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INTERNATIONAL
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ARABIAN AEROSPACE

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

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THE NEXUS WORLD

FROM SAUDI ARABIA TO A GLOBAL FORCE

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airline back
from the
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terror:
a view from
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on the
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Why girls allowed is a 'must' for our industry!

I have just completed a flight with a freshly-qualified pilot in the right-hand seat. A product of the UK's air cadet system, this 18-year-old had received a scholarship to attain a private pilot's licence and passed the aptitude test to be considered as a flyer for the RAF – something that not that many years ago would have been impossible.

The reason? This capable, confident young pilot is a woman.

The flight coincided with the publication of the Air Transport Action Group (ATAG) report, which showed that, globally, fewer than 6% of commercial airline pilots are female – and this at a time when the industry is threatened by a dramatic shortage.

Airlines have fallen way behind their colleagues on the ground and in the towers. A sample survey of air navigation service providers, conducted in 2017, found that 25% of air traffic controllers were women, while in Europe more than a quarter of airport staff are female and making up almost a third of the under 30s.

Even ATAG admits that it is difficult to get the figures from the airline industry.

There are changes afoot. The UAE was highlighted as one of the promising nations which, along with countries like Belgium, Japan, Canada and Switzerland, has female student pilots now making up more than 10% of the classes. Airlines like Royal Jordanian, Gulf Air and, more recently, Saudia, have been focusing on the opportunities for women moving up to the flight deck.

But, still, more than 90% of most airline recruits are male.

It is even worse in the boardroom. In airline executive roles, women make up just 3% of the top 100 airline chief executive officers, compared to 12% of CEOs in the wider economy.



Alan Peaford joins members of the Arabian women Pilots group the 99s.

Air forces should also be changing their approach. It is heartening to read in this issue about Bahrain's first female fast jet pilot (Page 111), matching the UAE air force. These women are role-models for the female pilots of the future.

Airlines are often accused of short-term thinking as they navigate the roller-coaster of the industry's economic performances. But, without thinking outside the box, more and more airlines will fail if they cannot attract the right numbers of people to meet the potential growth.

It takes years to attract, recruit and train a pilot to step into the right-hand seat – and several years more to even think of a command role. Now is the time, not just to be recruiting, but also positively publicising those role models and the opportunities for careers in our industry so we can see a more even balance in years to come.

Organisations like the Arab Air Carriers Organisation and the International Air Transport Association should also support this by urging their member airlines to report on the numbers of women in the different sectors of their organisations to enable more accurate figures and trends in the future.

Safe landings, Alan Peaford, editor-in-chief

COVER: Abdullah Al-Sayed, President & CEO of Nexus. PICTURE: BILLYPIX

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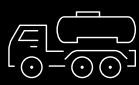
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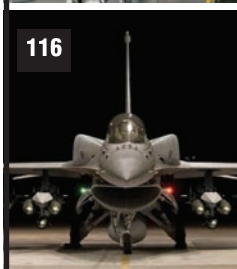
Lockheed Martin has received a \$1.12 billion contract to produce new advanced F-16 Block 70 fighters for the Royal Bahraini Air Force.



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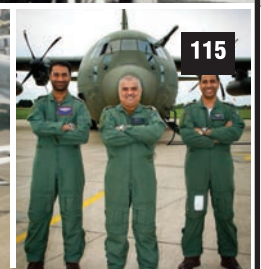
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THE A350 XWB GENERATED THOUSANDS OF INNOVATIONS. INCLUDING THE A330neo.



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Drumming up Avgasbusiness

Solvochem, a supplier of chemicals, petrochemicals, solvents and plastics worldwide, has invested in state-of-the-art facilities for drumming aviation gas (Avgas) at its Jebel Ali location.

The facilities will increase the availability of Avgas, the fuel commonly used for piston engine aircraft, across the MENA and south east Asia (SEA) regions.

This will enable aviation businesses in the regions to

provide a prompt service to their customers by reducing delivery time of the fuel, while also assisting them to meet urgent or unexpected demand for Avgas.

Tony Jouzy, managing director of Solvochem FZCO, said: "This new facility provides our company with the opportunity to become a leading supplier of Avgas throughout the MENA and SEA regions, including acting as a hub for other regions."



Russians deploy deadly S-300 to Syria

Following the tragic shoot down of the Russian Air Force Il-20 on September 17, the Russian MOD announced on October 3 it had deployed the deadly S-300 air defence system to Syria, reports **Alan Warnes**.

The eaves-dropping Il-20 was shot down by Syrian Army S-200s by mistake after targeting Israeli F-16s at the time.

The S-300 systems have been airlifted by three Russian An124-100s, which made a staggering 27 flights to the base at Hmeimim Air Base. According to Russian Army's Lieutenant-General Beatzhev the four S-300 launchers will completely 'block' the Syrian-Israeli border.

They will also pose a significant threat to the US and its allies bombing Islamic State and its affiliates in Syria.

SalamAir A320neos

Oman's first budget airline, SalamAir, has signed an agreement to add six new

A320neo aircraft to its fleet, of which five are on lease from an undisclosed lessor.

Eric Schulz, Airbus chief commercial officer said: "As a home-grown brand SalamAir has demonstrated huge potential by addressing Oman's demand for affordable travel options. The new Airbus A320neo is the best in the industry and will allow the carrier to achieve lower operating costs, greater fuel efficiency and offer the highest standard of passengers comfort."

RJ trains in on TGV

Royal Jordanian (RJ) has signed a bimodal partnership agreement with the French national railway company (SNCF).

This TGV AIR railway service offers RJ passengers the opportunity to travel to TGV destinations based on a single, combined, TGV and RJ ticket, with a single fare and a single reservation.

The service will operate to and from Paris-Charles de Gaulle Airport to 19 French cities and one in Belgium.



Partners: Dr Marco Miklis (left) and Professor Dr Temel Kotil.

TAI and Airbus to develop novel aircraft structures

Turkish Aerospace Industries (TAI) and Airbus have signed a collaborative agreement on research and development in secondary structures, such as movable parts, for Airbus aircraft programmes.

TAI president and CEO, Professor Dr Temel Kotil, said: "Between our technological partnerships in Turkey, we provide a new and significant contribution. The agreement we have made with Airbus for future commercial aircraft technologies shows that our company is progressively advancing in its technological leaps."

Airbus head of Europe, Caucasus and central Asia strategy and international, Dr Marco Miklis, added: "We consider the excellent value that Turkish aviation adds to world aviation. As Airbus, we want to contribute together with Turkish Aerospace Industries."

BAE selects Raytheon

Raytheon will design, develop and manufacture the projector for BAE Systems' Digital Light Engine (DLE) head-up display (HUD) on the F-16 Fighting Falcon for the UAE armed forces.

The digital HUD upgrade will integrate into the F-16's existing HUD space, requiring no changes to the aircraft, cabling or computing.

Royal birds

Royal Jordanian (RJ) has launched an all-new frequent flyer programme that offers loyal, frequent travellers a more rewarding, attractive and flexible package.

Carrying the name Royal Club, it replaces the old Royal Plus.

Platinum Hawk, Gold Sparrow, Silver Jay and Bronze Sunbird are now the new names of Royal Club membership tiers, giving them a more Jordanian identity.

SaudiGulf calling

CellPoint Mobile has partnered with SaudiGulf Airlines to develop and launch the airline's first mobile app to support booking. As part of the launch, CellPoint Mobile enables payments through SADAD, the national electronic payment method used in the Saudi Arabia.

"We chose CellPoint Mobile because of the company's long track record of designing and implementing mobile booking and payment solutions specifically for airlines," said Karim Makhoulouf, CCO of SaudiGulf Airlines. "We knew they would deliver a native booking app that would expand our revenue opportunities in the direct channel, communicate our unique brand essence, and, ultimately, give our passengers the seamless booking and payment experience they demand."

Revvng up for Honeywell

ExecuJet is becoming the provider of major maintenance on Honeywell TFE731 engines in the EMEA region.

ExecuJet's MRO facility in Johannesburg is based at Lanseria International Airport. It has been a Honeywell approved facility for more than 20 years.

Graeme Duckworth, executive vice president MRO services, ExecuJet, said: "In addition to the TFE731, we also carry full



On the same page: Yousef Al-Jassim (left) and Christian Scherer.

Kuwait signs for A330neo aircraft

Kuwait Airways has ordered eight Airbus A330-800 aircraft.

Yousef Al-Jassim, chairman Kuwait Airways, said: "The A330-800 will seamlessly fit into our fleet expansion and growth plans. Its unbeatable operating economics and performance, in addition to best-in-class passenger comfort, make it a sound investment. We are confident that the A330-800 will support us to compete effectively on our expanding route network."

Christian Scherer, Airbus chief commercial officer, added: "The A330-800, with its unique efficiency and versatility, will support the carrier's ambition to develop its expanding long-haul network. The aircraft will seamlessly complement Kuwait Airways' A320neos and A350 XWBs and deliver unbeatable operating economics, full operational commonality and unmatched passenger experience."

overhaul authorisation and onsite test cell capability for Honeywell TPE331 engines, commonly found in smaller turboprops – a key consideration for our customers, given the popularity of these aircraft among regional airlines in Africa, Europe and India."

Safety in threes

Royal Jordanian, Emirates and Etihad Airways were named among the top 20 safest airlines in the world, according to the annual list released by airlineratings.com, the Australia-based aviation

analysis website.

RJ's president/CEO, Stefan Pichler, said: "We strictly abide by international rules and regulations of air and ground safety. We also make sure to maintain our high international position and continue service improvements to increase RJ's competitiveness in the market."

Etihad's fun move

Etihad Airways has signed a commercial agreement with Warner Bros World Abu Dhabi, the world's first Warner Bros-branded

indoor theme park, which that opened in July.

The airline has announced a three-year partnership encompassing several collaborations aimed at increasing tourism to Abu Dhabi.

Robin Kamark, Etihad Airways chief commercial officer, said: "We continually look for ways to showcase the very best of Abu Dhabi as we bring international tourists from around the world to our home. This relationship will solidify our commitment in ensuring our guests have a memorable travel experience in the air and on the ground."

Etihad's House rules

Etihad Airways has launched a contemporary airport lounge brand in partnership with No1 Lounges.

To be known as 'The House', the project is the result of a collaboration between the airline and the lounge provider, which will operate the new brand.

The project begins at London Heathrow, where Etihad Airways' lounge will be rebranded 'The House, home of Etihad Airways'.

Oman adopts e-AWB

In-line with the government plans to implement international best practices in business, Oman has adopted the International Air Transport Association's electronic airway bill (e-AWB) standard in replacement of the paper airway bill – the contract of carriage for international airfreight shipments.

The introduction of the e-AWB standard will reinforce Oman's position as an internationally competitive logistics hub with a digitally-connected and integrated air cargo supply chain.

Algérie's B737-800

Air Algérie has taken redelivery of its first B737-800 following its conversion into a freighter with STAECO in Jinan, China.

Air Algérie currently operates two B737-700s, as well as a Lockheed Hercules, for its dedicated cargo needs.



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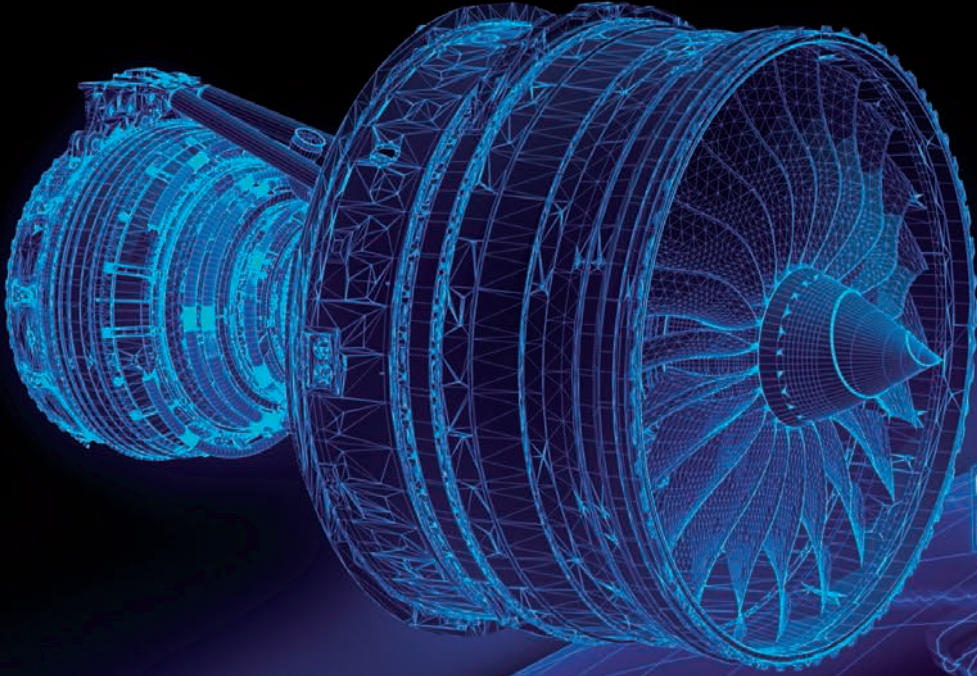
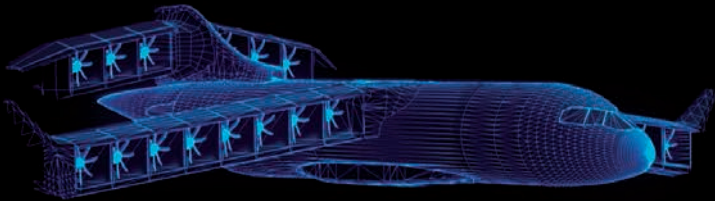


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Saudi female pilot breakthrough

Saudi Arabia's General Authority of Civil Aviation (GACA) has recently issued five licenses to Saudi women, permitting them to work as pilots on Saudi Arabian Airlines aircraft.

