a lot of that mind-set in how we go about developing and delivering products. We can complain about how long the customer takes to do things, but the industry itself also has to fix how it delivers its products."

This speed and agility is something Edge values highly and hopes to benefit from, being a new company in a young country, but with some serious foundations.

Al Bannai said: "Normally, when you are a very large organisation, you have a lot of bureaucracy and red tape in terms of how you move and how you operate, especially in the defence sector. We are benefitting from having a reasonable critical mass, with the size of the business today, but it is also a newly formed group, with the mind-set of a start-up – a mind-set that is saying, we need to shape ourselves to create a new type of a defence company, a new type of advanced tech • We will play a pivotal role in building local capability, which will be able to bring UAE nationals into the advanced tech sector, and also attract the brightest minds from around the world.

organisation.

"We are now exploring every opportunity worthy of investment. We have already formulated a good deal of our strategy and, during this year, we will press harder on these initiatives.

"You will shortly start hearing about a number of developments we are putting in place in the region. I can't say exactly where we will be in a year or so from now, but we are definitely looking to dramatically grow the capability and the size of this organisation."

Al Bannai believes that growth will happen organically and he is looking to use the synergies between the companies to increase the range of products available, and improve the group's capability to fulfil customer requirements. Growth by acquisition or joint venture is also possible, but only if the right opportunity presents itself.

Overall strategic plan

He added: "I think that, instead of a goal by itself, it really depends on how everything fits as part of our overall strategic plan, and whether it can either accelerate our capability build or really add to the performance."

There is a major focus on expansion into the space industry in the UAE and, while not a core strategy, Al Bannai believes that there will be a natural overlap with Edge capabilities.

He said: "Today, there is a whole organisation focused on our space exploration and missions. I am sure in the future, with the technologies Edge is evolving, the capabilities it is developing, and the talent that is being built when it comes to advanced technology, there will be a lot of areas where the country will leverage multiple resources to achieve multiple goals. So, wherever there are areas that we can support that mission, wherever there are areas we are needed to help explore that, we will. These are all national goals and all of us are available to achieve capabilities that we want to achieve as a nation."





Successes:

AAAT comprises a talented workforce of both Saudi Nationals and Expatriate personnel. All have long standing experience working in Saudi Arabia and the Middle East.

We are contracted to support the Saudi Military at their principal aircrew medical facility in the Eastern province of Saudi Arabia as part of a five year agreement. This partnership arrangement has been ongoing since 2007.

The Company have recently secured a new equipment contract to provide the latest generation Spatial Disorientation training device.

Adams Advanced Aero Technology Company (AAAT) have been working with our Saudi partner since 2007. From our very beginnings we have procured, installed and continue to maintain a multitude of aircrew training devices in use by the Saudi military. The long standing partnership with our Customers and our understanding of their needs has been instrumental in enabling us to develop our business. We have modelled our future growth on the projects we have delivered to date and are looking to expand further in the region. We continue to look for international partners who can provide aeromedical and aircrew training equipment that may be offered to other regional Clients. Of course the full support of our Suppliers and Contractors ensures we can provide the best possible solutions and services.

Spatial Disorientation

Following a protracted negotiation period Adams Advanced Aero Technology have been awarded a contract to supply a bespoke spatial disorientation training device (plus facility) to a branch of the Saudi Military. This equipment will be delivered and installed in May 2021. Following commissioning AAAT will continue to maintain this device on behalf of our Customer.

Spatial disorientation is the cause of an ever increasing number of avoidable military and civil fixed and rotary wing flying accidents. Statistics show that around 20% of military (USAF class A mishaps) and around 10% of all general aviation accidents are due to spatial disorientation, and 90% of these accidents are fatal.



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DEFENCE

TRAINERS

TACTICAL TEXANS FIT TUNISIA TO A T

The US State Department has approved a possible \$234 million foreign military sale (FMS) of 12 Textron Aviation Beechcraft T-6C Texan II trainers to Tunisia. Jon Lake reports.

he US Defense Security Cooperation Agency (DSCA) delivered the required certification notifying Congress of the possible sale on October 10 last year. It said that the proposed sale was intended to provide a replacement for "Tunisia's aging trainer fleet" and explained that it would allow the country to continue to train pilots for counter-terrorism and border security missions.

The Al Quwwat al-Jawwiya al-Jamahiriyah At'Tunisia (Tunisian Air Force) currently operates a number of different aircraft types in the training role, and several of these also have an operational role.

The air force uses the Siai-Marchetti SF-260 as its basic trainer, though these are also used in the light utility and liaison roles and some can be armed for counter-insurgency (COIN) and light attack missions.

The air force received nine Siai-Marchetti SF-260CTs and 12 SF-260WT Warriors between 1974 and 1978; the Warriors having underwing hardpoints allowing them to be armed, if required. About 18 SF-260s remain in use with Nos 13 and 14 Squadrons at Sfax-Thyna, with the SF-260WTs being concentrated within No13 Squadron.

Tunisian student pilots then move on to the jet-powered Aermacchi MB-326, some 10 of which serve with No11 Squadron at Sidi Ahmed. These are the survivors of eight MB-326Bs delivered in 1965, and five MB-326LTs and seven single-seat MB-326KT light-attack aircraft delivered in 1977.

The 12 new turboprop-powered T-6Cs seem most likely to replace these aging jets, filling the gap between the SF-260 and the nine surviving Aero L-59Ts (of 12 delivered) that operate in the lead-in fighter training and light-attack roles. The L-59Ts equip No16 Squadron at Gafsa.

Though powered by a 1,100hp Pratt & Whitney Canada PT6A-68 turboprop engine, the T-6 has jet-like performance and handling characteristics, with a speed of 320mph, an initial rate of climb of 3,100ft (944.8m) per minute and the ability to reach 18,000ft (5,486.4m) in less than six minutes.

The aircraft has a pressurised cockpit and the pilots sit on Martin Baker zero-zero ejection seats, while the tandem seats provide a fighter-like environment for the student pilot in the front seat.

Although the Texan is not a jet trainer, it offers tactical training capabilities that would previously have been confined to more expensive, higher-performance trainer aircraft.

The T-6 was originally developed to meet the US Air Force and US Navy joint primary aircraft training system requirement.

The T-6A was conceived as a relatively minimum change derivative of the commercial off-the-shelf Pilatus PC-9, with minor modifications to meet specific US requirements. These included a vapour-cycle air conditioner and on-board oxygen generation system and an increased canopy thickness. The latter was intended to prevent a 4lb (1.8kg) bird from penetrating the cockpit at a speed of 270kts (500km/h).

Bird-strike resistance

The leading edges of the wing, horizontal stabiliser and vertical fin were also strengthened with an additional spar to provide better bird-strike resistance.

The flight controls were modified to improve the aircraft's flying qualities, while a number of modifications were incorporated to make maintenance easier, and to shorten turnaround times between sorties.

In the event, additional requirements resulted in delays, cost increases (from an initial estimate of \$3.9 million to almost \$6 million per aircraft), and weight increases, such that the production T-6A weighed 22% more (1,100lbs) than the Pilatus-built PC-9, while parts commonality was limited to the landing gear tyres.

The T-6A made its maiden flight on July 15 1998. The T-6B was an upgraded version of the T-6A, with a digital glass cockpit (the result of a company-funded avionics upgrade), used by some US Navy units.

The T-6C is an upgraded export variant, with a digital glass cockpit (like that fitted to the T-6B) including a modern Sparrow Hawk head-up display, an up-front control panel, three colour flat panel multifunction displays, and hands-on-throttle-and-stick controls in each cockpit, as well as a data transfer module. The aircraft also features an embedded synthetic air-to-ground and air-toair training capability.

The T-6C is also fitted with underwing hardpoints (like those fitted to 20 T-6A NTA aircraft delivered to the Hellenic Air Force). This allows them to undertake live weapons training and COIN missions. The underwing hard-points can also accommodate auxiliary fuel tanks.

For many air forces, the advanced glass cockpit of the T-6C would be broadly representative of the cockpits of current front-line combat aircraft. This is not the case in Tunisia, where the air force's elderly Northrop F-5E fighters are equipped with old fashioned legacy analogue cockpits.

On the wing: An RAAF KC-30A Multi Role Tanker Transport, E-7A Wedgetail and an F/A-18F Super Hornet fly as part of Operation Okra. PICTURE: COMMONWEALTH OF AUSTRALIA.

Aussies pitch in to fight the terror threat

Australia bas been heavily involved in combatting the recent terrorist threats in the Middle East. **Dave Oliver** bas been finding out more. peration Okra is the Australian Defence Force (ADF) contribution to the military intervention against the so-called Islamic State of Iraq and Levant (ISIL) terrorist threat.

As part of Joint Task Force 633 in the Middle East, the operation began in August 2014, and its initial stated aim was to combat ISIL threats in Iraq.

Australia's contribution is being closely coordinated with the Iraqi Government, Gulf nations and a broad coalition of international partners.

In September 2015, the Australian airstrikes were extended to Syria.

Around 400 ADF personnel work under Operation Accordion to support operations, including Operation Okra, as well as personnel in the Australian/New Zealandled task group Taji, the special operations task group (SOTG), and embedded personnel in the combined joint task force Operation Inherent Resolve, established by the US-led international coalition against ISIL.

In late-September 2014, an air task group (ATG) of personnel from the Royal Australian Air Force (RAAF) was deployed to Al Minhad Air Base in the UAE.

The initial commitment included six F/A-18F Super Hornet strike aircraft from No1 Squadron, based at RAAF Base Amberley in Queensland, alternating with FA/18A Hornets of No 75 Squadron from RAAF Tindal, Northern Territory. There was also one E-7A Wedgetail airborne early warning and control (AEW&C) aircraft from No 2 Squadron from RAAF Williamtown, New South Wales, and one KC-30A multi-role tanker transport (MRTT) belonging to No 33 Squadron from RAAF Base Amberley.

Cease air combat operations

In December 2017, the ADF announced that the strike aircraft attached to the ATG would cease air combat operations and return to Australia in January 2018, although the KC-30A and Wedgetail would remain in support of ongoing coalition operations. The final RAAF strike mission was flown by two Super Hornets on January 14 2018, by which time they had conducted more than 2,700 sorties.

RAAF E-7As and KC-30As have continued to carry out four-month deployments as part of Operation Okra. The E-7A plays a critical role as it contributes to the control and tactical movement of aircraft over Iraq and Syria to ensure safety and mission success, while the KC-30As carry out air-to-air refuelling operations with coalition fighter aircraft involved in Operation Inherent Resolve. These include the Lockheed Martin F-16 and F-35, as well as all variants of the F/A-18.

In August 2019, Australia also became the latest country to join the US-led international maritime security construct (IMSC) in the Gulf, which includes Bahrain, Saudi Arabia and the United Kingdom, to enhance the safety of shipping assets passing through the region.

Tensions had escalated after a spate of incidents. In June 2019, Iran allegedly downed a US Air Force RQ-4A Global Hawk high-altitude long-endurance (HALE) intelligence, surveillance and reconnaissance (ISR) unmanned aerial vehicle (UAV) in the Gulf for allegedly breaching international aviation rules.

Sanction violations

The following month, an Iranian vessel was seized by Gibraltar over sanction violations. In retaliation, Iran's Islamic Revolutionary Guard Corps (IRGC) seized a British-flagged oil tanker.

To ensure the safety of ships transiting the key shipping route, the UK Government joined the US Navy in the security mission and also invited European allies to join the alliance to put up a strong force to ward off threats from Iran.

As part of the mission, Australia deployed an RAAF P-8A Poseidon maritime patrol aircraft (MPA), operated by No11 Squadron from RAAF Base Edinburgh, South Australia to the Middle East for a month by the end of 2019, and a Royal Australian Navy (RAN) frigate in January 2020 on a six-month deployment.

Australia Defence Minister, Linda Reynolds, said: "This is the first time the P-8A aircraft has operated in the Middle East and its deployment will support freedom of navigation in the region, which is a fundamental right of all states under international law."

This was not the first time that Australia had deployed MPAs to the Middle East. A detachment of RAAF AP-3C Orions was deployed between 2003 and 2012, conducting maritime surveillance patrols over the Persian Gulf and North Arabian Sea in support of coalition warships and boarding parties. They also conducted extensive overland flights of Iraq on ISR missions, and supporting counterpiracy operations in Somalia.

UAVS FALL VICTIM TO THE BATTLE FOR TRIPOLI

The no-fly zone over Libya has already claimed victims, writes *Jon Lake*.

General Khalifa Haftar's Libyan National Army (LNA) shot down two 'intruding' UAVs in the days before it declared a 'no-fly zone' over Tripoli, as part of its campaign to seize control of the capital from the internationally recognised rival Government of National Accord (GNA), also known as the National Salvation Government.

The LNA prohibited flying in its no-fly zone, "without prior coordination with the General Command of the armed forces".

Tripoli's Mitiga Airport, the capital's only functioning airfield, was exempted for humanitarian reasons. Despite this exemption, the GNA said that any threat to civil aviation was a crime that would be punishable under international law.

Since the toppling of Muammar Gaddafi in 2011, Libya has been wracked by civil war, with two rival factions wrestling for control.

The GNA in Tripoli enjoys UN and international recognition, and is supported by Islamist militias and Turkish forces, while the LNA is supported by that part of the Libyan House of Representatives that meets in Tobruk, by Egypt and the UAE, and by Russian Wagner Group mercenaries.

With both sides using UAVs for reconnaissance and attack missions, it was perhaps inevitable that US and NATO unmanned intelligence, surveillance, and



reconnaissance (ISR) aircraft would be mistaken for enemy assets and would come under attack.

On November 20 last year, an Aeronautica Militare Italiana (Italian Air Force) General Atomics Aeronautical Systems MO-9 Predator B was shot down while flying near Tarhuna, about 65km southwest of Tripoli.

LNA social media channels initially claimed to have shot down a Turkish drone operating in support of GNA-aligned forces, before the mistake was realised. The following day the US Air Force reported the loss of another unarmed remotely piloted aircraft over Tripoli. The LNA subsequently apologised for shooting down the American drone and agreed to coordinate their operations over Tripoli and its surrounding areas to avoid similar incidents in the future.

The LNA have not had things all their own way. On December 7, an LNA AF MiG-23ML was shot down by Libyan Government of National Accord (GNA) forces using a 9K32 Strela-2 (NATO reporting name SA-7 'Grail') man-portable, shoulder-fired, low-altitude, infra-red (IR) guided, surface-to-air missile system.

The pilot, Major General Pilot Amer al-Jaqam al-Urfi, ejected but was captured by GNA-aligned fighters from the city of Zawiya.

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DEFENCE

SURVEILLANCE



A game of high spy – with Project Dolphin

Highly modified: The UAE's new Bombardier Global 6000 ISR aircraft.

The UAE has been quietly overhauling and improving its intelligence, surveillance, and reconnaissance (ISR) capabilities for some years. Jon Lake looks at the latest situation. urther details have emerged about the two highly modified Bombardier Global 6000 signals intelligence (SIGINT) and ISR aircraft being delivered to the UAE Air Force and Air Defence under the €629 million (\$701m) Project Dolphin.

These are quite separate from the three Saab GlobalEye airborne early warning and control (AEW&C) aircraft – also converted Global 6000 aircraft – due to be delivered to the UAE imminently.

The acquisition of these aircraft – delivery took place at the recent Dubai airshow – provides a further boost to the UAE's autonomous capabilities, freeing it from a reliance on the SIGINT 'take' provided by its allies, including the US and Saudi Arabia.

When the UAE decided to procure a dedicated SIGINT aircraft, the Global 6000 was an obvious platform choice. The Global Express family forms the basis of a number of military special mission variants, including the Saab GlobalEye, the UK RAF's Raytheon Sentinel R1 radar surveillance aircraft, and the US Air Force's Northrop Grumman E-11A battlefield airborne communications node, (BACN).

Commonality with the GlobalEye will be particularly useful for the UAE.

The UAE Armed Forces army signed a contract for two new SIGINT/ISR aircraft with the Abu Dhabi-based Advanced Integrated Systems (AIS) in 2010. AIS, in turn, sub-contracted the project to Swiss-based AGT International, which was previously responsible for the UAE's Falcon Eye surveillance system and for the Abu Dhabi safe city project.

AGT, which is owned by Israeli entrepreneur Matanya 'Mati' Kochavi, subsequently revealed that it had received payments totalling about 3 billion shekels (\$846 million), and that it purchased two 'green' Global 6000 aircraft from Bombardier at a reported cost of \notin 43.25 million each (\$48.24m), as well as many of the mission systems installed in the aircraft.

The aircraft were delivered to AGT in the UK at Cambridge's Teversham Airport in late 2012, and were subsequently registered to Advanced Integrated Systems (IoM) Ltd in 2015.

There were reports that Fokker Aviation Services was initially involved in the planned conversion, together with Spec Ops Technology – a US, Netherlands and UAE-based company that specialises in airborne ISR platforms. But, in 2013, the Teversham-based Marshall Aerospace and Defence Group (formerly Marshall of Cambridge) received a \$100 million contract from AGT, and conversion work began on the aircraft.

Marshall has never commented on the programme, so the exact nature of the company's involvement remains unknown.

The first aircraft was seen emerging from Marshall Aerospace's hangars on April 27 2017 and made its maiden flight on June 21 that year.

The second aircraft appeared for the first time on May 18 2018. It made its first flight on August 8 that year, painted in full UAE Air Force markings, then flew to Robin Hood Airport (the former RAF Finningley) on August 30 before departing for the UAE the following day.

Special investigation

A breakdown of the costs of the programme was leaked from the Appleby law firm as part of the so-called Paradise Papers – the name given to a special investigation by the *Guardian* newspaper and its media partners into a leak of millions of files from two offshore service providers and the company registries of 19 tax havens.

This revealed that the two communications intelligence (COMINT) systems had cost \leq 40 million (\$44.61m) each, while the electronic intelligence (ELINT) systems were \leq 32.5 million (\$36.25m) each, self-protection systems \leq 21 million (\$23.42m) each, and that the long-range oblique photography (LOROP) cameras were \leq 20.75 million (\$23.14m) each.

Aircraft installation, integration and testing added €144 million (\$160.60m), and certification another €19.5 million (\$21.75m), while the programme also included €92.3 million (\$102.94m) of logistics and engineering support, and the provision of ground-based tracking and reception stations.

The LOROP sensor is understood to be a Collins Aerospace DB-110 electro-optical camera, as used in podded form by the Panavia Tornado, Lockheed Martin F-16 and Boeing F-15S/SA.

It has been reported that the COMINT system was supplied by QinetiQ, and may be based on the UK company's AS-5 COMINT/direction-finding system.

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ADRIAN

ANTI DRONE INTERCEPTION ACQUISITION NEUTRALIZATION



On alert: A flight of Royal Moroccan Air Force Lockheed Martin F-16s. Despite a growing defence budget, Morocco continues to lag behind neighbouring Algeria when it comes to military spending.

Massive boost for Moroccan armed forces

Morocco's 2020 finance bill will increase in the kingdom's national defence budget by 29% in 2020, allocating 45.438 billion Moroccan Dirbam (MAD) (\$4.728 billion). Jon Lake reports. he wonderfully named Moroccan Centre of Conjuncture (Centre Marocain de Conjoncutre) has said that the

country's national economic growth is expected to reach 4.6% in 2020, which it called "very promising compared to the weak results recorded in 2019". This would suggest that gross domestic product (GDP) will reach MAD 1,196.62 billion (\$124.54 billion) in 2020, meaning that defence spending will equate to about 3.8% of GDP.

In 2016, Morocco spent 3.28% of its GDP on defence, putting it in 26th place in the list of defence spending as a percentage of GDP – just behind the USA (then at 3.29%).

The increase seems likely to improve Morocco's ranking, though it will remain behind Algeria, its eastern neighbour and rival, which spent 6.55% of its GDP on defence in 2016 - \$10.57 billion.

Morocco is ranked 55th among 136 countries in the 2018 Global Firepower (GFP) index – a ranking of comparative military strength.

MAD 700 million (\$73 million) of the 2020 defence budget will be exclusively allocated to the costs of conscription, following the passage of Law 44.18 by the House of Representatives. The law reintroduced mandatory military service for young people aged 19 to 25, starting last September.

Most of the MAD 700 million (421 million) will go towards paying the conscripts' monthly wages, though MAD 288 million will be spent on rebuilding training and housing facilities, and MAD 61 million will be spent on logistics (medication and transportation).

Some 133,820 young Moroccans, including 13,614 female candidates (for whom the one-year military service is not compulsory), enlisted. Around 15,000 of these (including 1,100 women) were actually called up. Abdelatif Loudiyi, the delegate minister of the National Defense Administration, has predicted that 10,000 new conscripts will join the military each year.

Staff costs account for the bulk of Morocco's defence budget, and are set to rise from MAD 22.330 billion to MAD 33.167 billion due to increased numbers and pay increases across the Royal Armed Forces. Investment spending will increase from MAD 4.773 billion to MAD 5.146 billion, with increased money on equipment repair and infrastructure.

FINANCE

The equipment budget is to increase from MAD 6.051 billion in 2019 to MAD 7.125 billion in 2020, as Morocco continues to modernise and strengthen its armed forces through an ambitious procurement programme.

Morocco has been a key western ally in the international fight against Islamist terrorism, and is currently facing an increased threat of terrorism and insurgency. It is enhancing and improving its defence and internal security forces in response to a wave of unrest in the MENA region, and, in particular, to the ongoing insurgency in the Western Sahara region, where the Algerian-backed Polisario Front is fighting Moroccan forces. This has prompted Morocco to allocate substantial expenditure to counter-insurgency and counter-terrorism capabilities.

Relations deteriorated

Relations between Morocco and Algeria deteriorated after Spain announced its intention to abandon the former colony of Western Sahara territory in 1975, proposing to divide the area between Morocco and Mauritania. Algeria supported independence for the territory and opposed its absorption by its neighbours.

Mauritania abandoned its territorial claims and withdrew in 1979, but Morocco then claimed the territory relinquished by Mauritania, and this led to renewed tension between Morocco and Algeria. There has been a long-running arms race between Morocco and Algeria, which has received a steady supply of modern weapons from Russia.

The Moroccan Government is expected to procure transport aircraft, helicopters, multirole fighters, submarines, missile defence systems, frigates, and armoured vehicles, while the growing focus on strengthening border security will see increasing expenditure on security systems, motion sensors, alarms, and radar systems, as well as on military IT and networking systems.

Morocco is also expected to invest in a new state-of-theart coastal surveillance system.

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DEFENCE

TUNISIAN NATIONAL GUARD FORMS AIR UNIT

The Tunisian National Guard has formed an air unit equipped with three Bell 429 GlobalRanger helicopters, and this has now been declared operational.

The unit is a separate military force, not part of the Tunisian Armed Forces. It has a standing strength of 15,000 personnel and functions as both a defence force against external threats and as a security force protecting the nation internally, with a particular responsibility for border and coastal security.

Tunisia secured its land borders by declaring a closed military zone in some areas. It built a berm and an electronic fence to limit the infiltration of terrorists and insurgents from training camps in neighbouring Libya.

However, the coastline remained largely unsupervised, though the Tunisian National Guard now operates some 25 patrol boats donated by Italy between 2005 and 2015. These have helped to reduce the flow of illegal migration towards Italy and southern Europe.

Now the formation of the new air unit promises to help to secure inshore waters and Tunisia's tourist beaches, whose vulnerability was highlighted in June 2015, when a Daesh-affiliated gunmen killed 39 people during an attack on a tourist hotel in Sousse.

A Tunisian Government statement said that the \$17.4 million acquisition had allowed the formation of "the first air unit for the National Guard." It said that the unit would be tasked with monitoring Tunisia's coastline and preventing terrorist infiltration, as well as road traffic management, emergency response and medical evacuation.



The Bell 429 GlobalRanger is a light, twin-engined turbine helicopter with a maximum take-off weight of seven tonnes. It was developed by combining the advanced airframe and rotor blades designed under Bell's modular affordable product line (MAPL) programme with the engine and rotor system from the Bell 427.

The aircraft can accommodate one pilot and up to

seven passengers (six in the passenger compartment; one beside the pilot). The cabin is large and unobstructed, with a flat floor and large sliding doors.

The Tunisian Bell 429s are fitted with a wire-strike protection system (WSPS), a rescue hoist above the starboard cabin door, a searchlight under the tailboom, and have provision for an under-nose forward-looking infrared (FLIR) turret.

MORE EMIRATI CHINOOKS APPROVED BY US

The US Defense Security Cooperation Agency (DSCA) has approved the \$830.3 million sale of 10 Boeing CH-47F Chinooks to the UAE Joint Aviation Command.

The UAE already operates a fleet of around 20 Chinooks, assigned to Group 25's Special Operations Squadron at Sas Al Nakheel Air Base in Abu Dhabi.

[•]The UAE purchased 12 second-hand Elicotteri Meridionali-built CH-47C Chinooks from Libya in 2003, putting at least eight of them into service.

Eight aircraft were overhauled and upgraded to CH-47C+ standard (similar to modernised Italian army Chinooks) by Agusta and Piaggio Aero Industries in 2005, at a cost of \$72.3 million, plus \$40 million for new engines and \$10.2 million for a new Avitronics helicopter self-protection system.

The CH-47C+ was broadly equivalent to the later CH-47D, with glass fibre rotor blades,

uprated transmission and 3,750shp (2,795kW) Honeywell T55- L-712E engines, which allow maximum take-off weight to be increased to 50,000lb (26,680kg).

The 28 new engines were built under licence by Piaggio Aero, and included a number of spares. A follow-on support agreement allowed for the creation of a dedicated T55 service centre in the UAE.

A potential sale of 16 CH-47Fs to the UAE was notified in December 2009, and 20 of these advanced variants were delivered from October 2012. The CH-47F features a lower-maintenance airframe with a lower parts count, and is powered by 4,868shp (3,630kW) Honeywell T55-GA-714A engines. The new version has a BAE Systems' digital advanced flight

control system (DAFCS) and a Rockwell Collins common avionics architecture system (CAAS) cockpit.

On November 7 last year, the DSCA notified Congress of a potential sale of 10 CH-47Fs to the UAE, with 26 T55-GA-714A turboshaft engines, 20 M134D-H miniguns, 20 M240H machine guns, 12 BAE Systems AN/AAR-57 common missile warning systems

(CMWS) and 24 embedded global positioning systems with inertial navigation systems (GPS/INS).

Boeing is hoping that foreign military sales will bridge a looming gap between the end of production of the Block I CH-47F for the US Army, and the start of production of the improved Block II variant.



US HEADS BACK TO PRINCE SULTAN

The US Air Force (USAF) is returning to Prince Sultan Air Base, located in the closed city of Al Kharj in Saudi Arabia.

The base is home to the Royal Saudi Air Force's 6th Wing, which includes most of Saudi Arabia's intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) aircraft.

These include Boeing E-3A Sentries, RE-3 signals intelligence (SIGINT) aircraft, Beech 350 intelligence, surveillance, and reconnaissance (ISR) platforms, and



Updated: This Emirati Chinook was one of the Elicotteri Meridionali-built CH-47C aircraft purchased from Libya in 2003. It is seen here in CH-47C+ configuration, broadly equivalent to the later CH-47D, with triple load hooks and other improvements.

ROUND-UP BY JON LAKE

\$9.9M POD SPARES FOR SAUDI ARABIA

The US Defense Department has announced the award of a \$9.9 million foreign military sales (FMS) contract to Collins Aerospace – a subsidiary of the United Technologies Corporation – for the "purchase of a necessary additional quantity" of parts for DB-110 airborne reconnaissance pods by the Royal Saudi Air Force.

Work on the contract will be performed at the company's facilities in Westford, Mass, and in Worcestershire, UK, and is due for completion by December 21 2021.

The DB-110 (dual-band 110in focal length) sensor was originally developed as a private venture by ITEK, which was later bought by Hughes. That company was, in turn, acquired by Raytheon in 1997, before Raytheon Optical Systems was sold to BF Goodrich in December 2000. Finally, Goodrich became a part of UTC Aerospace Systems in 2012.

The DB-110 was intended to be an exportable derivative of the 144in focal length senior year electro-optical reconnaissance system (SYERS-2) used by the Lockheed U-2R/S, and was designed to be small enough to be carried in a pod by tactical fast jets.

The system allowed dual-band day and night digital imaging with real-time downlinking of imagery to suitably equipped ground stations, whereas previous wet-film based reconnaissance systems had tended to be daylight-only.

The first sale of the DB-110 was to the UK, for use on the Panavia Tornado. The RAPTOR pod designed for the Tornado was subsequently slimmed down and



High-flying: A Royal Saudi Air Force F-15S carrying a DB-110 reconnaissance pod on the centreline.

redesigned. The resulting AN/ASD-14 Fast Jet Pod was intended for use on the F-16, and was sold to Poland, Greece, Morocco, Pakistan, Oman, the UAE, Egypt, Iraq, and Turkey.

The pod can provide high-resolution imagery covering more than 10,000 square miles per hour and can be used from overhead, or from long stand-off range.

Saudi Arabia became the 10th customer for the pod,

ordering 10 pods at the same time as it signed for 84 Advanced F-15SAs. This was the first use on the F-15 Eagle.

The Saudi pods were put into service on the F-15S before F-15SA deliveries began and were used in support of Operation Inherent Resolve, the US-led anti-ISIL campaign in Syria and Iraq, and, subsequently, in the Saudi operation against Yemen.

The pod has now been cleared on the new F-15SA.



Saab 2000 Erieye airborne early warning and control (AEW&C) aircraft.

There are also Boeing KE-3, Airbus A330 MRTT and Lockheed KC-130H and KC-130J air-to-air refuelling tankers.

The USAF has adopted a more expeditionary posture in responding to potential flashpoints over the past two years, and has preferred to build up small operating air bases instead of relying on established major overseas operating locations. General David Goldfein, the chief of staff, has said that the USAF needs to go back to its "expeditionary roots" and be able to fight from austere airfields.

Increasing threats from Iran prompted an increase

in the US military presence in the Middle East, including the construction of an expeditionary annex at Prince Sultan Air Base.

This was constructed by the rapid engineer deployable heavy operational repair squadron engineer (Red Horse) units, supported by C-5, C-17, and C-130 airlifters.

About 500 personnel are expected to use the annex, which will host fighter aircraft and Patriot missiles, and which includes a medical facility.

The deployment of new forces to Saudi Arabia is intended to provide an additional deterrent, and to ensure the defence of US forces and interests in the region from "emergent, credible threats". There was a large US presence at Al Kharj during Operations Southern Watch, Enduring Freedom and Iraqi Freedom, but US Forces left the base in 2003, moving to Al Udeid Air Base in Doha, Qatar.

Forces at AI Kharj came under the command of the 4404th Wing (Provisional), and later the 363rd Air Expeditionary Wing.

The base grew in importance after the 1996 attack on USAF facilities at Khobar Towers in Dharan. Subsequently, the coalition air operations centre (CAOC) relocated from Riyadh to Prince Sultan Air Base, from where it exercised command and control of all coalition air operations for Operations Enduring Freedom and Iraqi Freedom.





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BUSINESS AVIATION



NEW AIRCRAFT

Glitzy: The Gulfstream G700 is Launched on the eve of NBAA.

Eclectic G700 heads for Qatar

he G700 will take over from the hugely successful G650ER, bringing together ultra-long-range, speed and performance with flight-deck innovation and a cutting-edge cabin, to offer customers an unprecedented aircraft experience.

Gulfstream announced the G700 on the eve of the National Business Aviation Association (NBAA) show in Las Vegas at a special event for industry, customers and press.

Company president, Mark Burns, revealed a full-scale mockup of the G700 and showed a video of the aircraft taxiing under its own power at Gulfstream headquarters in Savannah.

"The Gulfstream G700 takes the very best elements from our most innovative products and unites them with cuttingedge advances to create an all-new, advanced-technology aircraft that redefines safety, comfort and range at speed," said Burns. "This announcement is the biggest news in business aviation history and is the result of the investments General Dynamics made to develop Gulfstream technology for Gulfstream products."

Tallest, widest, and longest cabin

The G700 boasts the tallest, widest and longest cabin in the industry, with leading range and speed capabilities. It can fly 7,500nm at Mach 0.85 or 6,400nm at Mach 0.90.

The launch customer for the G700 was also announced. It will be Qatar Executive, the business jet side of Qatar Airways. The Doha-based airline has ordered 10 G700s.

Eleven Gulfstream aircraft are currently in service with Qatar Executive, including six G650ERs and five G500s.

"We are excited to be the launch customer and are looking forward to the aircraft joining our fleet," said Akbar Al Baker, group CEO of Qatar Airways.

One of the things that will appeal to Qatar customers is that the all-new cabin allows them to extend their personal and professional lifestyle to the aircraft. With up to five living areas, the G700 offers an extra-large 'ultragalley' with a passenger lounge or crew compartment; a six-place dining or conference room; and a master suite with shower.

There are 20 panoramic oval windows, the largest in the industry, and the industry's lowest cabin altitude, in a 100% fresh air and quiet cabin.

Qatar Executive was named launch customer as Gulfstream Aerospace unveiled its new flagship private jet, the G700, calling it "the most spacious, best-performing aircraft in the business-jet industry". **Dave Calderwood**

reports.

"Gulfstream has a long tradition of listening to our customers, and the G700 cabin is the evolution of that collaboration," said Burns. "Customers shared how much they value flexibility and comfort in the cabin, all without compromising the speed and range advantages they have come to expect from Gulfstream. The G700 delivers all that and more."

The aircraft also offers a range of cabin amenities that revolutionise the benefits of business-jet travel, including the most advanced circadian lighting system in aviation. The Gulfstream-developed technology recreates sunrise and sunset through thousands of white and amber LEDs, gently coaxing passengers into their new time zone and greatly reducing the physical impact of travelling halfway around the world non-stop.

Safety advancements

Up front, the G700 features the award-winning Symmetry flight deck and other new safety advancements. Along with active-control sidesticks and the industry's most extensive use of touch-screen technology, the flight deck also comes standard with another Gulfstream award-winner, the predictive landing performance system, which gives pilots advanced warning of potential runway excursions so they can adjust approaches or go around.

The G700 Symmetry flight deck also comes standard with Gulfstream's enhanced flight vision system and synthetic vision on dual head-up displays.

All-new, high-thrust Rolls-Royce Pearl 700 engines power the G700 and, along with newly designed Gulfstream winglets, ensure the aircraft achieves high performance capabilities with its larger cabin.

In preparation for the G700's first flight, Gulfstream has already accomplished nearly 14,000 hours of lab testing. It has successfully completed ground vibration testing, engine runs, loads calibration and all structural testing required for first flight.

The G700 flight-test fleet will incorporate five traditional test aircraft and one fully outfitted production test aircraft. Manufacturing for all test aircraft is well under way.

Gulfstream anticipates G700 customer deliveries in 2022.

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oneandonlyroyalmirage.com +971 4 399 9999 Montasser Channoufi, founder and CEO of Carthage SKY Services, plans to launch a fixed-base operation in Tunisia this year. He told **Vincent Chappard** how it will serve the country's growing business aviation industry.

The SKY's the limit for Carthage's planned FBO



Montasser Channoufi: "We must be prepared to get our share of the market."

a record by welcoming nine million tourists in a single year. In the tourism wake, the business aviation sector looks set to benefit enormously.

According to The Middle East and North Africa Business Aviation Association (MEBAA), markets for private aviation are expanding worldwide. While there are many private aircraft charter companies and related businesses already serving the major cities, demand is growing in many "smaller" markets like Tunisia.