It was only this July that women in Saudi Arabia were finally allowed to enrol in flight schools.

The issuance of these licences is seen as part of the country's overall efforts and, specifically, GACA's commitment, to empower Saudi women to work in the aviation sector.

Silvercrest dispute settled

Dassault Aviation has agreed an "amicable settlement" with Safran, ending the dispute concerning the Silvercrest engine planned to equip the Falcon 5X.

Further to the termination of the Silvercrest contract, the end of the Falcon 5X programme, and the launch of the new Falcon, later named Falcon 6X, Dassault Aviation and Safran entered negotiations which led to the settlement.

Dassault Aviation will receive compensation from Safran amounting to \$280m.

GCC in defence boom

The Gulf Cooperation Council (GCC) member states are forecast to spend more than \$100 billion on their defence capabilities for the first time next year, with increasing budgets in Saudi



From left to right: Qasim Galadari, Khaled AlAbbasi, Gulf Air chief executive officer, Krešimir Ku ko, Omar Fathi and Ebrahim Bushager.

Tamkeen pilots takes to the skies

A new batch of pilots from the Gulf Air-Tamkeen programme took to the skies with the Bahrain's national carrier in August as they completed ground and base training courses.

A group of seven pilots are now operating as second officers to complete a set of flying hours and earn their next stripe to be first officers.

Gulf Air and Tamkeen signed the joint agreement in May 2018 aimed at enhancing opportunities for the training and employment of Bahrainis within the kingdom's aviation sector.

Arabia and the UAE driving growth between 2018 and 2027.

"The 6% growth in defence expenditure in the GCC that we've seen this year is expected to slow, but growth rates of 3-4% a year are sustainable over the next decade – meaning that defence spending is likely to hit a record \$100 billion next year," said Craig Caffrey, principal defence budgets analyst at Jane's by IHS Markit.

Turkish profits up

Turkish Airlines posted a \$258 million operating net profit in the first half of 2018. Total revenue increased by approximately 30% compared to the same period last year, reaching \$6 billion.

Despite increasing fuel prices, net operating profit went up from \$17 million to \$258 million due to increasing demand and unit revenues.



Countdown begins

The team from Mohammed bin Rashid Space Centre (MBRSC) look relaxed ahead of the planned October 29 launch of KhalifaSat. They were in Japan to conduct the final tests on the satellite as it was prepared for the mating with the launch vehicle at the Tanegashima Space Centre.

As Arabian Aerospace went to press, the team confirmed everything was fine for the satellite's launch into orbit aboard the H-IIA rocket for a planned mission life of five years. For this, MBRSC is partnering with Mitsubishi Heavy Industries (MHI) and the Japan Aerospace Exploration Agency (JAXA).

Once deployed into a low-Earth orbit (about 613km up), it will capture and deliver high-quality detailed images of Earth to the ground station in Dubai.

Handy move

Etihad Airways has launched a new hand-baggage-only 'deal fare' across selected destinations, allowing travellers to purchase lower fares in economy class if no checked baggage is required. The deal fare includes a complimentary carry-on baggage allowance of 7kg and is available on flights between Abu Dhabi, Bahrain, Kuwait, Oman, Saudi Arabia, Jordan, Lebanon, Egypt and Azerbaijan.

Robin Kamark, Etihad Airways chief commercial officer, said: "After a successful trial late last year, purchasing behaviour demonstrated guests appreciate having more choice and liked being able to select the travel option that best met their needs."

Clark named aviation leader

Emirates Airline president, Sir Tim Clark, was named 'aviation and transport business leader of the year' in September at the Gulf Business Awards in Dubai.

The regional accolade recognised Sir Tim for his contribution to the aviation sector over the past 12 months, as well as his dedication and sustained commitment to building an outstanding track record of financial performance, innovation and superior customer experience.

Sir Tim was part of the airline's founding team, and has played a vital role in the development and growth of Emirates.

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	Airport Terminal Planning and Design (Classroom, 5 Days) 10-14
	Crew Resources Management Systems for Instructors (CRM) (Classroom, 3 Days) 17-19
	Airline Safety Investigation (Classroom, 5 Days) 17-21
November	
Training Needs Assessment (Classroom, 3 Days) 05-07	
Fatigue Risk Management Systems (Classroom, 3 Days) 13-15	
Safety Performance Indicators (Classroom, 3 Days) 27-29	

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Bagging weather solutions

SITAOonAir's electronic flight bag weather awareness solution (eWAS) is the latest application certified by Inmarsat for use across its next-generation SwiftBroadband-Safety (SB-S) communications platform for the flight deck.

It allows airlines to now receive the latest weather view in real-time during flights.

Oman's family support

Oman Air has introduced a range of projects to provide optimum support to families and those with special needs.

Working in close coordination with the Ministry of Social Development (MoSD), Oman Air has restated its commitment to sustainable social development and has pledged to continue promoting initiatives that aim to develop and support people with special needs.

Oman Air's chief executive officer, Abdulaziz Al Raisi, said: "We support a wide range of educational, cultural and sporting schemes, which not only help to improve the lives of individuals, but also make an important contribution to the economic and social wellbeing of the sultanate."

Gulf Air's first A320neo

Gulf Air has welcomed its first Airbus A320neo. The aircraft will service a number of regional routes within the airline's network.

The aircraft is the first of the 12 A320neos ordered during the 2016 Bahrain International Airshow. Its delivery also makes Gulf Air the first national carrier to fly the A320neo in the Middle East and Africa region.



Royal host for AACO executive committee

The executive committee of the Arab Air Carriers Organization (AACO) held its 82nd meeting in Amman in September, hosted by Royal Jordanian Airline.

The meeting was headed by Saleh Bin Nasser Al Jasser, director general of Saudi Arabian Airlines and chairman of the AACO executive committee.

Participating were RJ president/CEO Stefan Pichler, AACO secretary general Abdul Wahab Teffaha, plus the CEOs of eight Arab airlines.

The attendees tackled several strategic issues and the development of some joint projects among AACO members. The committee also discussed internal issues in preparation for AACO's 51st annual general meeting, which was scheduled to be held between November 5 and 7.

MD-83 for AMCON

Aerotask, a Dubai-based global aviation consultancy, has completed a transaction for a McDonnell Douglas MD-83 aircraft on behalf of the Asset Management Corporation of Nigeria (AMCON). Everts Air Cargo, an Alaska-based cargo carrier, has acquired the aircraft to support its existing fleet of five MD-83s.

"This aircraft was undoubtedly one of the most challenging we have dealt with and successfully placing it has, yet again, proven the mettle and capability of our team," said Robert Sitta, vice president aircraft leasing and trading.

Flying a deal

Joramco has successfully performed maintenance on one of Flyadeal's A320s.

Jeff Wilkinson, Joramco CEO said: "This collaboration reaffirms Joramco's strength, expertise and know-how on the A320 and we look forward to providing Flyadeal with continued long-term value solutions and superior maintenance services."

Strata shines spotlight on female leaders

Strata Manufacturing marked the fourth Emirati Women's Day by highlighting its pioneering female leaders in the engineering and manufacturing sector.

"With 11 production lines, we graduated more than 300 Emirati technicians from our composite aerostructure technicians training programme and, with an Emiratisation rate of 51% – of which 86% are female – women are considered to be the roots of Strata," said CEO, Ismail Ali Abdulla.

"Our holistic efforts as an AI Ain-based aerostructure manufacturer go far beyond the innovation and advancement of our capabilities. A significant number of our team are dedicated to enhancing internal processes that serve to boost our operational efficiency; these employees engineer improvements that empower our manufacturing capabilities."

One of those 'improvement engineers' is Mouza Mohammed Obaid Alkaabi, pictured right.

Having joined Strata straight after graduating in 2014 as an automating engineering coordinator, Alkaabi focused her early efforts on the installation of an on-system application for shop-floor tablets that helped technicians request an engineer's support.

The implementation led to time savings, and included a database capturing lessons learnt for future reference.

The process flourished and Alkaabi was promoted to IT specialist in 2016. She won the company's MADA award – a yearly recognition of employee achievements – in 2017.



It's the rail deal

Emirates and Trenitalia, Italy's national railway company, have entered a new codeshare agreement that will enable the airline's customers to discover new destinations across Italy.

Travellers will be able to reach some of Italy's most picturesque cities and towns using high-speed, modern and comfortable trains that leave from Emirates' four Italian gateways – Bologna, Milan, Rome and Venice.

Turkish codeshare

Turkish Airlines has entered a codeshare with Flybmi. The partnership will provide business and leisure travellers an opportunity to enjoy travel from Manchester, London Heathrow and Dublin to Istanbul.

Ahmet Bolat, chief investment and technology officer of Turkish Airlines, said: "We aim to improve our partnership to maximise the travel opportunities offered to our passengers through the networks of both airlines."

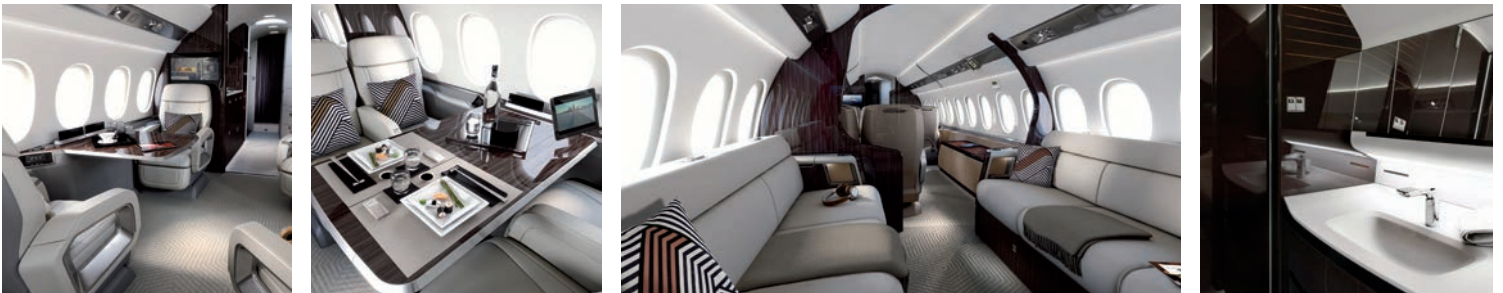
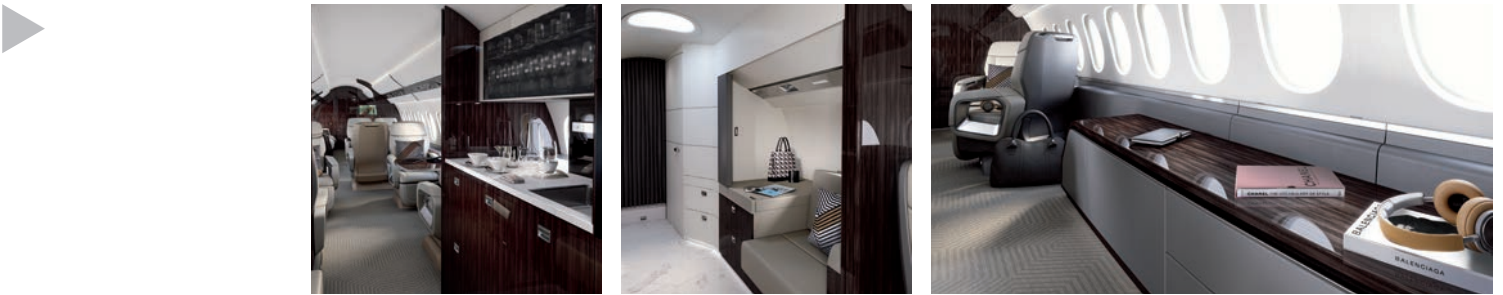
Oman's expansion

Oman Air is continuing its expansion across Europe by extending its codeshare agreement with Lufthansa.

Under the expanded agreement, passengers can now travel on Oman Air flights from Muscat International Airport and connect to Madrid, Brussels, Vienna and Prague from Lufthansa's Frankfurt and Munich hubs.

Abdulaziz Al Raisi, CEO, Oman Air said: "Strategic codeshares are a crucial way for us to broaden customer choice. Our continued relationship with Lufthansa is very important and we are delighted to offer our valued guests even better connectivity in Europe."

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Enhancing Falcon capabilities

The Falcon 8X has been certified by both the European Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA) to use an enhanced flight vision system (EFVS) that gives operational credit for poor visibility approaches down to 100ft, improving access to airports in bad weather and significantly enhancing fleet efficiency.

The Falcon 8X's FalconEye option will be further enhanced with the addition of a dual head-up display configuration that will support an EFVS-to-land capability, allowing pilots to fly a full approach and land without using natural vision to see the runway.

The full approval of this capability is anticipated in 2020.

First ACJ320neo assembled

The first ACJ320neo has been assembled, fitted with CFM International LEAP-1A engines and painted in ACJ house-colours, in preparation for its first flight.

Like the airliner versions from which it is derived, the ACJ320neo family features new-generation engines and sharklets, saving around 15% in fuel and delivering a leap forward in inter-continental range.

The resulting ACJ320neo can fly 25 passengers 6,000nm/11,100km or 13 hours.

A320s for Arabia

Air Arabia received two new Airbus A320 aircraft deliveries in October, bringing its total operating fleet to 53 aircraft.

Adel Al Ali, group chief executive officer, said: "The delivery of our last two aircraft for 2018 marks a significant step in the development of our fleet expansion strategy, especially as we added 12 new routes this year."

DWC cargo rise

Cargo volumes at Dubai World Central (DWC) grew to 475,190 tonnes in the first half of 2018 – a year-on-year increase of 7.1% compared to 2017.

After a robust growth of nearly 9% in first quarter, cargo volumes at DWC reached 245,359 tonnes in the second quarter, up 5.4% compared to 232,691 tonnes during the same period last year.

Welcome to the zone

Abu Dhabi Airports Free Zone (ADAFZ) has named international logistics firm, GAC Abu Dhabi, as the latest addition to its cargo terminal free zone site.

GAC Abu Dhabi is set to enhance its customer experience, allowing cargo



Robert Martin: "BOC Aviation is proud to have played a key role in supporting the development of the aviation industry in the Middle East and Africa."

BOC Aviation celebrates 25 years

Global aircraft operating leasing company, BOC Aviation, which has major links to the Middle East and Africa, celebrated its 25th anniversary in 2018.

"Since our inception, we have grown our asset base to more than \$17 billion and our aircraft portfolio to 320 owned and managed aircraft, comprising the most modern, fuel-efficient aircraft models," said Robert Martin, managing director and CEO.

"BOC Aviation is proud to have played a key role in supporting the development of the aviation industry in the Middle East and Africa.

"We have executed leases with 12 airlines in this region, many of whom are major flagship carriers. Today, this region accounts for over 12% of our owned portfolio."

BOC Aviation has also supported the region by contributing to the development of human talent and capital in the aviation sector.

"We work with the Arab Air Carriers' Organisation (AACO) by sponsoring seven scholarships on an annual basis for selected AACO member airlines to participate in training courses that are held at AACO regional training centres," added Martin.

to be transferred to any other free zones in the UAE without having to pay customs duty.

The move brings new benefits of 100% foreign ownership and 0% corporate or personal income tax.

Registered free zone companies pay no import or re-export duties, have no restrictions on capital repatriation and no currency restrictions, as well as being eligible for a full range of business activities licences.

Green light for Blue Ocean

A partnership between Blue Ocean Academy and the International Air Transport Association (IATA) has resulted in the launch of new IATA-certified training courses that will reinforce the UAE's position as a global aviation hub. The courses range from safety awareness, airline revenue management, ground operations management and dangerous goods regulations.

"The courses are crucial to bridge the gap between knowledge and infrastructure at a time when the UAE aviation industry is being fuelled by the development of the iconic Al Maktoum International Airport and the Dubai World Central," said Dr Sathya Menon, executive director - academics, Blue Ocean Academy.

Gliding to history

Airbus Perlan Mission II, the world's first initiative to pilot an engineless aircraft to the edge of space, made history in August in El Calafate, Argentina, by soaring in the stratosphere to a pressure altitude of more than 62,000 feet.

This set a new gliding altitude world record, pending official validation.

This marks a second glider altitude world record for Jim Payne and Morgan Sandercock, the same two Perlan project pilots who took the Perlan 2 to 52,221 feet on September 5, 2017.

Joramco service boost after EASA approval for Boeing 787

Joramco, the Jordan-based engineering division of Dubai Aerospace Enterprise (DAE), successfully obtained European Aviation Safety Agency (EASA) Part 145 approval for the Boeing 787 aircraft type in September.

The approval comes after Joramco obtained similar approval for this type from the Jordanian Civil Aviation Authority (JCARC) and the Federal Aviation Administration (FAA) last April.

Jeff Wilkinson, Joramco CEO, said: "This approval allows us to broaden our service offerings to a wider base of customers as we continue to build on Joramco's success as a leading maintenance, repair and overhaul facility offering a globally-competitive suite of MRO services."





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“If we negotiate the support of the European community with this open skies agreement – if we have support for training, for the development of the airports – we can have a success story in aviation like we now have a success story in industry.”

MOHAMED FRIKHA

Tunisian businessman and politician Mohamed Frikha tells Martin Rivers why he is bringing Syphax Airlines back from the dead.

THE PHAX OF LIFE

Mohamed Frikha could not have picked a worse time to establish his airline than 2011, the year in which Tunisian President, Zine El Abidine Ben Ali, was ousted in a popular revolt that served as the spark for the Arab Spring uprisings.

Although it seemed like a period of renewal and change in Tunisia – and, indeed, the north African country has fared much better than its neighbours in the years that have followed – fortune was not smiling on Syphax.

Flag-carrier Tunisair threw down the first hurdle by instructing its ground-handling division to block its rival’s very first flight. Then airspace in Libya – a vital market for any Tunisian airline – was shut down as that country spiralled into civil war.

Soon after, a pair of Daesh terror attacks targeting holidaymakers in Tunis and Sousse decimated tourism demand in Tunisia. And, finally, technical problems with the airline’s Airbus A330 grounded its only long-haul route to Montreal.

“We did not have luck,” Frikha shrugged, speaking via video link between the Tunisian and French offices of Telnet Group, the technology company he launched in 1994 and which has been hailed as a model for Tunisian entrepreneurship.

“For a start-up company, the first three years were very difficult – the flights to Libya stopped and all the tourist flights were cancelled – so we could not resist. We were obliged to stop our activities.”

Syphax’s grounding in July 2015 seemed to mark the

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Syphax took delivery of a pair of CRJ 900s



CONTINUED FROM PAGE 19

end of Frikha's strategy of building an intercontinental hub that would link Africa and Europe via Tunis, with spokes also extending to key cities in north America and east Asia. Its A330 and two A319s were returned to their lessors, and an order for six A320s was scrapped.

The airline's demise also snatched away air connectivity from Sfax, Tunisia's second largest city and Frikha's home town, which has always lacked the busy flight schedules of smaller but more tourist-friendly destinations like Djerba and Monastir. Despite having a population of 330,000, barely two flights a day take off from the city.

With millions of dollars of outstanding debts, thousands of angry customers, and a state-owned rival happy to restore its monopoly on scheduled flights, few believed that Syphax would return to the skies.

But Frikha never lost sight of his dream.

"The first time when Syphax has been stopped all the people said, 'It's finished for Syphax. Syphax is dead'," he recalled.

"I'm the only person who said, 'No, Syphax will come back' – because I want to come back and fulfil my obligations. It's very important for my reputation. It's very important for the reputation of the civil aviation [sector] in Tunisia. And it's very important for the country also – [to show] that we take our commitments to the European and American companies seriously."

Though dissolving the airline would have been an easier and less costly option, Frikha has spent the past three years drafting a strategy to restructure its balance sheet and repay everyone left out of pocket.

He likens the recovery plan – which has been approved by the court in Sfax – to a Chapter 11 reorganisation in America. As well as providing immediate compensation for passengers affected by the failure, it lays down a decade-long roadmap to clear the company's debts in full.

"We have the people that haven't used their

tickets... The first thing we will do is reimburse them and we will give them also free flights, because they have waited for us," Frikha pledged.

"We have many providers from Tunisia and also from France – like the French Civil Aviation [Authority], the airport companies, Eurocontrol – and with these providers we will do the necessary to respect our commitment and to pay them for their debt.

"Then also we have the people who are [invested in Syphax] in the stock market. For these people also Syphax can come back and the stock can have value."

Describing his desire to meet these obligations as a "personal challenge", Frikha said expectations are particularly high because of his recent ascension to the political sphere. The businessman entered Tunisia's Parliament in 2014 as a deputy for Ennahda, the moderate Islamist party that surged to power after the 2011 revolution. Although it fell into second place in the 2014 election, Ennahda remains a key powerbroker in the country's coalition government.

Presidential bid

Not content with his parliamentary role, Frikha even launched a presidential bid in the same year by running as an independent. The campaign failed to attract many votes but succeeded in raising his profile.

With key figures in Tunisia's business and political landscapes now lending their support – or at least reining in their opposition – Frikha is tantalisingly close to re-launching Syphax.

The airline took delivery of two Bombardier CRJ-900s this summer, leasing the 90-seater aircraft from Spanish regional carrier Air Nostrum. It plans to soft-launch operations as an aircraft, crew, maintenance and insurance (ACMI) provider upon receipt of its air operator's certificate (AOC), which was believed to be imminent as this article went to press.

"It will take some months – five, six months – until we will have the traffic rights and we will

have our programme for flights," Frikha said, suggesting a launch date of spring 2019 for regular operations. "For this period we will not leave the aircraft on the ground. We will lease them in ACMI mode."

He expects both units to be placed with an unnamed African carrier during the interim wet-leasing period.

When Syphax begins its scheduled operation, the CRJ-900s will be put to work linking Tunis, Sfax and Djerba with destinations in Algeria, France, Italy and Spain. Paris and Toulouse are likely to be among the first route launches.

Mohamed Hamdi, a former director of Nouvelair, Tunisia's main charter carrier, has been appointed chief executive. Though not as well-known as some of his predecessors – notably Mohamed Ghelala, the former president of the African Airlines Association (AFRAA), and Christian Blanc, the former boss of Air France – Hamdi has local expertise and an understanding of how to avoid confrontation with Tunisair.

Under his watch, Syphax will become a very different animal to the company that ceased operations three years ago.

First, the carrier will no longer deploy narrow-body and wide-body jets in its own right. It plans, instead, to focus on regional operations, developing what Frikha sees as an under-served market in the Mediterranean basin.

"It's a model which has [had] success in Europe. We have the example of Air Nostrum," he affirmed.

"Development of these kinds of flights in north Africa is very important. It's more important in this region than in Europe, because in Europe behind the aircraft you have high-speed rail (TGV), you have highways – but in this region there are no highways, no quick trains."

Frikha still believes that sixth-freedom traffic has a role to play at Syphax, citing the potential to connect towns in eastern Algeria, Libya and the Middle East with Europe via a stop in Tunis. But these flows will be pursued more cautiously than before.

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The second strategic shift relates to Tunisair. Syphax was always seen as an enemy by the country's flag-carrier, which suffers from a bloated workforce and legacy inefficiencies and has tried to minimise its losses by keeping a stranglehold on competition.

Unable to change practices at the parastatal, Frikha is extending an olive branch.

His new network will be designed to complement the state-run operation, providing feeder traffic for Tunisair's medium-haul and long-haul flights while avoiding head-to-head competition.

Deploying low-capacity CRJ-900s will help Syphax steer clear of Tunisair's mainline business. And, although the flag-carrier has a regional subsidiary of its own – Tunisair Express, which also has one CRJ-900 as well as two ATR 72-500s – it primarily focuses on domestic flights. Naples and Palermo in Italy and Malta are the subsidiary's only scheduled international routes.

"The regional flights [from Tunisia in general] are not very developed and we will not be a competitor to Tunisair Express," Frikha stressed.

First refusal

In a meeting with Elyes Mnakbi, Tunisair's boss, Frikha even gave the flag-carrier first refusal to wet-lease Syphax's CRJ-900s. "That shows the situation is different and we will work in partnership with Tunisair and with other Tunisian companies," Frikha said. "It's for the best of the country and for the best of the civil aviation activity in Tunisia."

The third change to Syphax's business model could be the most dramatic, though details are thin on the ground for now.

As well as cooperating with Tunisair at home, Frikha wants to find a strategic partner in Europe or the Middle East – specifically one that has A320s or Boeing 737s and is in need of operational and technical support. In short, Syphax plans to broaden its business activities to include pilot qualification, maintenance, repair and overhaul (MRO) services, and some form of operational "off-shoring" – growing its capabilities markedly but without stepping on Tunisair's toes.

"With our partners, we will develop our activities, and not necessarily from Tunisia," Frikha explained.

"Today, some very important companies have to leave their aircraft on the ground because they have no crew, because they have problems for the maintenance of these aircraft. We, in Tunisia, have this [human-resources] capacity. What we offer to our partners is to improve their mechanics and all the operation for these aircraft. And our partner can use our capacity."

He said that Syphax is ready to qualify hundreds of local flight crew as well as open a maintenance base, harnessing the country's low-cost workforce to the advantage of foreign airlines.



Mohamed Frikha: "I'm the only person who said, 'No, Syphax will come back' – because I want to come back and fulfil my obligations."