Carthage SKY Services has been growing fast since its launch in 2014. The Tunisian start-up offers a wide range of services, from VIP and VVIP flights to catering and fuelling at Tunisian airports.

Trip planning

Today, it is an international trip-planning and flight management company specialising in providing regulatory authorisations and ground support services to aircraft operators around the world.

The company is evolving from an airline representative into what is now a worldwide flight support provider for a full suite of aviation services as well as FBO, general sales agent (GSA), operations control centre (OCC), air operations supervisor and executive lounge facilities. Carthage SKY Services achieved ISO9001, ISO14001 and OHSAS 18001 quality certifications early 2019.

Located at Tunis Carthage Airport, it serves the main international airports of the country. These are managed by OACA, the public body in charge of the management, development and operation of the seven Tunisian international airports – Tunis-Carthage, Djerba-Zarzis, Sfax-Thyna, Tozeur-Nefta, Tabarka-Ain Draham, Gafsa-Ksar, and Gabes Matmata.

According to CEO, Montasser Channoufi, the key ingredients are there to make Tunisia an important business aviation hub.

The country benefits from its strategic geographical position, he believes. There are many flights in transit. Tunisia can become the centre of gravity for business aviation customers willing to travel to Africa or the US. Carthage SKY Services has, therefore, a huge potential to provide its services to worldwide operators.

"Today, the country welcomes 650 flights per year. This segment is expected to grow from 25 to 30%. We must be prepared to get our share of the market," he emphasised.

Carthage SKY Services aims at having a full FBO, integrating support and MRO activities, in 2020.

Positive estimates

Channoufi added that, alongside positive estimates, the political situation is also moving in the right direction; the country has embarked on a new phase and its institutions are stable, with the highest level of security.

Carthage SKY Services is now a member of MEBAA. For its CEO, this is an opportunity to belong to an extended community of the world's future shapers and interact with a valuable international network.

Channoufi said MEBAA defends the interest of operators. "Networking is vital in this sector to learn to know other members, share experiences, discuss important issues, and find adequate solutions to progress with a pragmatic approach."

Channoufi believes that 2020 will bring multiple emerging opportunities. This improvement will also be seen in the air transport sector, with the emergence of new airlines like Jasmin Airways.

Tunisia is preparing to sign an open sky agreement with the European Union after almost 10 years of discussion. A memorandum of understanding (MoU) was signed in December 2017. According to acting Minister of Transport and Tourism, René Trabelsi, the agreement will be signed this month.

The support and commitment of the Tunisian Government and authorities, coupled with private initiatives, clearly carves the way for a flourishing business aviation sector.



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BUSINESS AVIATION

NEW AIRCRAFT



Swiss roll out PC12 revamp

Swiss manufacturer, Pilatus Aircraft, has revealed a thoroughly updated version of its longrunning single-engine turboprop with the third-generation PC-12 NGX recently announced. **Dave Calderwood** reports.

he NGX boasts a revised engine and propeller with a 'low-speed mode' for reduced cabin noise and higher cruise speed, an updated cabin with new square windows, and a host of other improvements – all designed to keep the PC-12 competitive when a new rival, the Cessna Denali, arrives soon from Textron Aviation.

Markus Bucher, CEO of Pilatus, said: "To maintain the PC-12's leadership in the general aviation marketplace, we continuously seek innovative solutions, which benefit the safety, comfort and productivity of our customers.

"The PC-12 NGX is a showcase for the advanced technology collaboration between Pilatus, Pratt & Whitney Canada, and Honeywell. Together, we took the best, and made it even better. What's more, our customers do not have to wait years into the future to enjoy these benefits; the PC-12 NGX is here today."

Bucher confirmed that the PC-12 NGX has already passed certification and that its base price is \$4.39 million. A typically equipped executive version would run out at \$5.37 million.

Three customers for the NGX have already been announced, all owner-pilots. They are Dion Weisler, former CEO of HP (formerly Hewlett Packard), Shon Boney, founder of a US supermarket chain, and Brazilian businessman, João Carlos Marinho Lutz, who will use it to visit farms around Brazil.

Seven million flight hours

The PC-12 is well-proven, with more than 1,700 of the type already in operation around the world. The global fleet has clocked up more than seven million flight hours, including many on unprepared runways, for which the aircraft is certified.

One of its principal operators is the Royal Flying Doctor Service in Australia, which often has to fly into, and out of, short dirt air strips in hot conditions.

At the heart of the new PC-12 NGX is the PT6E-67XP turboprop engine by Pratt & Whitney Canada. It is fitted with a new electronic propeller and engine control system, including full authority digital engine control (FADEC), said to be a world first in this market segment.

The new turboprop engine enables the PC-12 NGX to

reach a maximum cruise speed of 290ktas, and is also able to operate without anti-icing fuel additives, such as Prist.

The Honeywell advanced cockpit environment fitted to the Pilatus PC-24 private jet has been adapted for the PC-12 NGX. A key feature is that the pilots can use either a cursor control device or a touchscreen controller, or both.

It's also equipped with a digital autothrottle for automatic thrust adjustment, which reduces pilot workload and optimises the power settings for every phase of flight.

The PC-24 jet has also supplied the 10% larger, rectangular cabin windows to deliver more natural light.

Emergency descent mode

Other new cockpit features include a new emergency descent mode and feedback to avoid over-banking, plus brighter flight displays and higher resolution moving maps, Honeywell's SmartLanding and SmartRunway awareness systems, 'intelligent' audio with ATC playback and Bluetooth interface, electronic checklists linked to the crew alerting system, worldwide graphical weather and pilot data link communications.

Pilatus has a long relationship with BMW Designworks, the California-based design studio, and the NGX's cabin has been completely redesigned with six different interiors available. The extremely light passenger seats offer optimum ergonomics with full-recline capability if required, and they're arranged to provide maximum freedom of movement with more headroom thanks to a redesigned headliner. Important for the Middle East is an improved airconditioning system, which delivers better and quieter air distribution.

The NGX isn't all about performance and looks, and Pilatus is claiming reduced operating costs thanks to scheduled maintenance intervals extended to 600 flight hours. The time-between-overhaul (TBO) period has also been increased from 4,000 to 5,000 hours.

Finally, there's a similar maintenance plan to that available for the PC-24 jet, covering every aspect of the aircraft and including both scheduled and unscheduled maintenance, and an aircraft-on-ground (AOG) recovery service.

BUSINESS AVIATION

LONGITUDE IN A WORLD OF ITS OWN

extron Aviation has started deliveries of its long-awaited Cessna Longitude business jet, writes Dave Calderwood.

The aircraft is the biggest so far in the Citation range and deliveries follow receipt of the aircraft's type certification from the US authority, the Federal Aviation Administration (FAA), in September last year.

Certification had been delayed while Textron and the FAA came to an agreement over a fuel tank issue. The super-midsize Longitude keeps its fuel in wing tanks, like most aircraft, but they extend into the wing roots and, thus, might be deemed fuselage tanks, which have different flammability requirements.

Most extensively tested

The Longitude is Cessna's most extensively tested aircraft. No fewer than five flight-test and demo aircraft completed nearly 6,000 hours of flight time, including a 31,000nm world tour to show off its 3,500nm range.

"The newly certified Citation Longitude brings unrivalled technology to the business travel market, for both the passenger and the pilot,



Unrivalled technology: The Cessna Longitude has completed a world tour. PICTURE: CESSNA.

offering our customers the most efficient and productive super-midsize jet now in operation," said Ron Draper, president and CEO of Cessna. He went on to cite the Longitude's longest maintenance intervals in its class, 800 hours or 18 months, making it "the most cost-effective aircraft in its category".

Leading private jet operator, NetJets, announced a 175 aircraft order for the Longitude at the 2018 National Business Aviation Association (NBAA) business aviation convention and exhibition, along with up to 150 of the larger Cessna Hemisphere jets, still in development.

The Longitude isn't only available as a business jet. At last November's Dubai Airshow, Textron announced that it is configuring the aircraft for flight-inspection missions for the Japanese Civil Aviation Bureau (JCAB).

Clean-sheet design

"From its early design stages, the clean-sheet design of the Citation Longitude gave us the flexibility to incorporate a wide-range of special missions capabilities into the platform," said Bob Gibbs, vice president, defense & special missions sales.

The JCAB Longitude will be outfitted with the latest Unifis 3000-G2 flight-inspection equipment from Norwegian Special Missions. It will perform verification of navigation aids, such as instrument landing system approaches, ground-based augmentation system, very high frequency omnidirectional range (VOR), tactical air navigation system (TACAN) and more.



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GROWTH

Swiss-based Amac Aerospace is bolstering its presence in the MENA region. Vincent Chappard talked to group executive chairman and CEO, Kadri Muhiddin, to find out more.

Muhiddin's taste for the big AMAC

ounded in 2007 to serve the VIP/VVIP demand, Amac Aerospace is today a private 'group of companies' that spans the width of Europe and has a presence in Turkey and Lebanon.

It operates a network of seven hangars for mid-size, narrow and wide-body jets, dedicated to maintenance, modifications activities and completion works.

The group showcased its products and services for the first time at the Middle East and North Africa Business Aviation Association (MEBAA) Show Morocco last year.

"Africa is a growing market. It is not mature yet, as compared to Europe or the Middle-East. The Middle East has reached a level where you can speak comfortably about private aircraft," said Muhiddin. "So, like aircraft manufacturers, MRO or completion centres, we want to show that business aviation is not a secret."

Amac Aerospace has a strong presence in the MENA region to support clients specialising in MRO activities and for completion or refurbishment.

Market develop

"We have seen this market develop across the board with mid-size jets, narrow-bodies and wide-bodies," he added.

According to Amac, enlarging and/or replacing fleet platforms, requires expertise in MRO as well as in-depth understanding and know-how. Interiors are typically capped at a 10-year life-cycle and, therefore, the wear and tear on the interior also needs to be followed up regularly.

"We can efficiently and quickly take decisions where our competitors might take longer," said Muhiddin. "We understand the client's requirements based on the aircraft itself or the mission types the aircraft will need to complete."

Amac is the official authorised service facility (ASF) for Bombardier in Europe. Since 2018, the company has completed nearly 70 maintenance inputs at its headquarters in Switzerland. It offers an array of services, from new SATCOM installations and specific maintenance to trouble shooting and aircraft-on-ground (AOG) services.

Amac is also the exclusive sales distributor of the Pilatus PC-12 NG in the Middle East. "This aircraft offers an incomparably versatile combination of capacity, amenity, speed, range and performance," said Muhiddin.

The Swiss company has two maintenance facilities in

Kadri Muhiddin: "The Middle East has reached a level where you can speak comfortably about private aircraft."

Turkey; it is also the official maintenance centre for the PC-12 NG and Dassault 900 and 2000 jets.

Its Istanbul plant is located within an area of the Atatürk International Airport that facilitates VIP incoming and outgoing movements.

Amac has also set up an additional hangar for MRO services at Milas-Bodrum Airport. It is the first to date to use a mixed business model.

"MRO operations in Istanbul are meant to promote Dassault maintenance opportunities and base and line maintenance for airliners in Bodrum during winter and business aviation-related services during summer," explained Muhiddin.

Amac signed two new contracts with Airbus in November and will welcome an A319 this year. With a developed supplemental type certification (STC), the company will install a Ka band system on the aircraft.

This month, a Boeing B737 is scheduled to arrive for a C3-check. Amac will carry out a landing gear overhaul, an automatic dependent surveillance – broadcast (ADSB)-out installation, a future air navigation system (FANS) installation and a partial cabin refurbishment.

The company is also looking forward to working on the cabin refurbishment on a Bombardier Global 5000.

2020: The year of business aviation

According to Ali Alnaqbi, founding and executive chairman of the Middle East and North Africa Business Aviation Association (MEBAA), 2020 will be a good year for business aviation in the MENA region.

Alnaqbi stated that the sector is achieving a positive growth rate of around 8-9%, higher than the global growth estimate of 4-6%, pointing out that the UAE has become the sector leader in the region.

"The year 2020 will be a milestone in the history of business aviation and private aviation in the Middle East region in general, and in the UAE in particular, as a result of Expo 2020," Alnagbi said.

He added that "air traffic in Dubai is currently around 15,000 movements, and this is expected to double to at least 30,000 due to the event".



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GENERAL AVIATION

ROTORCRAFT



Versatile: "The Bell 525 is an incredibly smart helicopter that will reduce the probability of the pilot making a mistake."

New look: Bell has been extremely clever in designing the cabin of the 525 to give maximum room and a flat floor.

Game-changing 525 rising above the early tragedy

Seven years after Bell Helicopter announced it was developing a brand new. clean-sheet design 'super medium' twin-engine helicopter, complete with a sophisticated fly-by-wire system, the company is now sparing no effort to get the 525 past the post of type certification. **Dave Calderwood**

reports.

t's been a tough seven years for Bell, now renamed as Bell Flight, with the lowest point being the crash of a test aircraft in 2016, a year after flight-tests started.

Both pilots were killed when the helicopter broke up in mid-air following severe vibration affecting the main rotor during a routine, though demanding, test.

The main rotor hit the tail rotor during the incident and that was that – there was nothing the crew could do.

Flight-tests stopped immediately after the crash and didn't resume for a year while US accident investigators and Bell engineers sought for the cause and a solution. As a result, changes were made in the fly-by-wire system to

deal with and isolate the damaging vibration; the professionals put aside the heartache of losing two of their key team and got on with the job. The two test pilots killed, Eric Boyce and Jason Grogan, wouldn't have had it any other way.

Now the 525 is nearing the latest phase of the certification process with no fewer than four test helicopters involved and a fifth – the closest to what will go into production – about to join.

More than 1,300 flight hours have been recorded and major milestones passed, including cold weather testing in Canada, down to minus 40 degree F.

Fly-by-wire control systems

One issue that has had to be tackled is the fly-by-wire controls systems. Although now common in fixed-wing aircraft, they are new to the airworthiness regulations governing helicopters. Bell and the US authority, the Federal Aviation Administration (FAA), have had to interpret and define what's required.

That much over-used phrase 'game-changer' has been applied to the 525 but it may actually be true in this case. Not only has Bell been extremely clever in designing the cabin of the 525 to give maximum room and a flat floor, but that fly-by-wire system is a quantum leap forwards for the pilots.

Essentially the pilot 'tells' the helicopter where he wants to go and at what speed, through fairly conventional controls, then the computer works out the best, most efficient and safest way to do that, while reducing pilot workload.

Perhaps the best endorsement for Bell's approach comes from members of Norway's oil and gas and search-andrescue (SAR) industry, who operate in the unforgiving North Sea between the UK and Scandinavia.

Michael Hougaard, a pilot flying daily over the North Sea, said: "The Bell 525 is an incredibly smart helicopter that will reduce the probability of the pilot making a mistake. It's amazing that the machine predicts what the pilot wants. That means that, as a pilot, I can focus on keeping track of the mission, which is crucial for safety in the North Sea."

Operations to the next level

Another pilot, Torstein Sandven, said: "The Bell 525 will be an extremely good platform that will take operations to the next level. We welcome all new technology that contributes to increased safety and I have high expectations for this machine."

As well as fly-by-wire, the 525 is also equipped with the most advanced integrated vehicle health management (IVHM) and health and usage monitoring system (HUMS), allowing maintenance engineers to easily diagnose failures and quickly return the aircraft to service.

The IVHM system is supported by Bell's mission link, allowing operators to access how their helicopter is performing relative to all other aircraft in the fleet.

Technician Tom Stian Beitland was impressed with the digital maintenance manual: "In short, it means that the entire machine is built in 3D and linked together with the maintenance manual. This makes it easier for us technicians to find components and procedures. It will help increase efficiency in troubleshooting if any problems arise," he said.

Kjetil Larsen, a pilot of a SAR helicopter in the North Sea, ran his own test: "We filled the cabin with as many people as we could find. We fitted 23 people on board, and yet there was room for more. That means the machine passed the test of being able to save 21 people in need."



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GROWTH



Expansion programme takes Qatar to a HIA level

Qatar's Hamad International Airport bas unveiled plans for its Phase II expansion programme, designed to boost the airport's capacity to more than 50 million passengers annually. Alan Dron reports. IA's Phase II expansion will be undertaken in two stages. Phase A will consist of the central concourse linking concourses D and E. Construction is scheduled to start early this year and will increase annual passenger capacity to more than 53 million by 2022. Current capacity is 30 million.

Phase B, to be completed at an as-yet-unknown point after 2022, will extend concourses D and E to further increase the airport's capacity to more than 60 million.

Significant features in the extension being started this year will include a new transfer area that aims to help shorten passengers' connection times between flights, together with the central concourse that will include nine additional wide-body aircraft stands.

The expansion will help the airport cater for the influx of visitors to Qatar for the 2022 Soccer World Cup. That will obviously be a short-lived spike in passenger numbers, but the increase in capacity will 'future-proof' the facility for the continuing expansion of Qatar Airways.

Seamlessly integrate

"Our expansion has been designed to seamlessly integrate with the existing terminal, allowing smooth passenger flow and improving the overall experience by minimising travel distances for connections and providing clarity and intuitive wayfinding," said Engineer Badr Mohammed Al Meer, HIA's chief operating officer.

"Our ultimate aim at HIA is to become a destination in our own right, not just a gateway."

Despite the problems posed by the continuing diplomatic dispute between Qatar and three of its neighbours, Saudi Arabia, Bahrain and the UAE (together with Egypt), and the total lack of direct traffic between the two sides, Qatar Airways racked up another increase in passengers in its latest financial year.

FY2019 saw the number of passengers carried increase to more than 29.4 million, up from 29.1 million in the previous 12 months. The airline plans to continue to expand its route network, which suggests that these numbers are likely to increase further in the next few years. The airport reported a record 10.7 million passengers in the third quarter of 2019, making it the busiest quarter and summer the facility has seen since it opened in 2014. Passenger numbers grew by 10.7% compared to the same period in 2018.

"The expansion of Hamad International Airport is a vital part of the future success of the Qatar Airways Group," said Group CEO, Akbar Al Baker, as the airport's expansion plans were revealed in late October 2019.

*Plans for the expansion focus on capacity and passenger experience – we want to provide even better airport journeys to more people around the world. The expansion will allow us to do this."

New cargo terminal

As well as expanding facilities for passengers, the airport's growth will also see the construction of a new cargo terminal. This will increase the capacity of freight-handling to an estimated 3.2 million tonnes annually. The new cargo centre is scheduled for completion by 2023, with three levels and three mezzanine floors and an 85,000sqm building footprint.

Apart from these functional improvements, part of Phase B involves developments to the airport's aesthetics.

An indoor, 10,000sqm tropical garden will be housed in a special section of the building with long, column-free areas that will enable trees and other flora from sustainable forests to be able to grow to their full potential. Special glass in the roof will control and filter the strong Gulf sunlight, allowing the trees gradually to acclimatise to their new, indoor environment.

More than 11,000sqm for retail and food outlets will be positioned below a 9,000sqm upper-floor Al Mourjan lounge with spas, gymnasia, restaurants and business facilities.

The whole building will be the first in the MENA region to achieve a four-star global sustainability assessment system rating, which looks at the 'green' credentials of buildings. The facility will also meet high standards of energy efficiency. Passports and other documentation are set to become things of the past for Emirates Airline passengers travelling between Dubai and the US, with the arrival of biometric boarding systems. Alan Dron reports.

When your face is your passport to faster travel



Digital scanning: The new Emirates Airline way to speed through an airport.

ou're heading into the security zone at an international airport. One hand is hauling your carry-on roller-bag, the other is carrying your briefcase or handbag. This is usually the point at which you have to begin a small but complicated juggling act, pulling out either a boarding card or smartphone, with its electronic boarding pass, then a passport as you approach departure control.

It's not a major problem, but it's one of a series of minor hassles that make getting on board a flight more difficult than you might like.

Those little irritations will shortly be in the past for passengers of Emirates Airline travelling between the carrier's Dubai hub and the 12 cities to which it flies in the US.

The airline, together with US Customs Border Protection (CBP), have cooperated in designing a system that does away with paper or electronic documentation and, instead, relies on a biometric scan of the passenger's face as they reach the gate for their flight.

The system was given its first outing last June in Washington DC, with the experiment being rolled out over the following two months to New York JFK and Los Angeles airports.

The intention is to expand its usage to the other nine US airports into which Emirates flies – Newark, Boston, Chicago, Dallas, Houston, San Francisco, Seattle, Orlando and Fort Lauderdale. This should have happened by the time this story is read, assuming the necessary equipment is installed on schedule. The system works like this: it takes a photograph of the passenger's face at the boarding gate, which is checked – usually within two seconds, according to CBP – against the huge gallery of digitised facial images held in its databank to verify the passenger's identity.

This, of course, depends on the CBP already having the passenger's facial data on file. So, if the traveller has not been to the US for many years, the system will reject them. In such cases, however, the passenger will simply have their identity manually checked by the gate agent, as at present.

Additionally, if a passenger does not wish to go through the scanning process, they can also choose to be boarded manually, as happens today.

The early tests in the US went well, said Emirates, with some flights achieving 100% biometric boarding and no manual checks. All data is held by CBP, not Emirates.

According to John Wagner, the CBP's deputy executive assistant commissioner in the Office of Field Operations: "CBP has been working with our stakeholders, like Emirates, to build a simplified, but secure, travel process that aligns with CBP's and the travel industry's modernisation efforts.

Streamlined identity verification

"By comparing a traveller's face to their passport, or visa photo, that was previously provided for the purpose of travel, we have streamlined identity verification that further secures and enhances the customer experience."

His comments were echoed by Dr Abdulla Al Hashimi, divisional senior vice-president at Emirates Group Security.

"Emirates continues to explore and invest in innovative solutions for hassle-free travel that help our customers fly better. Our ultimate aim is to help our passengers travel paperless, without the need for passports and IDs.

"We are talking with the authorities of several countries to make security using facial recognition technology more acceptable and accessible."

The Emirates-CBP tie-up is another move towards attempts to make airline passengers' experiences on the ground more palatable. IATA has for some time been keen to promote the 'one ID' system, whereby a single document – probably digital – will replace passports, national ID cards and boarding cards.

This has sparked concerns over passengers having to hand over increasingly large amounts of personal information to the authorities. However, IATA says that its surveys have shown that a large majority of people are prepared to surrender such information in the search for greater convenience.

That manual juggling act at security is likely to be just a memory in a decade's time.

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The future for air transport? Perhaps a very different format from today's that will require joined-up thinking from politicians, airports and airlines, suggests Dubai Airports' CEO, Paul Griffiths. Alan Dron reports.

Why bigger may not be better



There seems little doubt that air transport is approaching a tipping point. The recent groundswell of environmental concern over climate change and the aviation industry's role in it is making more people question current attitudes to air travel. For its part, the air transport sector is urgently seeking ways to mitigate its carbon emissions.

Dubai Airports' CEO, Paul Griffiths, believes that many established notions of what makes air transport work need to be looked at afresh. That includes considering how airports operate and what can be done to reduce those emissions, as well as lessening impacts on nearby residents.

On airliners, Griffiths said it has become clear that the way forward is with smaller, twin-engined types, rather than the Boeing 747 and the Airbus A380. This was despite the fact that "The A380 has been the lifeline of growth in Dubai... DXB is unique in having the throughput to support that aircraft.

"But it's the last of the line, rather than the first of the next. It's like more horses on the carriage rather than Henry Ford's Model T.

"Another massive change is the sensitivity around the ecological impact of the industry and its growth."

The aviation industry has moved towards addressing environmental concerns through measures, such as making aircraft lighter (thus burning less fuel), and making more efficient use of airspace and researching and adopting biofuels.

However, scaling up production of biofuels remained frustratingly slow and progress in reducing the amount of emissions "is painfully incremental, rather than breakthrough". The focus

 of approach
 to airport
 design and
 development
 simply must
 change.
 PAUL GRIFFITHS

That progress was likely to remain incremental, he said, as battery technology – deemed essential for hybrid or allelectric airliners – had improved only gradually over the past 100 years. Aviation kerosene was destined to be with us for many years to come. "The calorific density of hydrocarbons – the amount of power that can be extracted from a given amount of fuel – is still unparalleled."

Moving to ground infrastructure, Griffiths – speaking to the UK Aviation Club in London – noted that "Ultimately, an airport's success is defined by the ease of access it provides for the catchment area. If it's too difficult to build or expand airports, should we be looking at airport capacity through a different lens?"

Rapidly approaching advances in ground and local air transportation could enable a country to make far better use of its transport infrastructure, he said.

That could mean spreading passenger demand across a larger number of airports, rather than having everyone converge on a small number of congested sites. He suggested that technology could fairly soon allow these options – for example, a passenger could book an autonomous-drive 'sleeping pod' that could drive him or her through the night to a less-congested airport.

Urban air mobility

Alternatively, urban air mobility vehicles could, within a few years, fulfil the same function by being able to fly two or three passengers up to 100 miles (160km) at 125mph (200km/h).

"There is a huge amount of concern about the safety of autonomous vehicles, but it's nonsense. It's not the vehicles that are the problem, it's the humans.

"In the US, where they are most used, [hybrid vehicle manufacturer] Tesla reports cite one accident for every 3.34 million miles with the autopilot engaged. By comparison, the US National Highway Traffic Safety Administration's most recent data shows that, in the US, there is an automobile crash every 492,000 miles, which is about seven times worse.

"So, I would suggest that the need to build larger and larger airports could be eliminated if we could turn the model on its head, by distributing the demand across a wider geographic area instead of concentrating demand – and the associated noise and environmental impacts – into single highly congested airports.

"The focus of approach to airport design and development simply must change. It shouldn't be about how we create more capacity at pinch points but more about how we can use the latent capacity in the entire transport ecosystem and apply this on a global basis.

"Future airports will become intermodal hubs – connecting aviation with high-speed ground-based transport systems."

That, Griffiths admitted, meant getting politicians to think beyond their usual four-year terms in office to develop long-term intermodal strategies.

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The MENA region's biggest aerospace event, the Dubai Airshow, took place in November and lived up to the bype. Dave Calderwood, Alan Dron, Marcelle Nethersole, Steve Nichols, Alan Peaford, Jill Stockbridge and Alan Warnes report.

DUBAI <u>IS</u> THE REAL DEAL...



bubai's biennial aerospace and defence spectacular has been challenging the might of Farnborough and Paris since moving into the top three global air show events in the world.

FOCUS ON

And at the latest gathering, held at the Al Maktoum Airport/Dubai South/Dubai World Central, there was no question that it deserves its place.

With 1,288 exhibitors in attendance, 161 aircraft on the event's static display, and a packed schedule of conferences and keynotes, the programme was the show's busiest to date – as evidenced by the footfall of 84,043 trade attendees. Sales were also booming, with the order book on site reaching \$54.5 billion.

Biggest boost

UAE carriers gave Airbus the biggest boost with combined \$30 billion commitments for 50 A350-900 widebodies and 120 narrow-bodies.

Dubai's Emirates Airline is taking the A350s, while Sharjah's low-cost carrier, Air Arabia, placed orders for 73 A320neo, 27 A321neo, and 20 A321XLR aircraft.

The choice of the latest extra-longrange aircraft will enable Air Arabia to extend its destination offering, according to the airline's CEO, Adel Ali.

Both deals had been widely anticipated, and HH Sheikh Ahmed bin Saeed Al Maktoum, the chairman and CEO of Emirates, expressed his delight that the order – which formed part of a memorandum of understanding (MoU) earlier in the year – had finally been completed and would allow the airline to plan well into the future.

"The first aircraft will arrive in 2023 and be delivered through to 2028," he said.

"They are a good fit for us and give us greater flexibility."

He said plans included the introduction of a premium economy in the new type.

The original MoU had called for 30 A350XWB and 40 A330s. The A330s have been dropped from the firm order. The A350s will feature Trent-900 engines from Rolls-Royce.

Sheikh Ahmed said: "This \$16 billion deal reflects our confidence in the future of the UAE's aviation sector, and is a strong affirmation of Dubai's strategy to be a global nexus connected to cities, communities and economies via a worldclass and modern aviation sector."

Sharjah will be competing to connect cities with the Air Arabia expansion.

Ali said: "Air Arabia's fleet growth strategy has always been driven by commercial demand and we are glad to announce one of the region's largest single-aisle orders with Airbus to support our growth plans.

"This new milestone underpins, not only our solid financial fundamentals, but also the strength of the multi-hub growth strategy that we have adopted over the years, while remaining focused on efficiency, performance and passenger experience.

"We plan to expand our service to

further and newer destinations, while remaining loyal to our low-cost business model," he added.

The show's importance to the whole region was emphasised by a raft of African contracts being announced, along with the introduction of a new flag-carrier for Ghana.

Ghana signed for three Boeing 787 Dreamliners and six de Havilland Dash 8-400s as well. Meanwhile, Air Senegal signed an order for eight A220-300 aircraft with the first two to be delivered in 2021.

Bought the rights

De Havilland, which bought the rights to the successful turboprop from Bombardier, had a great show, also seeing further sales to Nigeria's Elin Group and signing a heavy maintenance agreement with Abu Dhabi's Falcon Aviation Services.

It also added a letter of intent for 20 Dash 8-400s from Dubai leasing company, Palma Holding.

While, naturally, there was a lot of talk at the show about the beleaguered 737 MAX aircraft, Boeing was able to celebrate orders for 60 of the currently grounded but still global best-selling aircraft.

Kazakhstan carrier, Air Astana, wants 30 of the jets; Turkey-based airline, SunExpress, added a firm order for 10 to an earlier order of the type; and an "undisclosed buyer" was reported to have ordered 20.

Above: Ghana's minister of Aviation Joseph Kofi Adda (right) and Boeing's Herb Wallen (second left) celebrate with Ghanaian colleagues.

Right, top: Todd Young, De Havilland Canada's chief operating officer.

Right, centre: Sheikh Ahmed: "This \$16 billion deal reflects our confidence in the future of the UAE's aviation sector."

Right, bottom: Air Arabia CEO, Adel Ali, and Airbus CCO, Christian Scherer at the signing.

DUBAI AIRSHOW REVIEW









UAE SPRINGS SURPRISE WITH GLOBALEYE

The Saab GlobalEye was a headline-catcher for the region's defence industry as it made its debut appearance at the show – four years after the UAE Air Force announced it was to buy the highly modified Global 6000.

The UAE has ordered three GlobalEyes as part of a \$1.27 billion deal, with deliveries expected to be completed over the coming two years.

But, in an announcement that even surprised manufacturer Saab, the UAE said it aims to spend \$1.02 billion on two additional GlobalEye swing-role surveillance systems.

Major General Ishaq Saleh Albloshi, the UAE's assistant undersecretary for defence industry and capability development, said: "We are part of the GlobalEye success and very much appreciate what Saab is doing to support our armed forces.

"Saab decided two years ago to become a strategic partner with the UAE and we are very proud. I think they have done everything to help us and improve our industrial abilities through research and development by building capabilities here in the UAE. It's why they are such a good partner."

Three additional Airbus A330 MRTTs were also selected by the UAE to add to its existing fleet of three. Albloshi believes the new tankers are a top need and he hoped the aircraft would be delivered by 2021.

With missions over Yemen and the increased threat from Iran, there is obviously a need for more air-to-air refuelling capability.

The Airbus deal will come as bad news for Boeing, which was hoping to sell two KC-46As to the kingdom.

Albloshi concluded: "The A330 MRTT is in operational service and the KC-46A is still under development and evaluation."

There was even more excitement as the show drew to a close and UAE aerospace company, Calidus, scored its first contract for the B-250 light-attack aircraft, with the United Arab Emirates placing an order for 24 aircraft. The contract, worth about \$620 million, represents the first time the UAE military has purchased a domestically produced aircraft.

The first B-250 aircraft was unveiled at Dubai Airshow 2017 and was shown at the 2018 Bahrain International Airshow, and at IDEX in February last year. It has now finally got the launch sale it has been waiting for

The Calidus B-250 could potentially attract customers from all over the world because, unlike its rivals – the Embraer A-29 Super Tucano and the Beechcraft T-6B Wolverine – the aircraft should not be regulated by International Traffic in Arms (ITAR) rules. Thus, the US cannot call the shots on who buys it.

In other defence highlights, a Boeing CH-47F Chinook cargo helicopter took its place on the display line as the US State Department revealed it had approved the sale of 10 of the type to the UAE.

Meanwhile, Leonardo and Diamond Aircraft displayed an upgraded DA62 mission surveillance aircraft (MSA) fitted with the Gabbiano ultra-light TS-80 radar. Its designation signifies the 80 watts of power it is able to output to achieve long-range surveillance.

Two years after the UAE MoD announced that it had ordered five Airbus C295 aircraft, the first one made a public appearance at the Dubai show, while the hosts also announced that it is going ahead with its much-publicised Dassault Aviation deal covering "enhancements" to the emirates' fleet of Mirage 2000 fighter jets.



Attractive bet: The Calidus B-250 should not be regulated by ITAR rules.



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DUBAI AIRSHOW REVIEW



ROTORCRAFT

FOCUS ON

Dubai takes a tilt at heli-terminal

The world's first helipad and terminal for the civil version of Leonardo's AW609 Tiltrotor aircraft was unveiled by Gian Piero Cutillo, managing director of Leonardo's helicopter division, and Captain Raman Oberoi, chief operating officer of Abu Dhabi-based Falcon Aviation.

The first heli-terminal will be built on the site of the Dubai 2020 Expo, and be available to all visiting helicopters offering VIP, business, lounge and onward travel services. It will also be accessible to all types of passenger, including the disabled.

The new terminal could also be a base for new vertical take-off and landing (VTOL) air taxis expected to debut during the expo.

There was far more helicopter activity at the show than in previous years.

Largest operator

A number of deals were announced, with Horizon International Flight Academy signing for 12 Bell 505 single-engine helicopters, valued at \$13 million, becoming the largest operator of Bell 505 trainers in the world.

The 505s, also known as the Jet Ranger X, will join Horizon's Bell-only fleet at Al Ain International Airport Zone. They are purpose-built for flight-training to local and international students for the civilian and military sector.

The largest helicopter operator in the Middle East and north Africa, Abu Dhabi Aviation (ADA), ordered another five helicopters from Italian OEM, Leonardo. The three AW139s and two AW169s will join ADA's fleet of 16 AW139s already in service. It's ADA's first order for the AW169 light-intermediate size helicopter.

"This agreement is to support the oil and gas industry inside and outside the UAE, and to satisfy transport, air ambulance and other needs, in light of expected high demand in 2020," said HE Nader Ahmed Al Hammadi, chairman of ADA.

Russian Helicopters was also making a mark at the show with several exciting and innovative rotary craft.

Top of the list was the international debut of the civilian passenger version of the Mi-38, which Andrey Boginsky, the company's director general, proudly claims is one of the fastest helicopters in the market segment, with a top speed of 300km/h.

However, speed is only part of the proposition, he said, with cost per seat per kilometre being a more powerful metric for customers.

Indeed, customers and safety are priorities for Boginsky, who confirmed that the first two passenger Mi-38s have been sold to the Russian Ministry of Defence as transport helicopters – with two more in VIP trim heading for Russia's president, Vladimir Putin, in 2020.

Also at the show was the Ansat lighttwin helicopter, making its Middle East debut with the corporate five-seat version taking part in the flight display.

And one new market drawing attention

Above left: The Helicopter Company's CEO, Yahya Al-Ghoraibi, announced the start-up had achieved its AOC in near record time.

Right, top: The world's first helipad and terminal for the civil version of Leonardo's AW609 Tiltrotor aircraft was revealed in model form at the show.