Despite implying that any narrow-bodies would be positioned overseas, Frikha added that Tunisia's geographical location and Syphax's access to traffic rights might also be seen as attractive. That appeared to leave open the possibility of a Tunisian base with larger aircraft, though he remained adamant that Syphax "will not do partnership with someone who will make some problems with Tunisair".

"We need to start our activities to be a serious partner to discuss the future," he said, when pressed further. "And we wait also for the 'open skies' agreement [between Tunisia and the European Union], which is very important to develop this partnership."

Presidential bid

That agreement, signed in December 2017, promises to dismantle bilateral restrictions between Tunisia and the EU, opening the floodgates to low-cost-carrier competition just as Morocco did a decade ago.

As yet there is no timetable for its ratification, and even once implemented it will exclude the country's main gateway, Tunis Carthage Airport, for a period of five years.

But, in sharp contrast to Tunisair and its affiliated unions – who have angrily opposed the deal, warning of unfair competition from Europe – Frikha sees liberalisation as an opportunity to empower the country's workforce. He draws parallels with the free-trade agreement that the EU and Tunisia struck for manufacturing industries in 1995.

"In that time all people in Tunisia were afraid. They said our factories would close. But the

Tunisian Government had good negotiations for the transition," he recalled. "If we negotiate the support of the European community with this open skies agreement – if we have support for training, for the development of the airports – we can have a success story in aviation like we have now a success story in industry."

It is fair to say that Frikha is hungry for success on many fronts.

As well as reviving Syphax and launching a political career, he is rapidly moving Telnet into new technologies. In recent months the company began a partnership with France's ArianeGroup to build the first Tunisian nano satellite; it teamed up with Japan's Fuji Imvac to manufacture drones; and it announced plans for an office in Silicon Valley in America. Much of its work will be completed at the Sfax Aerospace Valley, a new site that Frikha intends to become a hub for space technology.

With Telnet's share price rising faster than any other company on the Tunis Stock Exchange in 2017, investors seem confident in his ability to deliver results. The hope is that Syphax will share in the success and further propel its namesake city.

"If you want to develop the economy of Tunisia it cannot develop only in one town, Tunis," Frikha concluded. "It should be developed in two or three towns. Sfax should be the second leg of the economy of Tunisia."

"My philosophy is that the person who loves his country should love his region. I love my region, Sfax, and I will continue with its development." ■



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*AtlasGlobal is living up to its name by establishing a group of subsidiary airlines spanning the world. But, as **Martin Rivers** discovers, management already have their hands full dealing with the volatile Turkish market.*

Atlas' global map missing a few pages

AtlasGlobal's chairman, Murat Ersoy, turned heads last year when he pledged to create an alliance of nine different airlines spread across the world.

The Turkish carrier's appetite for overseas subsidiaries was not by itself surprising. The company rebranded from AtlasJet in 2015 to underline its global aspirations, and it already holds shares in three such ventures – AtlasGlobal Ukraine, Iraq's ZagrosJet, and Kazakhstan's Jet One.

But the scale of the plan – and its focus on protected markets like Saudi Arabia and Russia – shocked many, particularly given the difficulties encountered with existing subsidiaries.

In Iraq, ZagrosJet has been grounded for the past year and is now embroiled in a legal battle with AtlasGlobal following a total breakdown of cooperation.

In Kazakhstan, political interference has all but ruined efforts to turn Jet One into a scheduled airline.

And in Ukraine, pressure from flag-carrier Ukraine International Airlines has so far blocked plans for European route launches.

Despite these difficulties, Nevzat Arsan, AtlasGlobal's chief commercial officer, said the company remains enthusiastic about joint ventures.

"We had in our plan China, Saudi [Arabia] and Romania or Albania," Arsan said, raising the prospect of an east Asian subsidiary for the first time. "We are working now with legal [advisors] and some partners over there to see if it's possible. But it's going to be tough."

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“We had in our plan China, Saudi and Romania or Albania. We are working now with legal advisors and some partners over there to see if it's possible. But it's going to be tough.”

NEVZAT ARSAN

CONTINUED FROM PAGE 25

The Saudi project has gained the most traction to date, he confirmed, with plans to base narrow-bodies in the kingdom for flights to Turkey and the Commonwealth of Independent States (CIS).

That would inject yet more competition into a market that has already ballooned from two local airlines in 2015 to five this year – all part of King Salman bin Abdulaziz Al Saud's privatisation programme.

"We want to be part of that," Arsan affirmed. "We see that there is a huge opportunity over there."

However, even as AtlasGlobal broadens its gaze to overseas investments, he admitted that none of the ventures will launch before the turn of the decade. "It takes too much time," he shrugged. "And because of the last two years' crisis in Turkey, we are really focused on our current operation."

That was a reference to the wave of unrest – comprising terror attacks, a failed military coup and a bilateral fall-out with Russia – that destabilised Turkey in 2016, weakening demand for travel.

Following a respite in 2017, Turkey's difficulties took on a new dimension this year when a war of words with the US administration deepened a currency crisis that – according to western economists – has been caused by President Recep Tayyip Erdogan's ultra-loose monetary policy. The Turkish lira fell 44% against the dollar in the first eight months of 2018.

Financial headwinds

Frustratingly for AtlasGlobal and others, the financial headwinds emerged before the tourism sector had fully rebounded from its earlier troubles.

"In the second half of 2017 we started to see a strong recovery," Arsan recalled. "But if you ask the question, 'Has the recovery been completed, or reached the same level as 2015?' – [the answer is] no. In some countries we have seen more than a 55% drop [in demand]. Especially the Nordic countries."

AtlasGlobal has responded by reinventing itself: first, introducing sixth-freedom traffic to reduce its dependence on holidaymakers; and second, boosting charter flights at the expense of some scheduled European routes.

"Until 2015, AtlasGlobal was carrying 98% point-to-point and only 2% transit," Arsan noted. "But if you take our 2017 results, we carried 27% transit. There were lots of slots available [at Istanbul Atatürk Airport], so we got them and we created two banks in our strategy: a morning bank for Europe and an afternoon bank for Turkey domestic and Middle East and CIS, to give perfect connectivity from east to west.

"Thank god we switched strategy. We would not have survived 2016 with just point-to-point traffic."

“Thank god we switched strategy. We would not have survived 2016 with just point-to-point traffic.”

NEVZAT ARSAN

Management want to continue growing sixth-freedom flows until they account for about one-third of the business.

The picture on the network front is more complex, however, with scheduled operations rising by 21% over the 12 months to July 2017, before crashing to half their original size in the same month this year.

The temporary growth reflected a push by AtlasGlobal into Russia, which had restored ties with Turkey in late 2016 following a bilateral dispute over the shooting down of one of its warplanes. AtlasGlobal operated scheduled flights to about a dozen Russian cities last year – up from two the previous summer – but, according to Arsan, visa problems made the routes untenable.

Management thus changed tack again, dropping all scheduled Russian routes except for Moscow and shifting capacity to charter flights from the resort city of Antalya.

This evolution means that 12 of AtlasGlobal's 19 aircraft are currently based in Antalya.

Relocating aircraft from the Istanbul hub has had wider ramifications for the network – particularly in western Europe. Flights from Atatürk to Copenhagen, Hamburg, Milan, Stockholm and Zurich were all dropped this year, leaving AtlasGlobal with just four points in the region: Amsterdam, Düsseldorf, London Stansted and Paris Charles de Gaulle.

Delayed aircraft deliveries

Arsan said delayed aircraft deliveries forced the airline to pull back from Europe more than originally intended – he wanted, for example, to continue serving Stockholm – but restoring routes now will be tricky.

"When you drop a route in Europe and you want to reinstate it again after six months, the market doesn't trust you and they will not book on you," he admitted.

As of September, AtlasGlobal's scheduled network comprises seven points in Europe (also including Belgrade, Moscow and Mykonos); seven in Turkey and northern Cyprus (Adana, Antalya, Bodrum, Dalaman, Ercan, Istanbul and Izmir); nine in the Middle East and the Caucasus (Baghdad, Beirut, Erbil, Jeddah, Kuwait, Medina, Tehran, Tel Aviv and Yerevan); and three in central Asia (Almaty, Astana and Karaganda).

Dalaman and Mykonos are operated in the summer only.

The combined scheduled and charter network is served with a fleet of 12 Airbus A321s, two A320s, one A319, three A330s (wet-leased from Air Leisure) and one Boeing 737-800 (wet-leased from Somon Air).

Turkey's recent troubles have made management "a bit nervous" about expansion, so the scheduled network will remain relatively stable this winter.

Odessa will be the only new destination, while previously suspended routes to Gaziantep, Aktau and Shymkent will be restored (with the latter two replacing AtlasGlobal's existing Kazakh services). Longer-term, talks are under way about adding two new points in the Middle East and north Africa.

No aircraft orders are planned, in keeping with the airline's general aversion to direct purchases. But the fleet will evolve, nonetheless, with the arrival of two dry-leased A330s in November and March. Management tested the wide-bodies this summer on a wet-lease basis and quickly concluded they are viable year-round.

Strong demand

Baghdad and Tehran will become the first scheduled A330 routes this winter, benefiting from strong demand among freight shippers as well as passengers. The planes will also be deployed on high-density charter services – especially during the Hajj and Umrah – as well as stepping in for other scheduled routes during peak periods.

"We swap the aircraft a lot depending on the demand," Arsan noted. "If there is special event in, let's say, London, we put [the wide-body] in London, and then after two days you see that it's flying to Moscow."

He added that one of the A330s will be registered under the air operator's certificate of AtlasGlobal Ukraine, before being wet-leased back to the Turkish division. That should keep the subsidiary busy while it awaits approval for its European routes, as well as opening the door to charter flights from Ukraine.

By taking the aircraft on long-term leases, AtlasGlobal can also configure them with flatbed Business seats – something lacking on Air Leisure's aircraft.

As for the narrow-body fleet, management are negotiating dry leases for another "two to three" A321s for next summer as well as considering more A320s. But they have ruled out the A220 – formerly known as the Bombardier CSeries – despite signing a letter of intent for the type in 2011. And they have no interest in courting US manufacturer Boeing for a future fleet renewal.

"We don't want to shift from Airbus to Boeing," Arsan said, emphasising again the need for stability. "We are really happy with [the] Airbus performance, and our whole future plan is with Airbus." ■



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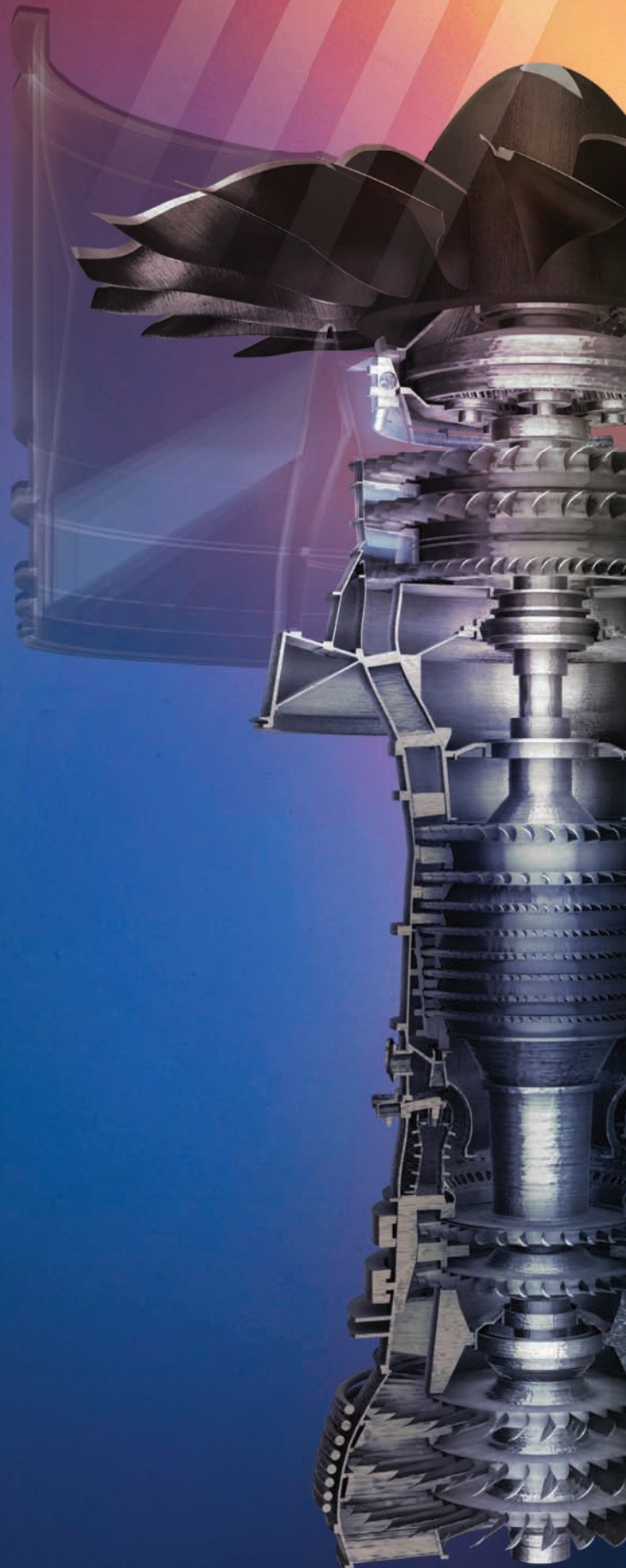
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Somon Air and AtlasGlobal are forging deeper ties in a bid to help the Tajik airline grow sustainably. Martin Rivers reports.

Somon cracks the EU code

Tajikistan's Somon Air is strengthening its relationship with Turkey's AtlasGlobal as it seeks to use Istanbul as a springboard for European expansion.

The two airlines already cooperate through a wet-lease agreement for one of Somon Air's Boeing 737-800s (EY-787), which now sports the AtlasGlobal livery and is deployed on various routes from Istanbul to Europe and the Middle East.

Both of Somon Air's 737-900ERs also periodically fly for AtlasGlobal on an ad hoc basis.

Thomas Hallam, Somon Air's chief executive, said the partnership will be deepened this year with a codeshare deal covering AtlasGlobal's flights to western Europe, as well as Somon Air's route from Dushanbe to Istanbul.

Tajikistan currently has just one direct link to the European Union – a once weekly flight operated by Somon Air to Frankfurt. Management are reluctant to add more European routes until the German service becomes profitable. But the country has few other carriers for EU connectivity: Tajik Air, the only other local airline, lacks third country operator (TCO) authorisation for European flights.

By placing its code on AtlasGlobal's services to Amsterdam, Dusseldorf, Paris Charles de Gaulle and London Stansted airports, Somon Air hopes to grow its exposure to the continent without taking on the risk of launching new routes.

The privately owned Tajik airline has steadily built up its presence in Turkey this year, adding a third weekly frequency to Istanbul and opening a representative office in the city.

Sales data from its upcoming codeshares will help management assess the viability of launching more nonstop routes from Dushanbe to the EU. Somon Air is already talking to Boeing about a future order for 737 MAXs, which will be deployed to both western Europe and the Far East once traffic levels are sufficiently mature. A second-hand 767-300ER is also likely to join the fleet soon.

Asked which European points have the strongest appeal, Hallam singled out Paris and London.

"The French have built a lot of infrastructure here. They have a very strong presence. And we have some projects



“Paris is certainly on the horizon. And the UK.”

THOMAS HALLAM

that we're doing in Paris next year," he noted. "We've made a commitment to an archaeological exhibit in a museum in Paris, which we think is going to open the door for people being interested in visiting Tajikistan. So, Paris is certainly on the horizon. And the UK."

The airline's existing network focuses heavily on Russia – where about one in 10 Tajik citizens find employment – but Hallam wants to reduce its dependence on migrant flows following a series of traffic-rights disputes with Moscow.

He sees strong potential to grow visiting friends and relatives (VFR) traffic, with up to 15 million ethnic Tajiks living in Uzbekistan and 10 million in Afghanistan. As well as encouraging more Afghans to visit Dushanbe itself, the chief executive plans to market Tajikistan's capital as a sixth-freedom stopover for Germany.

"At the moment, if you want to go from Kabul to Frankfurt, you're probably going to go via Dubai," he said, noting that all Afghan carriers are banned from the EU. "But if you come here and connect to our Frankfurt flight, you'll save four-and-a-half hours."

Tourism traffic from Europe is more of a long-term aspiration, Hallam admitted, due to the poor state of infrastructure in Tajikistan.

Stressing the need to boost regional traffic before exploring longer-range markets, he said the airline's focus is on adding cities such as Kabul, Islamabad or Karachi in Pakistan, and unspecified points in India. Flights to Tashkent and Bukhara in Uzbekistan were being launched as *Arabian Aerospace* was going to press.

Expansion in central and southern Asia will be driven by an upcoming commitment for the Embraer 190-E2. Somon Air has been working closely with the Brazilian manufacturer for 18 months and expects to induct its first E2 in late 2019. "We will probably take at least two from a leasing company initially – two and an option for two – and then in parallel we're talking with the manufacturer for their later deliveries," Hallam confirmed.

The 106-seat aircraft will also help Somon Air lift frequencies on strategic routes such as Dubai, which is currently served twice weekly. ■



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Etihad Airways is looking closer to home for growth as it plots a new course following major problems at some of its equity partner airlines. Alan Dron reports.

Why Etihad turned tail on partnerships

Four years ago, at a press conference in Milan at which Etihad had detailed its plans to take a 49% shareholding in Alitalia, I commented to a senior Etihad official that I thought his airline had just taken on a heck of a job in trying to turn around the ailing Italian flag-carrier. “So do I,” he said thoughtfully.

Etihad’s best efforts were in vain. Alitalia collapsed into administration in 2017, while Airberlin, another airline in which Etihad had taken a substantial stake, also declared itself insolvent just three months later.

These problems were among the reasons that Abu Dhabi-based Etihad posted a ‘core loss’ – equivalent to operating loss for its day-to-day airline operations – of \$1.52 billion in 2017. This was a 22% improvement on 2016’s restated figure of \$1.95 billion, but still a huge loss.

Etihad’s 2017 operating figures, issued in June this year, were notable for an almost complete lack of growth, for which the loss of passenger feeds from Airberlin and Alitalia played a significant role.

The airline carried 18.6 million passengers in 2017 (2016: 18.5 million); capacity measured in available seat kilometres (ASKs) was 115 billion km (2016: 113.9 billion); and load factor dropped fractionally to 78.5% (2016: 78.6%). The fleet shrank marginally to 115 aircraft (2016: 119) and cargo dropped to 552,000 tonnes (2016: 596,000 tonnes)

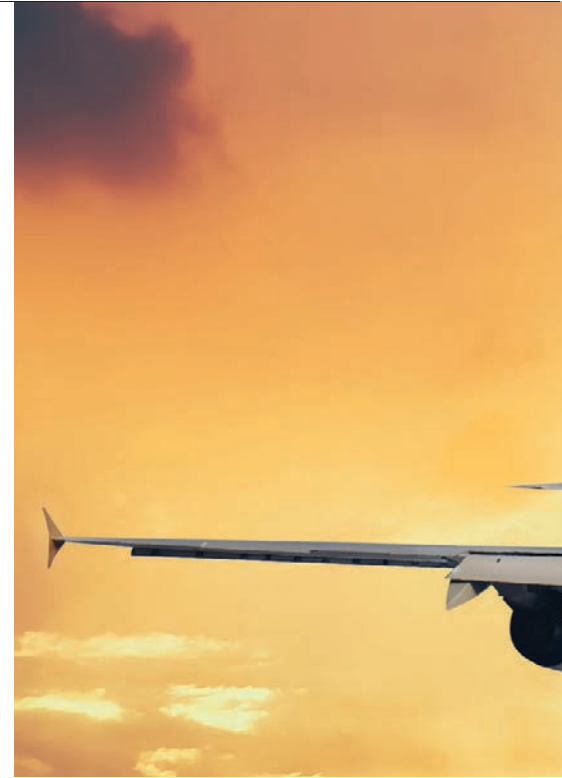
Despite this, Etihad Group’s new CEO, Tony Douglas, commented: “We made good progress in improving the quality of our revenues, streamlining our cost base, improving our cash-flow and strengthening our balance sheet.

“These are solid first steps in an ongoing



“We are more focused on flying point-to-point passengers, and making use of our association with Abu Dhabi, which has an increasingly impressive international profile.”

TONY DOUGLAS



journey to transform this business into one that is positioned for financially sustainable growth over the long term. It is crucial that we maintain this momentum.”

The airline has instituted a transformation process to get it back on course and says that the first tangible results from this have appeared. Notably, it said that its passenger yields for the last quarter of 2017 were up 9% versus the same period a year previously and that it was driving down costs.

Douglas was not available for interview for this article, but the airline did go into some detail on its current plans.

Connecting people

Asked if it was moving away, to some extent, from its model of connecting people over its Abu Dhabi hub and whether it saw the emirate increasingly as a destination in its own right, an Etihad spokesman said: “Over the past two years we have focused on a measured growth strategy, with a healthy mix of direct and connecting traffic flows. Our strategy has become even more intertwined with the development of the UAE national economy and the tourism and travel sector of Abu Dhabi. As part of this, we are more focused on flying point-to-point passengers, and making use of our association with Abu Dhabi, which has an increasingly impressive international profile.

“We have many attractions at our doorstep, from Louvre Abu Dhabi to Ferrari World, Yas Marina, the Formula 1 Grand Prix and Warner Brothers World Abu Dhabi – and that’s just to name a few.”

Perhaps significantly, he added: “Our home market of the UAE, and extended home market



of the GCC, and Saudi Arabia in particular, are our focus right now, with the emerging markets of India and China, of course, also playing a central role.”

Mark Drusch, vice-president at US consultancy ICF, said he believed that Etihad would continue to be a hubbing airline, but if it was moving more towards a point-to-point approach, that would be a dramatic shift in approach and one that could lead the airline to cutting back its size.

Drusch, a former senior vice-president at Delta Air Lines and Continental Airlines, said: “Even if Abu Dhabi is spending a lot of money building the local tourist destination-type activities, as Dubai has done, that’s not necessarily separate from continuing to operate a hub. The stronger the local market, the stronger your hub is.”

He felt the next problem for Etihad might come from another of its equity partners, India’s Jet Airways, which is also experiencing financial difficulties.

Over the past year, the price of fuel has risen sharply, while Jet Airways’ ticket prices have not. It said in August that it was exploring new sources of funding “as a priority”.

Etihad has a 24% shareholding in Jet and says that its relationship with the Indian carrier – together with those with its other partner airlines, Virgin Australia, Air Serbia and Air Seychelles, remain in place. “We have investments in all of these businesses, and we have a responsibility on behalf of our shareholders that we take full opportunity to develop them.”

Drusch believed, however, that after its costly experiences with Alitalia and Airberlin, Etihad will be reluctant to put in any more money to Jet,

or into any of its other partner carriers: “They might try to monetise some of their assets in Jet; for example, they own 25% of its frequent flyer programme.”

Neither did he believe that Etihad would put any more funds into its other partner airlines, although he believed that it might transfer surplus aircraft if they needed new equipment.

Etihad, like most major carriers, is facing challenges from developing trends in the airline business and is keen to change what it offers passengers, both to retain existing travellers and to attract new ones.

Best-in-class airline

“What modern consumers are looking for is changing,” said the company spokesman.

“Previously, the promise of being a ‘best-in-class’ airline was linked to a limited definition of best as being tied to the physicality of air travel. This often meant an emphasis on the hard product, rather than the experience, which is subjective to each traveller and their personal needs and wants.

“We have always aimed to cater to various customer segments, but even that has limitations if you can only offer a couple of classes to 18 million passengers.

“Digital merchandising and distribution capabilities are empowering airlines to become more customer-centric by giving the traveller the ability to choose what they want and customise their experience from an unbundled product accordingly. This means we need to also have the right digital infrastructure in terms of merchandising and distribution to be able to support the needs of our customers in the evolving digital space.”

Since his arrival at Etihad in January, Douglas has talked of improving the airline’s ‘commercial sustainability’. The spokesman said that the company was “making solid first steps in an ongoing journey to transform this business into one that is positioned for financially sustainable growth over the long term.”

One potential way of doing this, suggested Drusch, was to look at joining one of the three airline alliances – Oneworld, SkyTeam or Star Alliance. “That’s what’s missing for them. If Emirates aren’t going to do it and the US carriers aren’t going to make a big fuss about the ‘Middle East 3’ any more, Etihad may say ‘It’s time to get on board’ one of them. It wouldn’t have been possible before because of the row between the US carriers and the Middle East 3.”

One intriguing aspect of Etihad’s future may be increasing levels of cooperation with Dubai’s Emirates Airline. Speculation among industry observers on this point has been growing since the two airlines agreed in January to cooperate on security matters.

“It’s fair to say that, as two partners from the United Arab Emirates, we will continue to consider, where appropriate, what are the things that we can do together,” said the Etihad spokesman.

Drusch believed that a closer relationship between the two Arab carriers is possible, but that Etihad – which is considerably smaller than Emirates – would not want to be the minor partner in such a grouping: “If they were going to sit down and agree, it would have to be a massive overall development plan.” That could involve the two carriers taking responsibility for different areas of operations, he suggested. ■

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EXPERIENCE ADDED VALUE



The evening of August 4 saw a batch of five ATR 72-600s climbing out of Toulouse-Blagnac airport in a last-minute dash to Tehran.



A race against Trump...

A last-gasp ferry flight before the United States re-imposed economic sanctions increased Iran Air's fleet of modern regional aircraft by five machines. But, asks Alan Dron, how are they faring in service?

The aviation industry is accustomed to working to fine margins. The delivery of a batch of turboprop airliners to Iran Air just hours before the US re-imposed economic sanctions was one of the latest examples of that practice.

Around 8pm on August 4, a stream of five ATR 72-600s roared down the runway at one-minute intervals from the European manufacturer's final assembly plant at Toulouse-Blagnac airport.