Right, bottom: Russian Helicopters claims the Mi-38 has a top speed of 300km/h. was Saudi Arabia – but a home-grown business could be dominating the market.

The Helicopter Company (THC), set up with \$151 million of public finance to establish helicopter services across the kingdom, announced at the show it had achieved its all-essential air operator's certificate (AOC) in near record time.

"When we started, we realised the importance of having the AOC," said Yahya Al-Ghoraibi, chief executive, who formerly led Alsalam, the MRO company. "You cannot operate in the airspace without it. We made an arrangement with the GCCA and we agreed to a milestone that we would fulfil and they would support.

Challenging task

"It was a very challenging task and took us 10-12 hours every day. We managed to get there ahead of the pre-agreed time. I have to credit the regulator – they were very supportive, while also being very strict in applying the rules and regulations."

The Helicopter Company is now authorised to operate in the airspace of the kingdom, the Middle East and Africa. "We are the only Saudi company licenced to operate in the kingdom. We cover the VIP sector and tourism, and emergency medical services (EMS) as the need arises.

"We started flying operations at the end of July and have made more than 120 flights so far. We have a number of aircraft, including the AW139. We will soon be up to 10 aircraft," said Al-Ghoraibi.

FOCUS ON

GENERAL AVIATION



LIGHTNING READY TO STRIKE IN E RACE

The world's first electric racing aircraft, called White Lightning, was unveiled at the show. It will race at 250mph side-by-side with up to seven other aircraft in Air Race E, a new series starting later this year.

The aircraft was unveiled by air racing promoter, Jeff Zaltman, and Sandra Bour Schaeffer, head of group demonstrators at Airbus, which is supporting the pioneering series as official founding partner.

"This is a monumental moment," said Zaltman, "Air Race E offers the opportunity for teams from around the world to play a part in creating aviation history and contribute to finding a solution to cutting carbon emissions from air transport."

Bour Schaeffer confirmed Airbus' interest

ENVIRONMENT

GREENLINER TO SPEARHEAD ETIHAD'S ECO BATTLE

Etihad Airways will use a specially liveried Boeing 787 as the focus of all its environmental efforts - and share the results of any benefits with the entire aviation industry.

Speaking at the show, Tony Douglas, Etihad Aviation Group CEO, said that the 787, to be dubbed the Greenliner, will be used as a testbed for myriad environmental initiatives. If they prove themselves useful, they will be rolled out across the fleet, but will also be made publicly available.

The airline's move comes against a background of growing concern about the environment, which has taken tangible form in the Swedish 'flight shame' campaign that urges travellers not to fly.

IATA, the airline industry's representative organisation, has said that although carriers are making significant strides in reducing their environmental footprint, they must tell their story more forcefully to the general public.

Douglas insisted that the Greenliner was

was part of its drive towards de-carbonising air transport, "We believe in the technology," she said

White Lightning was built by Condor Aviation, a specialist engineering company in the UK, headed by Martyn Wiseman, who said the most difficult engineering challenge was the tiny aircraft's weight and balance because of the batteries required.

Light aircraft were also proving a huge buzz in the flying display as four Extra 300 aerobatic aircraft, flown by former Red Arrows pilots. proved they could show all the manoeuvres that you would see in the display jets. The Extras are now popular for upset recovery training and this flying display team - known as the Blades showed just how well this could be done.

Electric dreams Jeff Zaltman with Sandra Bour Schaeffer.

DUBAI AIRSHOW REVIEW

SPACE

UAE'S MARS PROBE SET FOR JULY LAUNCH

A Women in Space' conference, held as part of the Dubai show, saw plans for the UAE's Mars 'Hope' probe being outlined.

The Arab world's first probe to the Red Planet is due to blast off this year and reach Mars in 2021, in time for the 50th anniversary of the UAE. The rocket must leave Earth during a brief "launch window" in July 2020 - no ifs, no buts.

Salem Humaid Al Marri, assistant director general for science and technology at the Mohammed bin Rashid Space Centre (MBRSC), said: "Once in orbit, Hope, which was named after a public campaign, will explore the Martian atmosphere using scientific instruments that include visible, infrared and ultraviolet spectrometers."

It will also study the dynamics of the Martian atmosphere and its interaction with outer space and the solar wind.

The route to Hope has been arduous – the MBRSC has now launched four satellites and the last one, KhalifaSat, was the first to be a fully Emirati-built project.

But the Martian probe is a whole new ball game in terms of its complexity.

Its data should help scientists build a holistic model of the planet's daily and seasonal cycles, and may explain why Mars lost a lot of its atmosphere to space.



Hoppy-golucky: Pavlo Tanasvuk. Spacebit . CEO, with the lunar landerhopper.

The exhibition halls also had a space focus. A prototype of the UK's first ever lunar lander-the Spacebit lunar lander-hopperwas unveiled at the show.

Spacebit has also confirmed that its Spider Moon rover is scheduled to be tested in the Emirates prior to its launch in spring 2020.

The rover is currently in its final development stage and, along with tests in the UK, will be tried out on suitable grounds similar to the Moon's surface in Abu Dhabi.

Research on a precise UAE testing location is under way, with Jebel Hafeet in Al Ain likely to offer the ideal terrain needed for the world's smallest robotic Moon rover, which has legs instead of wheels.

Pavlo Tanasyuk, Spacebit CEO, said: "Our lunar lander is different as it incorporates the ability to hop from one landing site to another. It has embedded additional hardware, control and navigation software that will provide further on-surface mobility by repurposing it as a hopper."



"not just a box-ticking exercise". The project was a strategic partnership between Etihad and Boeing that aimed to make a genuine difference in championing environmental measures.

Douglas said Etihad was already undertaking initiatives, such as reducing the amount of single-use plastics on board its fleet by 40%, and hoped to get to 80%. However, if that meant replacing plastic cutlery and glasses with metal and glass, the aircraft's weight would rise, undermining the object of the exercise.

Not just ticking boxes: Tony Douglas (left) and Boeing CEO Stan Deal.

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BUDHA



Excellence in Motion

<image>

The business-friendly environment of Dubai is once again the venue for MRO Middle East, the largest event of its kind in the region. **Chuck Grieve** previews the show and summit.

Well-oiled show in no need

RO Middle East returns in February, with buyers and sellers from around the globe converging on Dubai's World Trade Centre for another three days of intense business activity.

Prominent among the global and regional MRO operations at the show will be Abu Dhabi's Sanad Aerotech (formerly TS&S) and Etihad Airways Engineering, Boeing Global Services (BGS), Lufthansa Technik, MTU Maintenance, Turkish Technic, Saudia Aerospace Engineering Industries (SAEI), Satair, Joramco and many other key businesses.

Business France once again heads a large French contingent. SMEs are also well-represented.

Organisers expect to improve on 2019 when the annual twoday exhibition, with its associated one-day summit, attracted 5,000+ visitors from more than 70 countries. Caryn McConnachie, aerospace director of organiser Tarsus F&E Middle East, said the 2019 edition highlighted "a real growth in the interest from exhibitors and the quality of the visitors", while the volume of business announced at the show demonstrated a "demand in the market for these kind of focused events".

This annual MRO Middle East summit on February 24 has a well-earned reputation for airing issues and opportunities in the regional market. This year's event promises insights into the changing aftermarket landscape, the impact of disruptive technologies and emissions targets, and more.

Summit delegates this year can join the debate at one of nine roundtable discussions, each led by a leading figure in the Middle East MRO industry.

On the exhibition floor, Boeing Global Services (BGS) arrives with a new chief executive, Ted Colbert, and a vision for pursuing "good growth, profitable growth". A spokesman said



Possibilities: MTU Maintenance views the Middle East as a fast-growing market for engine services.

the show presents an opportunity to showcase the way BGS supports and partners with its customers.

The exhibition will also provide a platform for MTU Maintenance, which plans to use the occasion to officially open its Middle East representative office, located near Dubai International Airport.

"The Middle East is key to us as some of our largest customers are based here and it is a fast-growing region in terms of engine services," said Sami Ben-Kraiem, vice-president marketing and sales for the Middle East and Southeast Asia. "While MTU has always been present in the region, this move brings us even closer to our customers."

Etihad Airways Engineering executives will be talking up their innovative work with Boeing on the 777 ecoDemonstrator flying testbed, on which the MRO and its partners tested their "revolutionary" intelligent and smart cabin, dubbed the i+sCabin.

SHOW PREVIEWS



Far left: MRO Middle East provides a platform for innovation for companies such as Abu Dhabi's Etihad Airways Engineering. Centre and right: The ExLRT loop-testing tool has its Middle East debut at the exhibition.

of overhaul

Etihad Engineering's chief executive, Abdul Khaliq Saeed, recently named aviation executive of the year, last year commended MRO Middle East as "the best platform" to showcase the full range of his company's MRO capabilities.

Among those capabilities this year is additive manufacturing (AM), after the company opened the region's first EASAapproved AM facility.

Etihad Engineering's recently signed supply contract with Satair is likely to provide a talking point for both companies at the show. Airbus subsidiary, Satair, distributes parts and components, including those of OEMs, to multi-fleet airlines and MROs.

Sanad Aerotech returns with more news of innovation geared to customer service. A recent addition was an automated maintenance process tool, which joins its battery of advanced technologies, including radio-frequency identification (RFID) and blockchain applications.

Sanad chief executive, Mansoor Janahi, said these newly deployed assets support the MRO's evolution into "a leading global MRO player that embraces breakthrough technologies to enhance operational efficiency".

Another regular exhibitor, Liebherr-Aerospace, is at the show to promote its support for Middle East operators directly, and also through OEM Services, its international joint venture with Diehl Aerospace, Thales Avionics and Zodiac Aerospace. Liebherr will be talking about its new 'USM by Liebherr' service, which is managed from Dubai.

Visitors have come to expect an array of advanced technology on show and demonstration. Among products having their Middle East debut is the ExLRT loop-testing tool. Developed by MK Test Systems in collaboration with Boeing, and newly certified, the ExLRT is described as light, intrinsically safe and user-friendly. Visitors can see it on Prime Aerospace's stand. Attendees at Aircraft Interiors Middle East (AIME) 2020 can expect to see the latest innovations from leading suppliers – from lighting and seating to carpets and materials. Marcelle Nethersole reports.

BILLIONS AT STAKE AS COMPANIES AIME FOR A SHARE

More than 5,000 visitors are expected to attend AIME 2020 at Dubai World Trade Centre on February 25-26 – and the reasons for that are obvious.

IATA is predicting 8.2 billion annual passengers by 2037, with the centre of activity moving eastward to the Middle East and Asia. The aircraft interiors industry has a compound annual growth rate (CAGR) of 5.87% and is predicted to be worth \$40.2 billion globally by 2025.

With this in mind, Caryn McConnachie, aerospace director of show organiser Tarsus F&E LLC Middle East, said: "The industry is very aware of the potential in the Middle East. We are seeing increased interest in AIME from exhibitors seeking to take advantage of the regional opportunities.

"Business France, the national agency for the international development of the French economy, will again arrange a French pavilion. Other international exhibitors already committed to the event include the US-based Schneller, and Mercury Airchair."

Austrian materials provider, Boxmark Leather, will use the exposure to the market to promote its newly developed leather, Queen.

"Queen is a full grain leather with a natural pattern," explained Christian Schober, key account manager. "It has an elegant silky hand, full body structure and is ideal for business jets, VIP, first-class or business class projects."

Among those exhibiting for the first time this year are Anjou Aero, True Blue Power, Brasil Green Technologies and Beijing Cronda Aviation Technology – demonstrating the international reach of the event.

The show, which is co-located with MRO Middle East, also sees a two-day conference focusing on in-flight entertainment and connectivity (IFEC) and offers the opportunity to network with leading regional and international airlines – the last edition of the event attracted more than 500 airline attendees keen to do business at the show.

"AIME is the Middle East's only dedicated aircraft interiors event, and one of the key benefits of this is the focused atmosphere and nature of the networking opportunities – in particular for SMEs or smaller suppliers to have the opportunity to interact with key industry decision-makers and attending airlines," said McConnachie.

"With 330 exhibitors expected at the event, all sectors of the aircraft interiors industry will be represented, and attendees will be able to interact with them, experience products firsthand, and drive their businesses forward." She added that the industry is also seeing new trends emerging.

"AIME is the ideal platform to discover trends and future innovations in the aircraft interiors market," she said.

"Most of these trends are driven by technology, economic pressures and passenger expectations, and, as airlines in the region continue to grow their fleets, they are also investing in interiors to meet these demands. In particular, in-flight entertainment and connectivity are experiencing a boom.

"Passengers want an easy-to-use and fully integrated connectivity throughout the flight to enjoy their content. Trends include maximising the potential for them to use their own devices, in addition to increasing onboard options, driving demand for charging and power, as well as connectivity access and in-flight WiFi."

McConnachie said many airlines were looking for flexibility across all classes for better commercial outcomes.

"Rather than three distinct price points, the future has much greater consumer options to suit personal budgets and a cabin to match," she said.

"Health and wellness will also become more important as some flights exceed the 20-hour mark, placing increased importance on break-out areas for all passengers. The best place to learn about trends in aircraft interiors and discover more about them will be at AIME 2020."

Caryn McConnachie: "Most trends are driven by technology, economic pressures and passenger expectations."

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FOCUS ON

SHOW PREVIEW

After almost a decade of disruption, north Africa could see a boost in aviation activities. A new show in Cairo is set to bring the region's industry together ...



Early discussions: EgyptAir group **AVIATION MENA OPENS** chairman and CEO, Ahmed Adel, talks to Alan Peaford about plans for **THE DOOR TO OPPORTUN**

battered north Africa is well on the road to recovery with its airlines leading the way. Across the Red Sea, Arab carriers away from the 'Gulf big three' - Emirates, Etihad and Qatar - are also reviving their fortunes with innovative programmes and partnerships.

At the heart of the revival is Egypt, whose national carrier, EgyptAir, has put its recent national woes behind it, with a restructuring plan now well under way.

The airline is climbing back to a place where it can challenge market leaders, both across Africa and with its traditional Middle Eastern connections.

The airline's seat capacity grew by 5.6% in 2019 and it has seen that grow even further during the early part of 2020. It is expecting 21 deliveries during this year - increasing the current fleet by a third.

So, no wonder then, that a new event from Times Aerospace, publisher of Arabian Aerospace, sets out to explore

these developments and to investigate the opportunities that exist for international industry to help stimulate growth

Aviation MENA takes place at the Hilton Cairo Heliopolis Hotel on June 9-10, 2020.

"Aviation MENA will be bringing the whole region together with a summit and exhibition that will break down the 'haves' and 'have-nots' and share the aspirations and plans of the industry players from across the region," said the show's managing director, Mark Brown.

"Airlines from the re-emerging countries, such as Iraq, Syria, Lebanon and Libya, will join the established players from Jordan, Morocco and Saudi Arabia to share thoughts and strategies and meet with the international audience and supply chain personnel who they want to work alongside.

"Saudi Arabia, Jordan and Turkey are also playing a key role in the event and we are expecting more than 100 companies to be involved as exhibitors and sponsors," added Brown.

Delegates will get a first-class opportunity to meet the key players from around the region. ALAN PEAFORD

the 2020 Aviation MENA event.

The development of low-cost carriers, competition threats from Europe, and the opportunity for new carriers from Tunisia and Libya, are among the key subjects for discussion.

Issues like airport development, challenges in conflict zones, training standards, maintenance and safety, and ground-handling will form the core of the summit discussions, with speakers from government, civil aviation authorities. airlines, airports and aviation services companies.

"The event is being produced in partnership with EgyptAir and Egypt's aviation ministry, who will be inviting colleagues from across the region to the historic aviation capital," said summit chairman Alan Peaford.

"We are working closely with EgyptAir's leadership to ensure the conference programme is relevant and interesting. Delegates will get a first-class opportunity to meet the key players from around the region."



AACO AGM

here is little doubt that the business landscape for many of the Middle East's major airline players has become more difficult over the past two years.

FOCUS ON

The 'big three' Gulf carriers – Emirates Airlines, Etihad Airways and Qatar Airways – have all recorded sharply reduced profits or large deficits over the past year as rising fuel prices, commercial hurdles, and geo-political forces outside the airlines' control, have made their impact felt.

Continuing conflicts in Libya, Yemen and Syria have also severely affected those countries' airlines and have restricted the ability of carriers from outside those areas to operate services into them.

On the plus side, the growing strength of low-cost carriers (LCCs) and the rapid emergence of Saudia as the fourth major player in the Gulf demonstrates that there is still a hunger for air travel and the opportunities for growth in the market.

Cautious optimism

That cautious optimism was reflected in the speech given by the Arab Air Carriers' Organization secretary-general, Abdul Wahab Teffaha, at the

organisation's annual general meeting. He gave several reasons for his optimism, including:

- passenger confidence that the quality of service of Arab carriers was among
- the best, if not the best, in the world;
 a constantly-developing airport infrastructure in the region;

a young population;

- the region's central geographic location;
- and the heritage and natural diversity that made the region a popular tourist destination.

To assure the continuation of the crucial role of air transport in the economy of the region, he asked the region's governments to continue adopting flexible policies with regards to traffic rights and market access, the expansion of airspace capacity through its flexible use by civil and military authorities, and to combat the negative effect of taxes and fees on civil aviation.

The last of these eventually resulted in negative effects on the tourism industry that was so important to many countries, he pointed out

He noted that, after a decade when annual growth rates had been high, this was faltering due to the combination of the global economic slowdown and the geopolitical crises in the region. Calls for more cooperation and a liberalisation of rules governing the airline industry were among the main results of the 52nd AACO AGM in Kuwait. Alan Dron reports.

Teffaha: Why we all need our flexible friends



Indicators were that, while the industry in the Middle East would continue to grow, it would do so at a lower rate than before. Similar lower growth factors were a concern globally.

He said that, although the Middle East and north African airline market was, in many ways, similar to that of Europe, the lack of a single market in the Arab world meant that the consolidation that had been apparent among European airlines in recent years had not happened in the Middle East.