Climbing away, they settled on a southeast course that would take them through the night on a nonstop route to Urmia, northwest Iran, where they refuelled before reaching their final destination, Tehran's secondary airport, Mehrabad, on the morning of August 5, the day before the deadline for delivering new aircraft to the country.

The sanctions, which had been originally introduced to dissuade Iran from continuing with its nuclear research programme – a programme the west believes was aimed at creating nuclear weapons – were repealed in 2015 following an agreement under which Iran agreed to suspend its nuclear activities.

However, that agreement, reached under the administration of US president Barack Obama, was repudiated by the Trump administration. The latter announced in May 2018 that it would re-impose the sanctions after a 90-day period designed to give western companies an opportunity to wind down their activities in Iran.

During the two-year window when sanctions were lifted, Iran Air had plunged into the airliner

marketplace. It ordered 100 aircraft from Airbus (46 A320 family, 38 A330 family and 16 A350) and 80 from Boeing (50 737 MAX8s, 15 777-300ERs and 15 777-9s).

Airbus had delivered just three aircraft by August, Boeing none. (Notably, however, the US company never formally included the Iranian aircraft in its order book, perhaps in a sign of caution over how the international political scene would play out. It also had an order for 30 737 MAX models from Iran Aseman Airlines.)

Iran Air also ordered 20 ATR 72-600s from the Franco-Italian turboprop manufacturer, together with a further 20 options.

By the start of 2018, ATR had delivered eight of the first 20 and planned to hand over the remaining 12 by the end of this year; by late spring, most of the remainder were at varying stages of completion at Toulouse.

The Trump ultimatum was a blow to all three airliner manufacturers, but arguably more so to ATR, for which the Iranian order made up a larger proportion of its future workload.

So, the European company was understandably keen to deliver as many of the outstanding aircraft as possible to Iran before the shutters came down once again.

Hence the stream of aircraft taking off from Toulouse-Blagnac on August 4.

I understand that a further three aircraft could have been delivered if the deadline had been extended by just 24 hours. ATR said it would apply to the US authorities for special permission to deliver them. However, it now accepts

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on Page 34



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that permission will not be forthcoming.

This leaves ATR with the task of shuffling its delivery schedules and finding new owners for the seven Iranian aircraft: "We are working on trying to replace the aircraft (slots) that cannot go to Iran Air," an ATR spokesman said. This process was progressing well and the company's delivery target for 2018 remained unaltered.

He added that some of the aircraft had been completed and parked, but declined to say whether they would require to be repainted or have their cabins altered before re-sale to another customer.

According to Reuters, finding alternative homes for the undelivered aircraft may be complicated by the fact that they contain some features that are not standard in aircraft designed for short hops, since Iran's mountainous geography requires extra emergency oxygen supplies.

Iran Air, which was unable to contribute to this article, has used the ATRs it has received to improve services on its domestic routes. Developing its regional services was very important to the carrier, ATR's then-CEO, Christian Scherer, said at the manufacturer's annual media briefing earlier this year.

He said Iran Air was using the aircraft to drive the country's economic expansion. They were being used to revitalise regional routes and bring residents from remote regions into the capital to expose them to Tehran's expanding economy.

"There isn't any more powerful tool for economic emancipation than communications," Scherer said. "This regional development is very powerful for them and it's, frankly, very benign from a geopolitical and security aspect."

He hoped – unsuccessfully, as it turned out – that this unthreatening use of the aircraft would encourage the US to allow ATR to continue to trade with the Iranians.

The biggest problem Iran Air faced with the new aircraft, said Scherer, was training up sufficient pilots to operate them. ATR had, therefore, sent some experienced ATR pilots to Iran to act as instructors, "to help them fly the



line and to do some on-the-job training".

Scherer added that the Iranians had been able to get much more productivity out of the ATRs than the aircraft they replaced – thought to have included ageing Airbus A300s, whose maintenance was becoming increasingly onerous. "When they started taking delivery, they realised they could fly these aircraft much more [than their elderly predecessors] because they were new and reliable and actually worked!"

According to an August report in the Iranian English-language economic daily publication, the *Financial Tribune*, Iran Air has opened up more than 25 new routes across the country with the turboprops.

Analysts agree that the Iranian ATRs are being used for point-to-point services, as well as creating a feeder network into Tehran.

There is irritation in Europe at the US sanctions, with some French politicians, in particular, angry at what they regard as the US imposing its rules on other nations.

There has been talk of enacting legislation that would give protection to European Union nations that continue to trade with Iran. The US has said that any company or organisation that continues to do so will be subjected to secondary sanctions. In September, for example, it blacklisted a Thai company that was acting as general sales agent for Iranian carrier Mahan Air.

Companies such as Airbus and ATR would be vulnerable to US wrath at sanctions-busting, as they use substantial quantities of US components – in ATR's case, notably the engines

The reliability of modern aircraft means that the new ATRs can be utilised more heavily than many of the elderly aircraft Iran Air was using for domestic services.

The national carrier now has 13 ATRs in service, although the remaining seven from its order are due to be re-allocated to other purchasers.

for its aircraft are PW127Ms. Although made in Canada, the parent company is US powerplant giant Pratt & Whitney.

The engines are likely to be a problem for Iran in the future, commented London-based Saj Ahmad, chief analyst at StrategicAero Research, who speculated on how they would be serviced when they became due for major 'C'- and 'D'- checks.

While the expertise of Iran Air's engineers and technicians was not in question, he said, getting hold of spares was likely to be difficult.

Iran Air is reported to have built up around \$5 million-worth of spare parts, but the quantity of spares that could be bought for that amount of money amounted to a drop in the ocean. "I suspect it was a case of grabbing what they could and then hoping for the best," he said.

Whether sanctions would also apply to ATR giving servicing advice to Iran Air was unknown, he added.

So, how will Iran Air keep its new aircraft operational once they reach the point in their service lives where deeper maintenance is required?

Potentially, Iran may have to resort once again to the clandestine networks of suppliers and front companies that it built up during the earlier period of US sanctions, which proved adept at side-stepping the bans on acquiring the necessary components to keep both military and civil aircraft flying.

For the moment, however, Iran's domestic travelling public is enjoying the novelty of flying in modern, reliable aircraft. ■



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As the Arab Air Carriers Organization (AACO) 51st annual meeting was due to open in Cairo in early November, secretary-general, Abdul Wahab Teffaha, discussed the current hopes and concerns of its member airlines with Alan Dron.

TEFFAHA: OUR HOPES AND FEARS

The only predictable aspect of the airline world is its unpredictability. Crises materialise seemingly out of nowhere. Some are resolved quickly while others, such as the conflicts raging in several nations in the Arab world, linger for years.

As the industry's representative body, AACO acts as an advocate for its 35 member airlines, trying to ease problems while acknowledging that some are outside its remit or capacity to handle.

Asked, for example, if AACO had become involved in the diplomatic row between Qatar on the one hand and Saudi Arabia, Bahrain, the UAE and Egypt on the other, secretary-general Teffaha was blunt: "Not at all. We are not politicians. Our job is to keep our services safe, secure, economical and appealing to customers. I hope the politicians will find solutions because we don't like crises."

Where AACO can get involved is where issues such as poorly thought-out regulations impinge on its members' interests.

Regulatory initiatives

"Our priorities are on the advocacy and aeropolitical side, to try to help the airlines present their case to regulators on anything that will add to costs, for example. That applies to a number of regulatory initiatives if they come from Europe, or the Arab world, or elsewhere."

Sometimes governments jumped into taking decisions without due analysis, such as jacking-up user taxes or charges, said Teffaha. This was sometimes done to try to raise a few extra hundred million dollars in taxes, while ignoring the possibility that it could damage a country's wider interests to the tune of billions of dollars – by adversely affecting tourism, for example.

The air transport industry provided huge amounts of added value by contributing to job creation and the wider economy, he said: "We want smart regulation, not populism."

As one example of AACO's efforts, he pointed to a recently concluded bout of negotiations with the region's governments. "We've just achieved a milestone in revising the 1979 Tunis Convention among Arab countries about double taxation, to take into account areas that have



“We’re still in a growth pattern. We have not – touch wood – experienced any decline in traffic since the 1998 Asian financial crisis.”

ABDUL WAHAB TEFFAHA

emerged since then. That revision – which took three years of negotiation – has now been approved by the Arab League and it is now up to individual states to ratify it.”

There also remained a lingering threat of protectionism, he said. This was not necessarily specific to the air transport industry, but the imposition of tariffs and the emergence of trade wars had to be watched carefully.

Despite such challenges, “We’re still in a growth pattern. We have not – touch wood – experienced any decline in traffic since the 1998 Asian financial crisis.

“As for the future, we have an extremely solid base for growth in the Arab world. Its [area is] very large, so there’s no alternative to airlines, and traffic to and from the Arab world is growing in healthy numbers – around 6.5 to 7% – so that’s a great safety net for us.

“The hubs and infrastructure in the Arab world are continuously improving, being developed and expanded and, therefore, the challenge that is being faced by other regions in terms of growth, where the capacity of the infrastructure is not keeping pace in tandem with traffic growth, is not happening here. Governments are doing an excellent job in providing expansion of capacity before we reach critical point. Of course, there are some bottlenecks, but the general situation is very positive.”

He noted that, over recent years, there had been a change in the traffic flows of AACO members. Traffic within the Arab world had at one time provided a cushion for members against fluctuations in intercontinental traffic. Today, that position was reversed, with the huge flows of traffic that passed through the region’s hubs shielding member airlines from dips in regional traffic flows.

Encouragingly, the growth in capacity (available seat kilometres) among AACO members over the past year had been less than the growth in passengers (revenue passenger kilometres), leading to an improvement in AACO members’ load factors of 1%.

As for AACO, he hoped that two new members would be announced by the end of the year. That would take its numbers to 35 carriers, a sign that the organisation was providing value to airlines. ■

As the region's airline chiefs prepare to meet for their annual Arab Air Carriers Organisation (AACO) assembly, they will be buoyed by some recent research statistics – but there could be trouble ahead without changes in global attitudes, as Alan Peaford reports.

Good news – but it comes with a health warning...

You only need to stand for a few minutes in any of Dubai International Airport's three terminal buildings to immediately realise the broad reach of air travel. As the world's busiest international airport, with some 87.7 million passengers passing through each year, flights to and from all corners of the world are arriving or departing every couple of minutes.

Dubai's phenomenal traffic increase – and the benefit to the UAE economy – reflects the value that the air transport industry is bringing to the global economic scene.

New research from the Air Transport Action Group (ATAG) has explored the fundamental role civil aviation plays for today's society and addresses the economic, social and environmental impact.

The report, *Aviation: Benefits Beyond Borders*, said the air transport sector now supports 65.5 million jobs and generates \$2.7 trillion in global economic activity worldwide. Air transport supports 65.5 million jobs and \$2.7 trillion in global economic activity.

The report added that more than 10 million people work directly for the industry itself with aircraft carrying 35% of world trade by value (\$6.0 trillion worth in 2017), but less than 1% by volume (62 million tonnes in 2017).

Human resource situation

But there are also challenges. The impending human resource situation that could see a shortage in pilots, engineers and aviation managers, along with greater national protectionism, could affect the potential for the civil aviation sector, both for commercial air transport and business aviation.

"More people in more parts of the world than ever before are taking advantage of safe, fast and efficient travel," said ATAG executive director, Michael Gill. "The wider supply chain, flow-on impacts, and jobs in tourism, made possible by air transport, show that at least 65.5 million jobs and 3.6% of global economic activity are supported by our industry."

But the industry is at a crossroads, according to Gill. "With an open, free-trade approach, the growth in air transport will support some 97.8 million jobs and \$5.7

How the jobs break down

The aviation sector in the Middle East directly employed an estimated 553,700 people according to the ATAG report:

- 192,900 of them (35% of the total) were employed by airlines or handling agents.
- 24,800 (5%) had jobs with airport operators such as airport management, maintenance, and security.
- 326,700 (58%) worked on-site in airports at, for example, retail outlets, restaurants, and hotels;
- 4,400 (1%) were employed in the manufacture of civil aircraft (including systems, components, airframes, and engines);
- 4,900 (1%) worked for air navigation service providers in air traffic control and engineering.

trillion in economic activity in 2036. However, if governments create a more fragmented world, with isolationism and protectionist policies, more than 12 million fewer jobs and \$1.2 trillion less in economic activity would be supported by air transport," he said.

"By working with one another, learning from each other's cultures, and trading openly, we not only create a stronger economic outlook, but we also continue the conditions for peaceful interaction across the globe. Aviation is the key driver for this positive connectivity."

Turbo-charges the global economy

This was backed by the director general and CEO of the International Air Transport Association (IATA), Alexandre de Juniac, who said: "Airlines empower people's lives and turbo-charges the global economy. In challenging political, economic and environmental times, the ability of aviation – the business of freedom – to sustainably connect cultures and spread prosperity beyond borders has never been more important.

"There was also concern expressed in the report about the slow pace of change in gender imbalance. Despite the need to recruit more bright young people into the industry, there is a huge gap between the numbers of men and women in the aviation sector. The report highlighted that global statistics on gender equality within the air transport sector are scarce. However, it said anecdotal evidence suggests that aviation still tends to be a male-dominated industry."