The links between the two regions will be marked by an Arab-Europe aviation summit in Beirut in March 2020.

Teffaha talked of the major issues facing airlines, of which addressing climate change and mitigating airlines' environmental impact had climbed to the top of the agenda.

Sustainable fuels

Development of technology, improvement of airport and airspace infrastructures, use of sustainable fuels and market-based measures, were the way to tackle the problem, he said.

Like many in the airline industry, he questioned whether the plethora of 'environmental' taxes and fees introduced by governments in many parts of the world would actually be reinvested in improving the environment.

For example: "Unfortunately, we haven't yet witnessed serious investment to produce enough sustainable fuel."

On airline security, Teffaha also highlighted the fact that the 2014 Montreal protocol, which seeks to deal more effectively with unruly passengers, has still not come into effect. For this to happen, one more state must ratify it. Even when the protocol does eventually come into effect, it will only apply to flights between states that have achieved ratification.

Among resolutions adopted by the AGM was one that encouraged states to avoid protectionist policies in the air transport sector and also to avoid adopting unilateral and extra-territorial measures that could affect the sector's development.

The AGM also noted that airlines are suffering from a proliferation of passenger rights regulations that, in most cases, contradict international agreements that regulate airlines' liabilities; carriers were being penalised with often disproportionate fines for delays that were not under their control.

Left: Abdul Wahab Teffaha: Five reasons for optimism.

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MAINTENANCE

The engine aftermarket is proving to be a moveable feast as numerous factors – some predictable, others not – converge. **Chuck Grieve** reports.

'PERFECT STORM' CLOUDS THE ENGINE AFTERMARKET

By the end of 2020, nearly 70,000 civil aircraft engines are expected to be in service. Analysts predict that just three narrow-body engines will account for 50% of that market: the CFM56 family with one-third, followed by the IAE V2500 and General Electric (GE) CF34 with 9% and 8% respectively.

The MRO demands of this fleet, which is well represented in the Middle East, are unprecedented. It has the makings of a "perfect storm", in the opinion of Sami Ben-Kraiem, vice-president marketing and sales, Middle East and Southeast Asia for MTU Maintenance.

David Archer, senior analyst at the independent aviation consultancy, IBA, said the industry had seen this situation approaching for a long time as a consequence of the rate of delivery. Compounded by delays to new programmes and the number of concurrent mature and first-run shop visits, a squeeze on MRO slots "had to happen".

What nobody could forecast were factors such as the way low fuel prices and high air transport demand have lengthened the service life of older engines, which adds to the maintenance burden and reduces the stock of used serviceable material (USM). Combined with shortages of new parts from OEMs, who are focused on their latest products, operators face an engine overhaul bottleneck.

Ben-Kraiem said MROs foresaw the increase in shop visits for newer versions of the CFM56 and V2500 engine families to peak demand by the mid-2020s.

But new-generation engines are also entering the shops earlier than anticipated, a trend that will accelerate in the coming decades.

"All this has led to our shops being fully loaded worldwide," he said, adding that operators who have failed to plan ahead could be left in the cold.

Archer said demand – especially among narrow-body operators – will remain "close to its peak" for another four or five years. "After that, we'll see a steady decline but no massive cliff-edge. That's the cyclical nature of the market."

In the short term, he said, there are winners and losers. The grounding of the Boeing 737 MAX fleet and teething



Adding pressure: New generation engines are entering the shops earlier than anticipated.



Above: David Archer: A healthy aftermarket is good for everybody. problems with LEAP and geared turbofan (GTF) entrants has put a premium on CFM56-7B engines, for example.

While the agreement by CFMI to drop what were seen as anti-competitive practices surrounding third-party maintenance of its engines is "obviously beneficial", Archer has seen little or no change because of it.

In reality, he said, the agreement struck with the International Air Transport Association (IATA) a year ago put into writing what the company was already doing, while removing pay-walls related to documentation, for example. "Privately, other OEMs have said if IATA came to them, they'd be open to similar agreements," he said. "After all, a healthy aftermarket is good for everybody."

Growing emphasis

The growing emphasis on narrow-bodies has left the widebody market somewhat adrift. There, Archer said, the latest engines on types such as the B787 and A350 are in general "doing well", their value depending ultimately on their condition.

He reports a "limited aftermarket" for older B777 engines, such as the Rolls-Royce Trent 800, PW4000-112 and GE90-7/8/9.

Issues with newer wide-body powerplants, notably the Trent 1000, have boosted demand for A330 engines, including the Trent 700, CF6-80E and PW 4000-100.

The demise of the A380 programme leaves the Trent 900 and GP7000 with limited options. Four on each of the 250 aircraft ordered make for "a lot of engines" with predominantly low cycle utilisation typical of long-haul operations.

Part-out will benefit only the remaining, diminishing fleet. "It depends how long the fleet stays in service," said Archer. "In 20 years, materials will get used up." After that, scrap or possibly alternate uses as terrestrial powerplants could be their fate.

MROs will feel the effect if investors believe they have minimal chances of recouping the cost of expensive maintenance, but for now, demand is strong and shops remain full.

ENVIRONMENT



Firnas breathes new life into recycling aircraft

Firnas Aero Technics wants to embrace the new culture and seize opportunities regarding dismantling and storage of end-of-life aircraft. Anuradha Deenapanray Chappard and Vincent Chappard report. ccording to estimates, between 8,000 to 10,000 aircraft will reach their end of life within the next decade.

With air traffic expected to double by 2030, the airline industry will need to find capacity to store, dismantle and recycle these aircraft.

Today, they are largely stored in deserts transformed into vast aircraft graveyards, particularly in the United States.

The safe and smart management of their end of life is, therefore, a crucial issue in terms of the environment, public health and regulations. Consequently, recycling and re-use of aircraft components has much scope.

Few companies are currently fully engaged in the storage and dismantling of aircraft, particularly in Africa and the Middle East. Global supply for the service is limited, while demand is growing rapidly.

Now a young Tunisian start-up – Firnas Aero Technics – has recently joined the market. It has a clear vision of offering efficient technical services, a diverse portfolio of products, and the highest national and international standards of quality across all operations.

The company specialises in aircraft maintenance, disassembly, storage consulting and provides cost-effective serviceable certified parts for direct re-entry into service or into stock.

"Our strategy is to reduce the size of aircraft cemeteries around the world," explained director Nader Torjeman. "We offer tailor-made solutions for storing and dismantling end-of-life aircraft for airports, airlines and rental companies."

North Africa has a major card to play in the dismantling and recycling of airframes as Torjeman pointed out it has an ideal environment and climate for the storage of aircraft.

According to Torjeman, the Firnas Aero sites offer convenient



MAINTENANCE

CONTINUED FROM PAGE 75

local storage solutions, enabling rapid induction and redeployment of aircraft through a sustainable development process, while operating in conditions of optimum safety, industrial performance and respect of the aircraft and the environment. The company provides a real alternative to aircraft owners (companies, charterers, brokers) as well as fully integrated aircraft asset management solutions.

"We offer not only disassembly services but also aircraft maintenance and recycling services once they have reached the end of their life cycles," he said. "This process includes full service-controlled aircraft teardown. We also provide flexible short and long-term storage, return-to-service checks, aircraft-on-ground (AOG) support, airworthiness directives (AD) and line maintenance programme up to Acheck. In addition, we can be at the customer's location, when and where required."

Engine dismantling

The company has also set up a facility dedicated to engine dismantling, providing customised solutions ranging from certified quick engine change (QEC) processes to complete engine recycling. It is Part145 and EASA certified.

The dismantling of aircraft also meets a vital need for MRO workshops. Sourcing and access to spare parts (equipment, engines) at competitive prices are key elements to provide support and an optimal level of service to companies. The availability of spare parts also helps to reduce turnaround time and shop visit



costs, for both MRO operators and airlines. Firnas Aero Technics plans to set up storage and decommissioning sites worldwide. The first one, comprising of a warehouse and relevant equipment, will be located at Tabarka Airport in Tunisia. The project is being finalised and the site will be operational by mid-2020.

The company wants to grow regionally. The Moroccan authorities have granted it a concession at El Rachidia Airport.

According to Firnas Aero Technics, its plants in Tunisia and Morocco provide various advantages, mainly in terms of proximity and deployment to west Africa. These countries offer an interesting legislative framework and competitive costs. Firnas Aero Technics is also finalising the construction of an MRO hangar in Marrakesh, with a storage capacity of two business jets, to initially launch a maintenance line. It has required certifications from EASA and the Moroccan authorities.

Torjeman said that even though there's a real demand in this sector, there's a lack of capacity.

The company has started the second phase of its project with the construction of a new hangar for heavy maintenance, to be completed within a year.

It plans to seal financial (banking) and technical partnerships for its MRO activity.

The company is also now working on other expansion projects in Asia and in the Middle East.

Building up its teardown

Since 2016, Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) has been developing an aircraft dismantling business to improve its supply of spare equipment and engines.

Several hundred pieces from these aircraft will be recertified before being resold or to feed the global network of spare parts and the company's workshops.

As an airline-MRO, the group has a full insight into the fleet plans of its clients, enabling it to tap the investment opportunities within the dismantling market.

The AFI KLM E&M teardown management entity centralises the coordination of all activities, from sourcing to trading and parts availability, and offers the required flexibility to respond to investment opportunities, matching the needs of maintenance.

These operators invest first in the purchase of aircraft. AFI KLM E&M recently announced the setting up of a subsidiary company dedicated to the sourcing of aircraft and the management of their dismantling to upgrade recovered assets, in support of maintenance activities.

Tarmac Aerosave dismantles its first A380

Tarmac Aerospace is a major operator in the dismantling and storage of aircraft. This joint subsidiary of Airbus, Safran Aircraft Engines, and Suez realised the first project (initiated a year ago) by dismantling an Airbus A380 in November.

This operation was managed in collaboration with German asset manager, Dr Peters, and the American company, VAS Aero Services, for the sale of spare parts.

More than 90% of the total weight of the aircraft has been recycled and spare parts are now available on the market.

Two more A380s are currently in storage and in transition.

Keeping the A380s in working order allows them to return to service at any time, according to Tarmac Aerosave. Since 2007, 560 aircraft from all manufacturers, out of a total of 850 stored, have been put back into service.

Patrick Lecer, Tarmac Aerosave CEO, said: "We are very proud of this industrial success, obtained with the largest aircraft currently in service in the world. Tarmac Aerosave pursues its objectives of innovating and adapting to the air transport market, anticipating the needs of its customers and the evolution of environmental standards."



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TECHNOLOGY

Product lifecycle management (PLM) is more important now than ever as complexity in products and processes skyrockets and digitalisation becomes the norm. **Chuck Grieve** looks at some approaches to this challenge.

Awakening the digital sleepers



omplexity is the hallmark of the modern era, and few places more so than aviation. Not only are aircraft and their systems increasingly complex, the myriad laws and regulations governing every aspect of their lifecycle demand pin-sharp attention to detail for compliance.

Enter product lifecycle management (PLM), a philosophy and the systems to support it. PLM is the digital gateway for people to access critical information and work with others in different disciplines throughout the product lifecycle, from design and manufacturing to service and repair.

With its origins in automotive engineering and military aviation, PLM has become a key element of modern manufacturing and subsequent aftermarket processes. Its value lies in managing complexity with effective information and communication technology (ICT).

Supporting profitable products

Graham McCall, vice-president operations UK for software provider, Aras, has observed that an emphasis on engineering leaves some PLM systems weak in other processes critical to developing, manufacturing and supporting profitable products. What's needed, he said, is resilience.

Writing for *ADS Advance*, McCall said the four key functions of a resilient platform are to provide contextual information, coordination, collaboration and management throughout a product's lifecycle. "A resilient platform... is fundamental to breaking down barriers and building trust in data, so teams can work together efficiently and effectively."

Boeing's Ted Colbert, newly appointed to lead Boeing Global Services (BGS), told *Arabian Aerospace* at the

Supporting PLM: Boeing's AnalytX is the Seattle airframer's wide-ranging suite of digital monitoring and management tools.



Middle East focus: Liebherr has centralised its USM certified parts line of business at its Dubai Service Centre. PICTURE: LIEBHERR.

recent Dubai Airshow that he believes the biggest 'sleeper' area of growth could be digitisation – leveraging new opportunities that take advantage of data to support decision-making: "To inform the operator, inform the mechanic, inform the planner."

Lifecycle management is, of necessity, a partnership between OEMs and their customers. Boeing identifies its various digital monitoring and management tools as Boeing AnalytX. A spokesman said AnalytX is neither a single software application nor "just a platform"; rather it represents a collection of services and solutions designed to help operators improve situational awareness, increase performance and optimise processes.

In the MRO space, Boeing recently deployed its Boeing optimized maintenance program with Emirates across the Dubai carrier's 777 fleet. This programme is designed to bring together Boeing airline operations consulting expertise and data analytics software to evaluate an airline's fleet maintenance programmes.

Additional revenue

The Boeing spokesman said Emirates maintenance and engineering executives were "pleased" with the programme, which was implemented last January. He added that Emirates had noted benefits, including additional revenue operation days for the fleet, an increase in hangar availability, a reduction in resource and material requirements, and overall financial savings.

PLM can be applied at different stages. Lufthansa Technik (LHT) embraces the concept in its VIP aircraft services division which, it says, is designed to support owners "in every facet of the lifecycle of an aircraft" from selection through green-aircraft completion to aftermarket.

Last year, LHT took a decisive step in digital transformation by adopting the Windchill PLM platform. LHT planned to use Windchill as an "engineering backbone", enabling R&D and manufacturing to work concurrently and improve collaboration, both internally and among its many suppliers.

As a systems OEM, Liebherr-Aerospace is on almost every large civil aviation programme, and backs up its OEM role with a 'cradle-to-grave' approach covering MRO, engineering support, documentation, new spares and even used serviceable material (USM).

The company recently developed a centralised procurement structure for its USM, managed from its Dubai Service Centre. Damon Seksaoui, aerospace division general manager for Liebherr Middle East, said: "This involves analysing aircraft teardown forecasts and selecting Liebherr parts to feed 'USM by Liebherr' certified parts towards customers supporting this line of business."

Joel Cadaux, the company's director business and services – customer services, said PLM "is in the core values of the Liebherr Group. We are committed to delivering full product lifecycle support, from entry-intoservice to end-of-life." Committed to Excellence

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"Reflecting briefly on the past year, we have achieved so much and our "Transformation" continues to deliver an improved service for all our customers and a better environment for us all to work in. As always, We need to keep pushing and keep challenging ourselves. We are proud of what we are achieving but we also recognize that there is still a lot to do. 2020 will bring more positive change and more challenges."

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Queen Alia International Airport Tel. +962 6 4451445 Fax +962 6 4453344 Email sales@joramco.com.jo www.Joramco.com P.O. Box 39328, Amman 11104, Jordan MAINTENANCE

SAFETY



ACCESS POINTS

Engineering access equipment is the basic, yet essential, ingredient of any MRO operation. Though much of it is low-tech, these pieces of equipment are anything but out of date in their conception and specification. Chuck Grieve reports.

ffective equipment is essential for staying ahead in the competitive MRO market, especially as the world of digital is integrated into aviation solutions at a rapid pace.

That's how Stuart McOnie, managing director of British engineering company, Semmco, views the bigger picture.

He knows what he's talking about: his company has been designing and manufacturing engineering access equipment for more than 25 years.

Semmco is no stranger to Middle East MROs. Many deploy its range of maintenance access platforms and ground support equipment, which includes the nitrogen/oxygen trolley with digital panel, and the SMART range of digital tyre inflators with pressure checks. The SMART units reduce the burden for engineers by eliminating the need to wear a head torch, with instant results on the tyre pressure and checks.

Business development manager, Ben Hoyle, covers the Middle East, Asia and Australasia from the Dubai office, which also manages the company's local manufacturing through a specialist metal fabricator in Jebel Ali Free Zone.

"We've taken on board the feedback from our customers and developed a range of products that suit their requirements," said Hoyle. The Semmco wheel-and-brake change trailer, for example, has an open-air version with no roof because it becomes intolerably hot in the summer. "We arrived at that design through talking to customers," he added.

Although its equipment does not need original equipment manufacturer approval, Semmco consults with OEMs and, on occasion, works in close partnership with them to ensure any new access products are fit for purpose.

Low-tech products

Typical of its innovative low-tech products is the Semmco wheel mover.

Manoeuvrable and easy to use, the device is designed so the technicians can move any aircraft wheel safely, efficiently and securely, regardless of its size.

The wheel mover is fitted with a dead man's handle that automatically engages the brake when the bar is released. Adjustable webbing restraints secure any size of wheel to the frame so that it cannot move during transportation.

Hoyle said the company is conscious of the fact that its equipment must continue to function through extremes of temperature - up to 50-60 degrees in summer. "We're constantly consulting with customers to see what they want," he explained.

"Everything we sell is able to cope with the conditions here. Even the rechargeable battery on our nitrogen/oxygen trolley is an up-rated version for hot weather."

Semmco can develop variations on its products for different markets, depending on the criteria of the end-user. The company's equipment, including platforms for popular aircraft in the region, such as the Boeing 777 and 787 and the Airbus A350 and A380, is currently in use in every country in the region with airline and MRO customers.

Engine stands are the focus of a business called, appropriately, EngineStands24. This subsidiary of Estonia-based Magnetic MRO has been making inroads into the Middle East, leasing Continued and selling stands for a variety of "the most popular engine types in the



MAINTENANCE

CONTINUED FROM PAGE 79

region" from its Dubai hub, which was launched last year in cooperation with the Emirati company, Chabok Aviation.

The facility, near Al Maktoum International Airport, started operations in February last year with a stock of stands for narrow-body engines, including the CFM56-5A/B, CFM56-7B and V2500, which it leases, trades, sells or stores.

It plans to expand into wide-body stands for GE90, GEnx-1B, Trent XWB, Trent 700 and PW4000 engines.

The company was launched in 2016 as "the industry's first e-store for lease, trading, logistics and storage of aerospace engine stands". Customers also have the opportunity to track its stands via an online system, making it a convenient solution for the user.

Dubai is EngineStands24's fourth location and first outside Europe. Besides the Middle East, it has access to stands in Europe, the USA and Asia.

Dean Entekabi, managing director of Chabok Aviation FZCO, said the tie-up with EngineStands24 was a "significant and very promising step" that would allow both companies to expand their range of services for the added convenience of local and global customers.

Daiva Zemaite, head of EngineStands24, said the Dubai hub – a strategic location for continued expansion in the Middle East MRO market – has already added new customers.

UAE-based Arab Suppliers, a member of the diversified GN Group of India, has been providing equipment to flag-carriers and MROs from throughout Europe, the Middle East and Asia, since 1982.

Nose-to-tail solutions

Its product lines include docks for narrow-body and wide-body airliners, from complete nose-totail solutions to configurations for engines, wings, tails, fuselages and noses. It also offers maintenance platforms and stands for helicopters and a variety of access stands.

The company has extensive experience in both civil and military aviation, boasting a team skilled in design and supply of docking systems and adjustable maintenance platforms suitable for working at height.

"Our access systems can provide customised solutions that successfully address the needs of safety compliance, speed to completion and ergonomics," said a spokesman.

The company represents a wide range of international brands, including Werner of the UK.

Spanish company, Buildair, has come up with a simple solution to the need for quick covered space – inflatable hangars.

The Barcelona-based company designs and builds a range of units that it says can offer unique benefits to the MRO industry.

Commercial director, Felipe Cano Ventas, describes the fabric structure as a "kind of cage"



Good fit: A CFM56-7B engine sits in a low profile base with cradle supplied by EngineStands24.



Get a grip: The WinGrip anchor point is designed to keep MRO technicians and the aircraft they're working on unharmed.



Decades of experience: Arab Suppliers can supply full nose-to-tail access solutions or specific configurations.



Novel: Spanish company Buildair has won big-name clients for its inflatable hangar solution.

of inflated tubes and straps. It's light, portable, reusable and quick to install. And once inflated, it stays put.

The units are designed to withstand winds up to 120km/h from any direction, and proved their durability by emerging unscathed from Spain's worst-ever storm in 2014. "We had winds of more than 110km/h," said Cano Ventas. "Buildings around the hangar were damaged but the hangar itself was not."

The structures, technically membrane-strapanchorage systems, are made up of inflatable tubes which, when inflated, are stabilised by an innovative network of straps that also holds the structure to its anchoring points.

An automatic control system can adjust the low pressure inside the tubes in response to external factors, such as wind load, to limit temporary changes in shape.

Cano Ventas said the largest inflatable hangar currently deployed, for Airbus in Madrid, measures 54x110 metres. The design team, which has a background in civil engineering and structural analysis, believes a span of 90 metres is possible.

Buildair clients include Lufthansa, Chilean carrier LAN, Airbus and Saudi Aerospace Engineering Industries (SAEI).

Vacuum anchor system

The WinGrip vacuum anchor system has its champions in Middle East MRO hangars – and for good reason. This simple but effective piece of equipment protects both workers and aircraft from harm.

Made by MSA, the Latchways WinGrip is designed as a practical solution for protection against falls in an aircraft MRO and manufacturing environment. It comes in single and multiple user systems.

One or more of the devices are fixed by suction to wings, stabilisers or fuselage without damaging the aircraft, while doing away with the need for an overhead lifeline. It can be used on wet or dry surfaces, in the hangar or on the apron.

The anchoring system works on compressed air from a local or remote source, such as the refillable nitrogen bottle supplied as part of the kit.

In single-user configuration, a worker wearing a safety harness attaches their own safety line to the anchor point. The system allows 360-degree movement, while constraining the worker to a pre-set distance to prevent accidentally falling off.

With the multiple user system, up to four workers attach themselves to lines running between anchor points across the entire surface being worked on.

International sales manager, Simon Francis, said the system is easy to use, with minimal set-up and removal time. If the vacuum is lost prematurely, the anchor points emit audible and visual alarms.

INTERIORS

Global Eagle Entertainment (GEE) is focusing on the future of in-flight entertainment with better targeted media and monitoring, and greater use of connectivity to give passengers more choice.

Steve Nichols

reports.



GEE WIZARD! THE EAGLE HAS TAKEN OFF FOR A BETTER IFEC EXPERIENCE

lobal Eagle Entertainment offers a suite of rich media content and seamless connectivity solutions to airlines worldwide, including Qatar Airways, Saudi Arabian Airlines, Emirates Airways and Turkish Airlines.

It currently licences 17,000 movies annually, which are delivered to more than 170 airlines worldwide. Eighty of these are operating twinaisle aircraft.

Duncan Abell, VP marketing and communications, said: "The in-flight entertainment and connectivity (IFEC) market is changing dramatically and no-one really knows where it will end up. Basic seat-back IFE doesn't cut it any more. It has to be a much wider experience.

"In-flight connectivity use will increase, and more passengers will bring their own content on board, either on their own device or via a webenabled connection to Netflix, Hulu or another provider.

"We are not trying to lock passengers out of the airline ecosystem, but want to integrate with it, whether that is in the airport lounge, via a seatback IFE system or a passenger's own device.

"Global Eagle currently delivers live TV and video on demand, and I think we will see more

content streamed from the ground via satellite before it is intelligently cached on the aircraft."

One of the challenges has been the existing IFE update cycle for aircraft.

GEE's digital content supply chain technology platform, branded 'Open', is now active. Open is a cloud-based environment that tracks content from acquisition to delivery, all while collecting data throughout to improve analytics.

Personalised IFE experiences

GEE is now releasing a complementary data platform called 'Pulse', which gathers data on user behaviour to "curate personalised in-flight entertainment experiences". By tracking what passengers are watching and when, airlines can more precisely determine the content that best suits them.

Chris Esposito, chief technology officer, GEE, said: "Airlines want to take advantage of new technologies to meet passengers' demand for a high-quality, personalised IFE experience. Cloudbased solutions are the only option for airlines to scale, and Open and Pulse are the next-generation platforms to power future experiences.

"Open is at the heart of the content universe," said Esposito. "We have to grow the depth and

breadth of content, appealing to different age groups and cultures as well.

"At the moment, the experience you get is limited to the size of the hard disk on the aircraft's server. In future, with Open, we can add more content as and when required.

"We currently have 100,000 titles in Open and connect to more than 800 different distributors," he added.

In October, GEE said that Open had delivered 250,000 media assets to airlines. It says it will continue to transition customers on to Open throughout 2020.

"We are data-led not data-driven. It's about intelligence and insight into what the passenger actually does. We have a very good understanding of customers, which is why airlines use us. Some airlines want to increase and differentiate their content. Others want to decrease their expenditure – everyone is different," explained Esposito.

The heart of Open is its content universe, a library of hundreds of thousands of titles to keep customers entertained across all ages, cultures and destinations.

GEE said its content is intelligently curated and the system



INTERIORS

IN-FLIGHT ENTERTAINMENT



CONTINUED FROM PAGE 81

dynamically changes it in real-time.

"The barriers are starting to drop and the airlines are realising that, with video-on-demand, you can get data back on who is watching what. We are moving to a model where the aircraft is just another connected space," said Esposito.

"We want the consumer to have an experience that is as close as they can to the one they have at home," added Abell.

Ultimately, the key to real-time updating of IFE content will be better in-flight connectivity. GEE already has more than 1,000 aircraft connected with its Ku-band Airconnect service.

Its connectivity customers include Southwest Airlines (700 aircraft), Air France and Norwegian Airlines.

Turkish Airlines recently selected GEE and Profen to deliver IFEC to more than 100 narrowbody aircraft.

High-quality connectivity

It says passengers will have access to high-quality connectivity, providing internet access on the airline's fleet of Boeing 737NG and Airbus 321 aircraft.

Turkish Airlines chairman of the board, M. Ilker Ayci, said: "We are confident that, with this partnership, Profen and GEE will meet our high expectations. We are pleased to have selected two companies that have the competent skill-set to deliver high-quality connectivity to our passengers."

Per Norén, GEE's president, said: "By integrating our award-winning Airconnect Global Ku-band satellite IFC solution, airtime portal, content, and satellite network, with Profen's substantial teleport, regulatory, billing, and security infrastructure, we will provide Turkish Airlines' passengers with high-speed end-to-end in-flight connectivity, full coverage and world-leading ease of access.

"Since its founding in 1933, Turkish Airlines has earned a worldwide reputation for consistent service innovation and the highest levels of passenger experience, from safety to quality, comfort to value. This partnership perfectly reflects the airline's world-leading reputation."

Within a year, Turkish Airlines passengers will be able to start enjoying the IFC services.

Profen Group is a 200-employee strong company with offices in the UK and Turkey, working in the communications, defence, government, broadcast and internet industries.

Onder Havuzlu, president, Profen, said: "By successfully combining our national engineering experience with Global Eagle's IFC expertise, we will begin to provide secure, high-quality data connectivity solutions for the Turkish commercial aviation market."

Flydubai's Boeing 737 fleet is also equipped with GEE's Airconnect platform.

But GEE is not resting on its laurels. The future of satellite-based in-flight connectivity may revolve around low-Earth orbiting (LEO) satellites. These offer lower latency, which is the delay time between a signal being sent and it being received. A typical geo satellite round-trip of nearly 72,000km means a time delay of at least 240 milliseconds.

With a satellite in LEO, this time comes down to less than 50 milliseconds.

In October 2018, GEE successfully completed testing to demonstrate how a new, low-cost LEO satellite network can revolutionise the way airline passengers enjoy high-speed connectivity and content. The testing was undertaken aboard GEE's Albatross One test aircraft near Telesat headquarters in Ottawa, Canada.

This marked the first time an in-flight aircraft has communicated at broadband speeds with a LEO satellite system, demonstrating the capabilities of the system for mobility customers.

Telesat's Phase 1 LEO satellite was launched in 2018 with Telesat and GEE agreeing to collaborate on LEO system development, testing and marketing.

During in-flight testing, the team successfully demonstrated fast data upload speeds from the aircraft, engaged in uninterrupted video conferencing and movie streaming, and "experienced the lowest latency of any satellite connection to date".

Change the market

GEE said the testing demonstrates how a global LEO constellation of satellites, which includes polar regions not covered by geostationary (GEO) satellites, could change the market dynamics in aviation.

Tests were also conducted to ensure the smooth transition from existing GEO satellite networks to LEO while switching satellites in flight.

A GEE test team live-switched back-and-forth between Telesat's Anik F3 GEO satellite and Telesat's Phase 1 LEO satellite.

Telesat has plans for an advanced LEO constellation with a global network scaling to nearly 300 satellites. The LEO constellation has highly agile spot beams, which focus capacity into high-demand areas, such as airports, and promises to deliver an order of magnitude greater broadband capacity than current systems.

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Thales has unveiled its new PureFlyt flight management system (FMS), which will be available from 2024 and promises enhanced safety and efficiency in the cockpit. **Steve Nichols** reports.

Thales unveils 'game-changing' flight management system

he new FMS is specifically designed to efficiently manage aircraft in a connected aerospace ecosystem and in increasingly crowded skies.

With the global commercial aircraft fleet forecast to double by 2030, Peter Hitchcock, VP Thales commercial avionics, said the FMS is the largest piece of technology on an aircraft.

"Thales is the sole FMS player in Europe. More than 6,000 aircraft, with 200 airline customers, are equipped with Thales' FMS, clocking up 100 million hours on board aircraft," said Hitchcock.

The company's existing FMS product – the FMS 300 – is currently being used on the Airbus A320, A330, A340, the ATR 42 and ATR 72, plus the military Airbus A400M, Dassault ATL2 aircraft and Northrop Grumman UH-60V and Sikorsky S-76 helicopters.

So will PureFlyt be available on Boeing aircraft as well as those from Airbus? "We'll certainly make it available to all airframers. It won't be exclusive to Airbus," Hitchcock said.

PureFlyt is a connected FMS, designed to offer airframers and airlines the best combination of safety, security, and fuel and operations efficiency.

Electronic flight bag

It will interface with a Microsoft Surface or Apple iPad tablet-based electronic flight bag (EFB) to enable pilots to calculate alternative trajectories in real time, using both on-board and open-world data, such as weather information.

"We chose a commercial off-the-shelf (COTS) tablet solution rather than developing our own. This keeps the cost down and means that pilots can use an EFB with which they are familiar," Hitchcock explained.

He said that the Microsoft Surface and Apple iPad were the most common COTS-based EFB solutions in use. PureFlyt is currently not scheduled to run on Android-based tablets, such as the Samsung Galaxy Tab, which are seen as a less secure system by Thales.

"Current EFBs allow pilots to plan their flights in their hotel room, but have limited capabilities once they enter the cockpit. With PureFlyt software, which will be available for Microsoft and Apple operating systems, the EFB becomes a more useful tool in their air," said Hitchcock.

He said that by using a secure in-flight



connectivity system, such as Iridium Certus or SwiftBroadband Safety, near real-time weather information would become available while in flight. The EFB could also receive messages from ground operations as well.

"A bi-directional secure data link was always a priority," he said. "Even though the bandwidth available from L-band Iridium Certus and SwiftBroadband Safety is relatively small, compared with, say, Inmarsat's GX Ka-band system, it should be more than good enough for weather information.

"In-flight connectivity on current FMS systems is limited, as they were mostly designed in the 1990s. We wanted to design a system for the 21st century that is upgradeable and likely to still be in use in the 2050s," he said.

The system can then suggest alternative routeing to avoid thunderstorms or other adverse weather, complete with an updated estimated time of arrival and any additional fuel burn.

"Typically, pilots only get up-to-date weather information from any on-board weather radar system. But any weather feature may be out of its range. Traditionally, EFBs only know about weather from out-of-date forecasts, but now they will be able to get up-to-date information while in flight," he said. These alternative suggested routes are automatically optimised for time and fuel burn cost, with the differences from the original flight plan being highlighted. This means pilots know what they are selecting from the outset.

"Your original flight plan might be for flying at flight level 340, but the FMS might suggest flight level 375 to save fuel. If air traffic control (ATC) agrees, you can then transfer to the new suggested routing and save the airline money.

Trajectory management

"We call it trajectory management. Sometimes, for very good reasons, the pilot may have to deviate from the planned path. PureFlyt will always calculate how to get back on track with a valid plan and it can do this five to 10 times faster than current FMS systems," he said.

He added that this usually happens during high workload phases of the flight, when pilots don't want to be distracted too much. By automatically calculating alternative routes, it means pilots can concentrate on their main job – flying the aircraft.

Another new feature is vertical profiling on the EFB, showing the actual flight profile in a graphical display.

"We think PureFlyt is a game-changer for environmental reasons. We think it could save 13

AVIONICS



million tonnes of fuel and 40 million tonnes of CO2 per year by 2025; 40% of an airline's costs are on fuel, so any reductions would be very welcome.

"These estimates are based on 4% fuel-burn savings on passenger commercial flights worldwide, as well as reducing noise during airport take-off, approach and landing operations," he said.

If the pilot wants to choose the selected flight deviation, the updated flight plan can be uploaded to the aircraft's FMS via a cable connection.

Hard-wired

"We chose a hard-wired, rather than wireless connection, for the flight plan uploads, to enhance security. This will also result in fewer potential keying errors."

Protection to the server on the aircraft was paramount, Hitchcock said.

"The tablet has the same PureFlyt software as the aircraft, so pilots become very familiar with it. By combining the integrity of the FMS and the agility and power of the EFB, the aircraft trajectory can be permanently controlled, adapted and enhanced, resulting in optimised flight, decreased fuel consumption and improved passenger comfort. "At the end of a flight, the updated flight plan from the EFB is ready to be sent to the company at the touch of a button," he said. "Which saves a lot of time and effort by the crew."

PureFlyt has been developed by a team of 400 engineers at Thales' operations in Toulouse and Bordeaux, along with commercial airline pilots.

Hitchcock said Thales has used artificial intelligence technologies to simulate two billion test cases, accumulating an invaluable experience, equivalent to 100 million actual flight hours.

"The FMS is connected to more than 30 systems on the aircraft," he said. "This generates a lot of data, from weather, temperature or pressure changes, to fuel burn parameters. With a 100 tonne aircraft, we really need to understand how this environment affects performance.

"Our 4D-approach is a first for FMS systems and eliminates the gap between the EFB and the FMS. Finally, we've designed the system for the next generation of aircraft, both civil and military, manned and unmanned.

"A total of 800,000 new pilots will be needed in the future to cope with the projected growth in air transport. Most of these will be millennials and they will expect to see a digital cockpit," Hitchcock pointed out.

"The use of tablet computing will be second

nature to them. Existing FMS systems will seem old fashioned."

He added that PureFlyt has also been designed to be future-proof, accommodating the implementation of concepts such as the initial 4D (I4D) trajectory management methods currently being researched by Single European Sky ATM Research (SESAR) in the EU and NextGen in the US.

The connectivity enables other benefits for the pilot as well.

Full benefit of passengers

"By computing and sharing vast amounts of data, PureFlyt will make flights safer, greener, easier for the pilots to manage, more profitable for airlines and, all this, ultimately for the full benefit of passengers," said Jean-Paul Ebanga, Thales VP flight avionics.

"In the air, the digital revolution has only just begun. A paradigm shift in on-board cockpit electronics is taking place in the connected airspace and PureFlyt is at the forefront of this digital new age, leading the next generation of FMS that truly makes the aircraft a node of connectivity."

PureFlyt will be available for entry into service in 2024, for both line-fit and retrofit applications.

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SECURITY

International SOS company, MedAire, which specialises in medical and travel security services to aviation and maritime clients, recently appointed Hany Bakr to the newly created role of security director for Europe, Middle East & Africa (EMEA). Dave Calderwood reports.