A global survey of gender equality in flight crews shows that, despite the first commercial pilot's licence being granted to a woman in 1934, women still only make up around 5.5% of pilots worldwide.

Air travel in the Middle East is expected to continue to grow at about 5.8% per year over the next two decades. This increase will, in turn, drive growth in the economic output and jobs that are supported by the air transport industry over the next 20 years. Oxford Economics forecasts that, by 2036, the impact of air transport and the tourism it facilitates in Middle Eastern countries will have grown to support 4.3 million jobs (78% more than in 2016) and a \$345 billion contribution to GDP (a 166% increase). ■



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 **Eurofighter
Typhoon**

The RSAF continues to take deliveries of 84 F-15SAs ordered back in 2011, but the current RSAF Chief has more pressing matters, like confronting the complex threats his country is facing from Russian and Chinese systems.

PICTURE: ALAN WARNES



Saudi Arabia wound up by Russia's fantastic toys

The Royal Saudi Air Force (RSAF) is looking to modernise the operational concepts at its Riyadh-based Air Warfare Centre.
Alan Warnes
reports.

• The Russians are using Syria as a test area for their new toys. And they are absolutely fantastic. NATO and the US are not willing to compete with them. 📌

Lieutenant General Turki bin Bandar bin Abdulaziz al-Saud, who was appointed commander of the RSAF in February, is behind a shake-up in a bid to confront the emerging threats that have been so evident in Syria.

High-fidelity threats from Russia and Iran are causing the Middle East countries real concern, and the RSAF wants to source technologies to have a realistic chance of defeating them.

Al-Saud understands the very complex threats he is facing, and knows that dropping bombs, like the US and its allies have in so many countries over the past 20 years, solves nothing.

The next conflict is going to be much harder and many observers are looking at the scenario currently being played out in Syria.

Heavy electronic warfare effects

A source told me: "It is a showcase of Russian technologies and the US and its allies flying over there are being subjected to heavy electronic warfare effects like jamming, eavesdropping, and the disruption of datalink capabilities. The Russians are using Syria as a test area for their new toys. And they are absolutely fantastic. NATO and the US are not willing to compete with them."

Russia is also deploying anti-access area denial (A2AD) assets like the S-300 and S-400 air defence systems all over the Mediterranean.

The same source said: "Algeria, Egypt, Syria and Turkey will all soon have these systems, so Russia could control the area because all the systems are connected to Moscow. All the maintenance and support is done through a network, which controls the air space. We are very ill-prepared for what they could do, and as they spread the network they take more control of the air space."

This kind of battleground is what concerns the RSAF chief and his allies. They are concerned the Iranians may also

acquire a sophisticated A2AD system from Russia one day.

He wants to cover all eventualities, and take into account all the threat capabilities.

While the UAE has already bought some technologies, it has been in an ad-hoc way. However, the RSAF chief is believed to have taken on a more integrated approach. He has a totally new vision to deal with threats, and that's why Saudi's Crown Prince Mohammed bin Salman has installed him.

The source said: "He wants forces trained properly against threats that they might face tomorrow. He is keen to acquire radar, missile and EW capabilities used by his foes to ensure that he can take them on. They want access to technologies they can defeat."

The S-400 capabilities were highlighted during a Russian Ministry of Defence briefing on the Russian Air Force Il-20 that was shot down over Syria on September 17.

Major-General Igor Konashenkov provided data and recordings on the incident, obtained from the control centre of an S-400 surface-to-air missile (SAM).

High-speed targets

He told journalists: "The radar is able to detect and accompany not just aircraft, but any high-speed targets that follow a ballistic trajectory."

In front of a large screen, he highlighted the position of the Israeli F-16s which had attacked sites in Syria and the S-200 missile launched by Syrian forces.

He said: "The S-200 missile approached the F-16, but then dramatically changed direction and headed for the Il-20, because of its larger reflecting surface and slower speed. We blame the Israel Air Force for this."

Russia then announced that it would be transferring a S-300 air defence missile system to Syria to strengthen the combat capabilities of the Syrian air defence – much to the alarm of Saudi Arabia and its allies. ■

A huge new player has emerged in the aerospace defence world. Alan Warnes finds out more.

PLAY IT, SAMI

Saudi Arabian Military Industries (SAMI) is set to control the way in which the kingdom spends its defence dollars. It is all part of Crown Prince Mohammed bin Salman's announcement, in April 2016, of an ambitious 'Vision 2030' blueprint.

The crown prince is Saudi Arabia's minister of defence and chairman of the public investment fund (PIF).

The aim of Vision 2030 is to boost jobs and revenue, as well as preparing for a future with lower oil income. The crown prince sees defence business investment as a way to increase defence capability in country, with SAMI in charge of full industrial participation of Saudi's international programmes.

The target is to employ a workforce of around 40,000 people in aerospace and defence by 2030.

Overriding objective

SAMI's overriding objective is to localise at least 50% of Saudi's military spending by 2030. Saudi Arabia's defence budget of around \$150 billion a year is only smaller than that of the US and China, and a lot more than Russia. As a result, SAMI, a 100% government-owned entity, is aiming to become one of the world's top 25 defence companies by 2030.

It has huge financial support from Saudi's PIF, which already controls oil giant Aramco, the biggest company in Saudi Arabia and worth around \$5 trillion.

A powerful board of directors is headed up by HE Ahmed bin Aqeel Al-Khateeb, who is the chairman, as well as being a board member of the PIF and the general secretariat of the Saudi Arabia Council of Ministers. He is also special advisor to the crown prince.

The vice chairman is Dr Ghassan Abdulrahman Al Shibl, the chairman of Saudi Arabian Airlines (Saudia) and ex CEO of Advanced Electronics Company (AEC).

The seven board members include HH Prince



Crown Prince Mohammed bin Salman visited Boeing's Seattle facility to pave the way for a SAMI deal with Boeing. PICTURE: BOEING.

Faisal Bin Farhan Al Saud, who is a senior advisor to the Saudi ambassador in the US. He has more than 15 years of experience in business and military industries, and with much of SAMI's revenue expected to come from big US companies, he will be busy.

HE Khalid Bin Abdulaziz Al-Falih is Minister of Energy, Industry and Mineral Resources and is chairman of Aramco. He is an ex-CEO of the massive company.

There are three foreigners on the board: Michael Consentino, president Airbus, Defence and Space; Philip Yeo, chairman of Economic Development Innovations Singapore (EDIS); and Giuseppe Giordo, president and CEO of

Czech aerospace company, Aero Vodochody, and ex CEO of Alenia Aermacchi (now Leonardo).

The CEO is Dr Andreas Schwer, the ex-chairman and president of Germany's Rheinmetall Industries. He has more than 20 years' experience in the military industries sector and reports to the board.

The company's website shows it is split between four divisions – defence electronics, weapons and missiles, land systems, and aeronautics.

Many challenges lie ahead for the board and the CEO. The consolidation of all the Saudi defence industries under SAMI's ownership will be the one.

With so many foreign companies, like Boeing, Lockheed Martin, Raytheon, and BAE Systems installed and operating in Saudi, it won't be easy. Some may even balk at the thought of their shares being taken over by SAMI. But, at the end of the day, money talks and SAMI has plenty of that.

Newer technologies

A second need is to invest into newer technologies that may complement the businesses already in Saudi. The government has always made it clear the transfer of technologies is important, if it is to wean itself off its reliance on oil. So don't be surprised to see SAMI acquiring some major cutting-edge companies.

A third consideration, which the Riyadh-based conglomerate has already started to create, are industrial agreements with the sellers of equipment to the kingdom.

This won't be an easy task, particularly when management structures also have to be set up. SAMI will undoubtedly be scouring the world for the best to run all the divisions and departments.

Ten months after being launched, SAMI signed a memorandum of agreement with what could be its biggest partner, Boeing, on March 30, 2018.



Boeing signed a joint venture with SAMI in March 2018, which is aimed at localising more than 55% of its business in Saudi Arabia. PICTURE: BOEING.

The new joint venture (JV) is aiming at localising more than 55% of the maintenance, repair and overhaul (MRO) services for fixed and rotary-wing military aircraft in Saudi Arabia. The agreement will also transfer technology to install weaponry on these aircraft, as well as localise the supply chain for spare parts in the kingdom.

The agreement was signed by Al-Khateeb and Boeing president and chairman, Dennis Muilenburg, at Boeing's commercial manufacturing facility in Everett, Washington. Al-Khateeb, said: "Boeing has a long-standing commitment to Saudi Arabia and is extremely keen on expanding its footprint in the country. On the other hand, SAMI is exploring all collaborative opportunities to build a strong autonomous military industries eco system in the kingdom."

The JV will provide sustainment services for Saudi's military fixed- and rotary-wing aircraft. It will be the sole provider of these services for all military aviation platforms, strengthening the

kingdom's defence capabilities and enhancing its deterrent potential.

The military operates an extensive fleet of Boeing aircraft. It has 737S, 747s, 757s, E-3A Sentrys, KE-3/RE-3s, F-15C/Ds, and F-15S/SA Eagles – more than 200 aircraft – operating with the Royal Saudi Air Force (RSAF), plus AH-64s and AH-6i helicopters working with other services.

According to a Boeing statement, the new agreement is expected to reach revenues of \$22 billion by 2030 and create 6,000 jobs and training opportunities for the Saudi youth. Around \$450 million will be invested in facilities and equipment across Saudi Arabia.

In March, the UK and Saudi governments signed a memorandum of intent to finalise discussions for the purchase of 48 Typhoons.

Progress to an agreement for these, as well as support and transfer of technology and capability, is on-going, according to BAE's half-yearly set of accounts. The company added: "This will enable BAE Systems to continue with the

Under SAMI, international business will see 50% of the work being localised, which means that any deal with BAE Systems will mean Eurofighter Typhoons being assembled in Saudi.

PICTURE: ALAN WARNES.

industrialisation of defence capabilities in Saudi Arabia in support of the Saudi Arabian Government's national transformation plan and Vision 2030."

Final assembly of the Typhoon would follow on from the Hawk programme.

The first of 22 in-kingdom final-assembled Hawk aircraft is expected to be delivered to the RSAF in 2019. This sees the 'cigar tube' of the front, centre and rear of each Hawk airfreighted to Saudi Arabia, where they will be assembled. This is likely to be a lot easier than following the same process with the Typhoon, which is built all over Europe.

Five combat systems

SAMI has signed only one JV contract so far, a \$2.2 billion framework deal in April with Spain's Navanti. The agreement covers the purchase of five Avante 2200 Corvettes from Spain's state-owned shipbuilder, which will also include the supply of all five combat systems. The JV covers the installation, integration and test of the complete combat systems for the last vessel.

Work will also include logistics support, training programmes and simulators for the ships' maintenance, as well as the ground-testing bases.

Work was expected to begin as *Arabian Aerospace* was going to press, with the last delivery in 2022.

Around 6,000 jobs will be created both directly and indirectly.

With money not being an issue, SAMI will be a massive game-changer, not just in Saudi Arabia but right across the globe. ■



Group Captain Chas Dickens, OBE (left), commander of the UK Royal Air Force's No903 Expeditionary Air Wing (EAW), gives a first-hand account of the UK's combat air operations over Syria and Iraq to Jon Lake.

“ If you think about Daesh as an organisation, they are probably the most despicable group I have ever seen. ”

The UK is one of 77 nations contributing to the on-going multi-national military intervention against Daesh (the Islamic State of Iraq and the Levant). Its contribution to the mission is known as Operation Shader.

Dickens was keen to point out: “The Royal Air Force is the second largest contributor to this campaign and our attack, and intelligence, surveillance, and reconnaissance (ISR) assets, are in constant use.”

Coalition air operations in Iraq are undertaken at the invitation of the Iraqi Government and they support operations by the Iraqi Army, while in Syria the coalition is working with Syrian Democratic Forces on the ground.

“It's important that we understand that some of the pace of this campaign is set by their capabilities and their ability to move forward,” Dickens explained.

He and his officers and men have enthusiastically embraced the task of defeating Daesh and are motivated by a sincere desire to make people's lives better in Syria and Iraq.

“If you think about the people on the ground in Iraq and Syria and the freedoms that they used to enjoy, when Daesh came into those villages and cities they changed their way of life. If you didn't obey their directions then you were killed, or sometimes tortured,” Dickens explained.

“If you think about Daesh as an organisation, they are probably the most despicable group I

have ever seen. I have been involved in operations in Iraq previously and in Afghanistan and this group have done things to people that I have not seen in other campaigns. We've seen them go into villages and hang the elders as a deterrent to other people on the ground. We've seen people towed behind motorcycles, who have disobeyed Daesh, and they are towed around until they are dead. Captured airmen have been burnt in cages. These are a particularly nasty bunch of people.”

Freeing thousands of people

By defeating Daesh on the ground in Syria and Iraq, the coalition is freeing thousands of people from the group's malign rule, but Dickens believes that the air campaign is also of crucial importance in protecting the public in Europe and the United Kingdom.

Dickens said taking away the territory that allowed Daesh to present itself as a caliphate or an 'Islamic state', and disrupting the narrative of success and victory that Daesh has tried to propagate, will help to prevent the organisation from inspiring and exporting terrorism around the world.