Reducing risk brings its rewards for Bakr

any Bakr is quite clear about his new role. "I assist clients in managing and mitigating risks to their people, their aircraft and their operations," he said.

"MedAire has provided security service to the aviation industry since 1998. This role was created to support our clients in Europe, the Middle East and Africa in response to the growing need in the industry for unbiased, third-party intelligence, advice and assistance services."

Bakr has more than 20 years' experience in the aviation and travel industries, holding executive leadership positions in various airlines' ground operations, safety, quality and security, both in Europe and the Gulf regions.

"At the Qatar Airways Group, I was acting vice president group security, accountable for all aspects of aviation and corporate security worldwide, ensuring the company's 50,000 employees and operations in more than 100 countries had appropriate strategic oversight, security risk management, and complied with national and international regulations," he explained.

"I also led group asset protection, with overall responsibilities for worldwide employees, criminal investigations, cyber security, access control and video surveillance systems, airports and corporate offices for the Qatar Airways group companies."

Aviation security risks, which MedAire is helping clients to mitigate, include:

Flights operating over, around, or adjacent to airspace considered problematic by some states – conflict zones;
 Civil unrest affecting aircrew, company business travellers, local employees, and flight and airport operations; and



Hany Bakr: "The safety of people, aircraft and operations are absolutely inter-related. PICTURE: MEDAIRE.

SUPPORT

Terrorism, non-state actors' and lone-wolf incidents compromising law and order in cities and other jurisdictions. "The safety of people, aircraft and operations are

absolutely inter-related. Operators must consider risks in and around airfields, threats in a country's airspace, and information on events that could affect flight operations or crew and passenger safety," said Bakr.

"Aviation security, as it relates to crew, must extend past the aircraft – pre-flight and post-flight. Airports are attractive targets for insurgents and terrorists, as are hotels – two locations where crew and aviation support staff are often located.

"In terms of aircraft and operations, questions have to be asked: can aircraft safely operate in the area? Can aircraft be left unattended? Is there adequate lodging for the crew overnight?"

Specific risks the company is monitoring today include parts of the Middle East, Asia, north Africa and the Horn of Africa, Latin America, southern Europe, and east Asia, which are either under flight operations restriction or prohibition by numerous states.

Conflict zones

Parts of those regions are considered conflict zones by some states in which flight operations are either restricted to certain altitudes, airways, or completely prohibited.

Beyond these regions, there are several other areas in east Asia, the sub-Indian continent, and the Middle East where geopolitical tensions have raised the overflight risks due to escalation in hostilities.

Over the past 12 months, there have been significant examples of civil unrest in major cities around the world – protests, demonstrations, and strikes. There are direct and indirect implications for air carriers and their personnel.

"MedAire's role is to provide independent, unbiased intelligence and advice. It is always the client's discretion on how to move forward, based on their individual risk threshold," said Bakr.

"We offer a number of services to inform, educate and advise our clients on how to mitigate security risks to their operations – pre-flight, in-flight and while at destination.

"One is the alerting system whereby, through a globally positioned footprint, MedAire's intelligence team scan, round the clock, and through a wide array of resources, for aviation-specific and travel risk information that can have an impact on aviation operations and personnel safety. This information helps clients make tactical, operational and strategic decisions.

"Specific services include go/no-go flight assessments, airspace assessments based on MedAire's proprietary airspace risk analysis tool, aviation travel security briefs, which provide recommendations for safely conducting operations into – and in the vicinity of – a specific airport.

"Aviation alerts notify subscribers when events occur that may affect air travel or the aviation industry. In addition, we provide medical and travel alerts, which provide actionable safety advice for emerging medical and safety events to crew and personnel," he concluded.

FINANCE

LEASING

Dubai-based lessor, DAE, has almost doubled the value of its portfolio of managed aircraft, following a deal with a major financial institution. Alan Dron reports.





The majority are the singleaisle types most popular with airlines, the Airbus A320 family (135 aircraft) and the Boeing 737 (103).

The company also has 60 wide-bodies, of which the biggest component is 27 Airbus A330-family types.

Relatively unusually for a major lessor, DAE has also gone into the turboprop market in a major way, with a large batch of 55 ATR 72-600s coming from the Franco-Italian manufacturer. Although turboprops have struggled to gain a large foothold in

A huge new lease of life for DAE

ubai Aerospace Enterprise (DAE) has continued its progress to becoming one of the world's major aircraft lessors. It has been mandated by one of the world's largest fund managers to source and manage aircraft valued at roughly \$1.4 billion.

The fund manager concerned has not been identified. but DAE will acquire the aircraft and manage them, via its aircraft investor services (AIS) platform, on behalf of the client.

The multi-year mandate tasks DAE with sourcing and managing the aircraft and assisting the investor with the capital structure for them.

Most of the aircraft to be acquired will be previously used narrow-body and wide-body types, sourced through DAE's relationships in secondary market trading and saleand-leaseback channels.

This development will increase DAE's managed portfolio to more than \$2.7 billion in assets. Coupled with other projects, DAE anticipates that its managed portfolio will continue to grow to its previously announced target figure of \$5 billion.

"DAE is thrilled to have the opportunity to grow its managed aircraft business by sourcing and managing aircraft for a world-class financial institution," commented CEO, Firoz Tarapore. "We are off to a flying start and have already sourced 25% of the portfolio.

"We own more than 300 aircraft and will manage more than 100. We maintain an active dialogue with 250 airline customers."

In fact, by early December, DAE counted no fewer than 357 aircraft on its books, with the aircraft owned by the company having an average age of just more than six years.

the Middle East (particularly in the Gulf), they remain highly popular in Asia, Europe and Africa.

Overall, the company, which is 100% owned by the Investment Corporation of Dubai, has 110 airline customers in 56 countries.

It is another string to the bow of Dubai's avowed intention to focus on aerospace as a major driver of its economy and to diversify away from the oil and gas sector.

DAE reached a further milestone in December, when it announced that its portfolio of managed aircraft, together with mandates to source and manage aircraft for thirdparty investor customers, had reached \$3.5 billion.

Increased its managed fleet portfolio

Since announcing the creation of AIS in January 2018, DAE had, by December 2019, increased its managed fleet portfolio to more than \$2.5 billion, managing four aircraft asset-backed securities (ABS) securitizations, as well as aircraft for several investor partners.

The AIS team provides its clients with a single point of contact within the company.

Following a portfolio sale agreement announced last October, DAE's managed fleet grew to 75 aircraft. DAE has said that it will continue to build its managed fleet as it fulfils existing mandates from investor customers, growing it to more than 125 aircraft in the coming months.

Commenting on the \$3.5 billion milestone, Tarapore noted: "DAE's AIS product is gaining significant traction in the investor community as the only true aircraft investor service product offered by a large leasing company.

"Investors appreciate the ability to access DAE's substantial and capable platform, while having a team dedicated to serving their needs as customers. DAE intends to remain at the forefront of responding to changing investor needs, with a clear line of sight to a substantially larger managed fleet alongside our growing owned fleet.

DAE expects to ultimately manage more than \$5 billion worth of aircraft assets for third parties."

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ENVIRONMENT

RECYCLING

Zero waste is a philosophy that's encouraging people to recycle and reuse. Airlines in the Middle East have taken initiatives to slash waste and the use of plastic on board aircraft. **Anuradha Deenapanray Chappard** and **Vincent Chappard** report.

HEROES OF ZERO COOK UP A RECIPE TO REDUCE WASTE

he airline industry has been criticised for its lack of cabin waste recycling, which threatens the environment. Now, initiatives are being taken to meet the sustainability challenge.

The situation is serious. Research undertaken by the International Air Transport Association (IATA) indicates that the average passenger generates 1.4kg of waste per flight. That means the sector created 4.9 million tonnes of cabin waste in 2016, chalking up a bill for \$790 million.

With the current passenger growth rate of 6.5%, this volume is set to double in the next decade.

Travellers agree that something has to be done. According to Professor Ralf Wagner, from Germany's Kassel University, who conducted passenger surveys on behalf of several airlines, actions are urgent.

The World Airlines Clubs Association (WACA), an international NGO advocating social and economic policies to promote responsible and sustainable travel and tourism, has also picked up on the issue.

President, Maga Ramasamy, said airline companies and passengers are more conscious about the amount of waste produced in the cabin, not only food but also plastic usage and, more particularly, the single-use plastic (SUP).

"Some airlines and their business partners, including caterers, have started initiating actions towards an integrated model to reduce, re-use and recycle (including energy recovery) waste collected on aircraft," he pointed out.

The message is certainly getting across – and the Middle East is playing its part.

In April 2019, Etihad Airways was the first airline in the region to operate a flight without any single-use plastics on board.

Reducing waste and, in particular, reducing plastic is a mission for Linda Celestino, Etihad's vice president of guest services and delivery. "This is part of our sustainability charter," she pointed out.

Emirates has made a network-wide commitment to



Etihad's Linda Celestino: On a mission to reduce waste and, in particular, plastic.

reduce single-use plastics on its aircraft. Since June, ecofriendly paper straws have been introduced and all Emirates flights will soon be plastic straw-free.

Qatar Airways and the Qatar Aircraft Catering Company (QACC) have launched a new waste reduction and recycling programme in Doha. Over three months, the two companies have recycled 266 tonnes of materials, including cardboard, plastic wrapping and a variety of plastic containers. These materials have been collected by two local firms for recycling, along with 6,300 litres of cooking oil, which will be converted into biodiesel.

Further afield, Air Mauritius has reduced the use of SUP by 20 tonnes per year. Flights to Rodrigues and Reunion Island have been free from single-use plastics since October.

Australia's Qantas marked a milestone last May by operating the "world's first zero-waste-to-landfill flight" from Sydney to Adelaide. About 1,000 single-use plastic items were substituted with sustainable alternatives or removed altogether from the flight, including individuallypackaged servings of milk and Vegemite.

And, in Europe, Air France has implemented preventive actions by sorting and rethinking its waste circuit, as well as recycling.

But solutions for a zero-waste flight are still complex. They are based on coordination and cooperation between airlines, airports, service providers and the manufacturers, and the adoption of risk-based regulations.

The biggest challenge of this global initiative is how to manage sustainably the reduction of waste and plastic throughout the whole process, while maintaining or enhancing both service and the customer experience.

PEOPLE

Noureddine Mouaddib made an appeal to tackle challenges regarding human resource development in aviation at a conference in Marrakesh, Morocco. **Vincent Chappard** and **Anuradha Deenapanray Chappard** report.

Mind the gap...stark warning as next-gen talent goes missing

oureddine Mouaddib is predicting huge tension throughout the aviation sector as it continues to outpace the number of qualified people with the ability to resource it properly.

The founder and president of Rabat International University was speaking at the Middle East and North Africa Business Aviation Association (MEBAA) conference in Morocco.

"The challenge is how to attract talent towards aviation as people are increasingly drawn towards other high-tech sectors, which look more exciting and have interesting salaries," he said.

In the early 2000s, Morocco and other countries in the region didn't have excellent or highly ranked universities. Young people from modest backgrounds couldn't afford to study abroad, so it became a necessity to offer on-site training in advanced sectors, as well as diplomas and degrees.

Consequently, under the leadership of King Mohamed VI, the International University of Rabat was launched in 2005. Today, it trains 5,000 students, including 600 in the aerospace sector.

Attracting and retaining the best people are major aspects of the future leadership and operational challenges, said Mouaddib. There's a need to create comprehensive training programmes and cross-functional opportunities. More focus should also be put on both internal and external development programmes by building bridges between the industry and training centres, institutes or universities.But, as he pointed out, universities cannot work alone. They need the support of industry professionals for internships and to help people discover the work environment and the labour market.

"We need to train our students with a specific profile, so that they are operational once they get their degree."

Besides human resources, other major issues like research and innovatiåon must also be addressed.

"This know-how must be acknowledged through technology transfer, patents and the setting up of start-ups. Our universities must be part of international research and innovation networks. It is also about creating an ideal setting and environment for the mobility of students and researchers," stressed Mouaddib.

The role of universities training centres and institutes is crucial in such a promising, innovative and challenging industry that constantly requires highly skilled people, creative thinkers, risk-takers and tenacity, he concluded.

It is a view shared by many in the industry. While there has been a significant rise in the number of training programmes for engineering and technical jobs, it is only recently that a real focus has been made on management training opportunities.

Ali Ahmed Alnaqbi, founding and executive chairman of



 We need to train our
 students with a specific
 profile, so that they are
 operational
 once they
 get their
 degree.
 NOUREDDINE
 MOUADDIB

MEBAA, underlined the problem. "There will be people leaving the industry because of retirement in future," he said. "There is no injection of fresh blood in our industry and that is why we are specifically targeting universities and colleges to raise one of the main challenges in business aviation and aviation in general."

So how serious is the problem?

According to the International Civil Aviation Organization (ICAO), by 2037, air transport in the Middle East will require more than 44,000 additional pilots, 4,000 air traffic controllers, 47,000 MRO technicians and 93,000 new cabin crews. Africa will also need more than 23,000 additional pilots, 4,200 air traffic controllers, 28,000 MRO technicians and 37,000 cabin crews. Asia will lead the growth for new fleet and personnel.

Ridesharing companies also plan to offer multimodal air transportation between suburbs, cities and ultimately within cities. They will likely develop fleets of small, electric vertical take-off and landing (VTOL) aircraft in a near future. These fleets will also require pilots and technicians to be maintained.

Added to that, the number of commercial flights and passengers is expected to double by 2030. One third of the world's goods and 90% of e-commerce orders are delivered by aircraft. Demand for private and business aviation is also going up.

Consequently, over the next two decades, the high demand for a qualified workforce will need to be correlated with aircraft delivery plans and technological innovation.

all in a day

Damon Seksaoui Marcelle Nethersole speaks to the general manager, aerospace division at Liebherr.

Can you tell me a little about Liebherr-Aerospace?

Liebherr-Aerospace is a supplier of systems and components for the aviation industry, with more than five decades of experience.

The range of aviation equipment produced by Liebherr varies from civil to military sectors and includes flight control and actuation systems, landing gear and air management systems, as well as gears and gearboxes. These systems are deployed on wide-bodied aircraft single-aisle and regional aircraft, business jets, combat aircraft, military transporters, military training aircraft, civil helicopters and combat helicopters.

Liebherr-Aerospace has four aviation equipment production plants at Lindenberg (Germany), Toulouse (France), Guaratinguetá (Brazil) and Nizhny Novgorod (Russia). These sites offer a worldwide service with additional customer service centres in Saline (Michigan/USA), Seattle (Washington/USA), Montréal (Canada), Sao José dos Campos (Brazil), Hamburg (Germany), Moscow (Russia), Dubai (UAE), Singapore and Shanghai (People's Republic of China).

Can you tell me about the facility in Dubai?

Liebherr Middle East FZE was established in 2007 within the Jebel Ali Free Zone Dubai to ensure sales and servicing of construction machinery and maritime cranes throughout the Middle East region.

In 2008 the Liebherr Group launched an aerospace liaison office to provide airlines with technical support on our systems and equipment installed on various platforms and operated by all airlines in the Middle East.

With the growing activities, the office was further developed into a logistic support centre in 2015, providing our customers with spares under an "as locally repaired" services performance scheme.

A dedicated team ensures key account management, technical and commercial support, as well as logistic services to optimise our support and ensure spares availability on demand. How do you see the future of MRO changing?

With the increase of inservice aircraft fleets, the MRO/aftermarket is completing a decade of uninterrupted growth. Within this global trend, we observe regional shifts, such as a European slowdown, a decline in the Middle East, or the boom in Asiatic/Chinese market.

We have also observed a rise in aircraft OEMs positioning in the aftermarket sector. Major OEMs are developing their MRO services on their own platforms, as well as the competition's. They are launching new services, including USM.

This means air-framers aim to increase their involvement in the supply chain to better control costs.

Meanwhile, some tier-1 suppliers tend to consolidate through mergers and acquisitions in order to create major groups able to manage the nose-to-tail aftermarket.

Our approach is to focus on our core expertise in order to offer a qualitative and comprehensive range of services for our own products. This unique strategy leads to high-level quality, on-time performance and control of costs.



What is new for Liebherr?

Liebherr-Aerospace is currently engaged in various projects; mainly optimising operations of growing new-generation aircraft types, such as the A320neo and the 350 fleet, preparing the 777X flighttest and entry-into-service phase, and accelerating the development of our product health monitoring and digital services.



What does a typical day involve for you?

My responsibilities are varied and involve coordinating customer support and services activities; this includes analysing the local market evolution, conducting regular meetings with all our airline customers, understanding their operational challenges, and defining support and services solutions to ensure cost-effective and continuous operations.

Our team of dedicated professionals also ensures we track each repair or exchange order on our components to provide clear visibility to our customers, and manage on-demand spares availability 24/7 to avoid aircraft-on-ground (AOG) situations.

■ What are some of the projects you work on in the Middle East?

As part of our drive to innovate our services, we developed in, 2019, a centralised procurement structure committed to Liebherr used serviceable material (USM). This involves analysing aircraft teardown forecasts and selecting Liebherr parts to feed our "USM by Liebherr" certified parts towards customers supporting this line of business.

In addition, we are investigating how we can apply our technologies and experience to the railway sector, like we do in other regions of the world, and we think we can bring a lot to the Dubai metro.



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We are the first Middle Eastern MRO service provider to receive the EASA Part 21J Design Organisation Approval for major cabin design and modifications and have extensive cabin and back-shop capability as well as EASA Part 21G Production Organisation Approval.

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PC-21

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14 YEARS OF PROVEN SERVICE, 211 AIRCRAFT, 8 VISIONARY AIR FORCES!

For years, we were told a turboprop trainer would never be able to replace a jet trainer. We proved them wrong – pilots now even transit directly from the PC-21 to fighter aircraft with the benefit of huge cost savings. Our highly effective training system has been successfully adopted by leading air forces around the world – a clear demonstration that the PC-21 is the training system concept of the future.

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