He explained that the nature of the air campaign, which he estimates as having killed some 50,000 Daesh fighters, is changing.

Now that Daesh has been cleared from its strongholds in Iraq, there has been a growing emphasis on attacking its now tiny toehold in

Syria. Daesh has lost 98% of the territory it held at the beginning of the campaign, and has been squeezed and degraded into the Mid Euphrates River Valley (MERV) in Syria.

The 'physical caliphate' – where the organisation holds ground and controls a population – is now very small and collapsing, although Daesh is now attempting to conduct an insurgency across the region, carrying out 'terrorist type acts', to demonstrate its continuing capability.

Although the Typhoons and Tornados are now usually tasked to operate over Syria, they can still rapidly reposition to attack Daesh fighters wherever they come together, whether in Syria or Iraq. This can sometimes lead to extended sortie lengths of nine hours or more.

As well as undergoing a shift in geographical focus, the tempo of the air campaign has also been reducing as Daesh has been cleared from more and more areas.

The number of weapons being dropped (the 'kinetic activity') has reduced – particularly compared to the intense fighting around Mosul.

The Typhoon detachment commander said: “This is what winning looks like. The last time the squadron came out it was at the height of the heavy fighting in Mosul and Raqqa. Every time you took off there was a very good chance that you were going to drop, and you might expend multiple weapons in a tour. Now, however, it might be only once or twice in a tour that you might get to a kinetic event.”

Typhoon missions on Operation Shader rely heavily on tanker support.



Dickens explained: “The operation is going in phases, so when we’re clearing Daesh out of an area we will use more weapons. And so, when we cleared Dashisha, we used more weapons, and when we clear Daesh out of MERV we will use more weapons. But when we’re dealing with insurgents the use of weapons will be less frequent. We will need to identify where they are and wait until they mass and then we’ll look to kill them there and then.”

But, while the Typhoons are dropping fewer bombs, they continue to fulfil a vital role, clearing the last elements of Daesh out of Syria, providing security and overwatch in Iraq, and also undertaking limited strikes in Iraq when required.

No903 EAW reports to No83 Expeditionary Air Group at Al Udeid in Qatar, and then to the permanent joint headquarters (PJHQ) at Northwood in the UK.

The wing is based at RAF Akrotiri in Cyprus and currently comprises a detachment of six Eurofighter Typhoon FGR.Mk 4s, eight Tornado GR.Mk 4s, and a number of air mobility, air-to-air refuelling (AAR) and ISR assets, including two C-130J Hercules C.Mk 4s, an Airbus Voyager KC.Mk 3 tanker, and a Bombardier Sentinel R.Mk 1.

UK-based Typhoon and Tornado squadrons take it in turns to man the deployments, for about three months at a time.

The RAF first deployed the Eurofighter

Typhoon on Operation Shader in December 2015, augmenting an existing Tornado deployment.

Since then, the wing has typically launched a pair of Typhoons and a pair of Tornados in the morning, and another two pairs in the afternoon, six days per week, though the UK assets can move according to the requirements of the air tasking order compiled and issued by the multinational combined air operations centre (CAOC) at Al Udeid, which plans and commands the air campaign.

Mixed Typhoon / Tornado pair

Exceptionally, if unserviceability dictates, the RAF can launch a mixed Typhoon/Tornado pair.

The primary air-to-surface weapon on Shader is the 500lb Paveway IV dual-mode bomb. This is carried by both the Typhoon and the Tornado.

The Paveway IV can use laser or GPS guidance and offers selectable fusing, and variable impact angles and attack directions.

The GPS, or coordinate-seeking mode, is used where possible, with GPS coordinates for targeting sometimes generated using the Litening pod. The advantage of this weapon mode is that it is wind-corrected, making a direct hit routine.

Against moving targets – where a target’s coordinates are changing all the time – or in the face of GPS jamming, or when less accurate coordinates are available, laser-guidance is used.

The ability to engage a high-value target in a vehicle, in the open, well away from the civil population, is highly prized. And, although the Paveway IV is not optimised for hitting moving targets, the capability has been demonstrated on Shader many times.

The Typhoons typically take off with about 6.3 tonnes of fuel (4.9 tonnes of internal fuel plus two underwing tanks), as well as four Paveway IV dual-mode bombs, two advanced short-range air-to-air missiles (ASRAAMs) and a single AIM-120C-5 advanced medium-range air-to-air missile (AMRAAM).

A Litening 3 laser designation pod (LDP) is carried on the centreline pylon, giving a take-off weight of about 21-23 tonnes.

Even in this ‘Shader fit’, the Typhoons take off in dry power, as there is no need to use reheat. The aircraft burns about 50kg of fuel per minute, giving about one 80 minutes between refuelling brackets.

Missions typically last between six and eight hours, but have sometimes been extended beyond nine hours.

The Tornado can also use the MBDA Brimstone missile and the Storm Shadow cruise missile, and uses the RAPTOR reconnaissance pod.

The Tornado is being withdrawn from service in March 2019, and will finish operations on Shader in February. By then, the Typhoon will be

**CONTINUED FROM PAGE 43**

operational with both the MBDA Brimstone and the MBDA Storm Shadow, which are being integrated under the so-called Centurion upgrade, but the RAPTOR reconnaissance capability is not migrating to the Typhoon.

It is expected that additional Typhoons will be deployed on Shader when the Tornado is withdrawn, in order to maintain the ability to launch two waves, totalling eight combat sorties, per day.

As Daesh has increasingly transitioned into an insurgency, the air campaign has focused more on finding the enemy and distinguishing insurgents from the civilian population.

A range of ISR platforms and assets are used to build up an intelligence picture over time and gain an understanding of the normal pattern of life.

Fast jets like the Typhoon and Tornado, and assets like the Reaper remotely-piloted air system (RPAS) then build on that picture, finding specific intelligence on individuals, groups and networks.

Laser designator pod

The Typhoons and Tornados have, therefore, flown a lot of armed overwatch (non-traditional ISR or tactical recce missions) using the Litening laser designator pod as an ISR sensor but also carrying four Paveway IV bombs to be used when Daesh forces are located and identified.

The Tornados usually carry a pair of Paveway IVs and a single Brimstone missile during this phase of the campaign.

As Daesh has become more of an insurgency, merging into the civil population, engagement opportunities have become more limited. The Royal Air Force is trying to be as discriminate as possible, employing a very robust targeting process to ensure an absolute minimum of collateral damage. Enemy forces are often found and tracked but may never be away from the

Two RAF Typhoons formate on their tanker during an Operation Shader mission.

Right: This Typhoon carries four Paveway IV bombs, a centreline Litening pod, with an ASRAAM short range missile under the starboard outer wing and a BVR AMRAAM missile on the port forward station.

civilian population, and there may be no chance to engage them, meaning that aircraft frequently return to Akrotiri with their weapons.

Although the Typhoons do carry a single beyond-visual-range (BVR) air-to-air missile and a pair of short-range missiles, these are for self-defence only, and the aircraft have no defensive counter air (DCA) tasking, unlike the US Air Force's F-22s, for example. Typhoons have occasionally flown in the air-to-air role in theatre – for example during the coalition missile strikes against Syrian chemical warfare facilities, but they do not currently or routinely fly air-to-air or swing-role missions.

This is because Britain has limited its operations to defeating Daesh (who happen to be fighting in the on-going civil war in Syria) and to participating in a one-off strike aimed at deterring the use of chemical weapons by the Syrian regime. Britain has been determined to avoid intervening in the Syrian civil war more widely.

This marks a real contrast with the US, which has supported the Syrian opposition and the Federation of Northern Syria during the civil war. The US has targeted Daesh, but it has also targeted the al-Nusra Front since 2014, and has attacked some Syrian Government military positions since 2017. Syrian Government aircraft attacking America's allies could be engaged by US aircraft.

Dickens went on to explain that the RAF was operating to the north east of the Euphrates River, and because of the deconfliction

arrangements with the Russians (which include a hotline between the Russians and the CAOC), the Syrian Air Force does not cross the river.

"The last thing we want is a miscalculation," he said. "We do not want to escalate the campaign."

Reading between the lines, it seems as though the UK may wish to avoid any chance of being dragged into any confrontation with Russia, which supports the Syrian regime, not least since Anglo-Soviet relations are already strained. Dickens did not comment on this, saying only that: "The Americans have a different mandate to us. We're here only as a counter-Daesh mission. There's no requirement for DCA."

Cold War white elephant

It is, perhaps, ironic that on Operation Shader, the Typhoon is proving itself to be a very effective air-to-ground and ISR aeroplane. Dismissed in some quarters as a Cold War white elephant that was narrowly optimised for air defence, the Typhoon is not flying in the air-to-air role over Syria.

Dickens does not see an imminent end to the air campaign. "The coalition will need to stay together to be able to target Daesh whenever they come together to cause insecurity. But the important part for me is to train and partner forces on the ground so that they can provide their own security," he said.

"Going forward, what we'd really like is for the Iraqi Air Force to be able to take care of their own security, because at that point the coalition's job will be complete." ■

Oman completes Typhoon deliveries



A four-ship of RAF Typhoons turns high over Oman during a recent exercise. Left: Oman has now taken delivery of all 12 of its Tranche 3 Typhoons, which equip No.8 Squadron at Adam air base.



The Royal Air Force of Oman (RAFO) has now received the final pair of Eurofighter Typhoons from BAE Systems, completing the delivery of the batch of 12 tranche 3 aircraft that now equip the re-formed No8 Squadron at Adam Air Base.

No8 Squadron previously operated SEPECAT Jaguars from Thumrait, and retired its last four operational aircraft on August 6 2014 after 37 years with the type.

The last two Typhoons left the BAE Systems UK factory airfield at Warton, Lancashire, on June 4 2018, just less than a year after the first pair of aircraft was delivered.

Close cooperation with the UK Typhoon force is expected to be a feature of RAFO operations, with RAF loan officers and groundcrew and contract pilots

and technicians bolstering the Omani nationals.

It is understood that Oman will maintain its aircraft in the same configuration as the UK, using the same weapons and systems wherever possible. Though no details of weapons have been confirmed, some sources suggest that Oman will be the first Typhoon operator outside the UK to use the MBDA ASRAAM air-to-air missile, all other customers having opted for the shorter-range and cheaper Diehl IRIS-T.

Adam is a new air base, 200km south east of Muscat, built up on the site of a proposed domestic airport situated in the Ad Dakhiliyah Governate.

In 2013, development of Adam Airport was halted because it seemed unlikely to be

commercially feasible, and the site, which then consisted of a runway and a few taxiways, was handed over to the Oman Ministry of Defence.

The buildings and factories business unit of Larsen & Toubro Oman LLC won the order to build the new air base, while Strabag Oman LLC, whose original contract to build the civil airport had been cancelled in March 2011 after 60 months of work, was awarded the second package of the rehabilitation works at Adam Air Base in November 2014.

These works included construction of a parallel taxiway, apron, substation, and airfield lighting, as well as a sunshade for the Typhoon flightline. The works were completed in May 2016. ■

Wind of progress for Qatar Typhoons

The Qatari agreement to buy 24 Eurofighter Typhoons (and nine BAE Systems Hawks) was fully activated when BAE Systems received its first payment on September 18 this year, writes *Jon Lake*.

Qatar formally agreed to buy the Typhoon on September 17 2017, when the then-UK Defence Secretary, Sir Michael Fallon, and his Qatari counterpart, Khalid bin Mohammed Al Attiyah, signed an agreement in Doha.

The Typhoon deal goes beyond a simple supply of aircraft, and will see an unprecedented degree of training, cooperation and support being provided by the UK Royal Air Force.

This began in November 2017, when four RAF Typhoons deployed to Al Udeid Air Base for exercises with Qatar's Mirage 2000-equipped fighter squadron.

It was also revealed that the RAF would form a joint squadron with the Qatari Emiri Air Force (QEAF), integrating Qatari personnel, including pilots and ground-crew from 2019, prior to the delivery of its own aircraft in 2022.

The squadron will initially be based at RAF Coningsby, undergoing training and practising cooperation, before deploying to Qatar.

Qatar confirmed its acquisition of the Eurofighter Typhoon in December 2017, and at a reception at the Savoy Hotel on London's Strand to celebrate Qatar's national day, UK Defence Minister, Harriett Baldwin, revealed that No12 Squadron's historic numberplate would be used by the new joint RAF/QEAF squadron.

The new squadron officially reformed on July 24 2018, with a formal standing up ceremony being held

in London. New Defence Secretary, Gavin Williamson, hosted the Amir Of Qatar, Sheikh Tamim Bin Hamad Al-Thani, and Dr al-Attiyah, who is himself an RAF-trained fighter pilot.

At the ceremony, the Amir was presented with his Sandhurst medal, coinciding with the 20th anniversary of his graduation from the academy.

The ceremony marked an important milestone in the strengthening defence relationship between the two nations, who share mutual interests in countering violent extremism, and in ensuring stability in the region.

Dr al-Attiyah said that the joint RAF/QEAF squadron would play a pivotal role in securing Qatari airspace during the 2022 FIFA World Cup, which the country is hosting.

The ink was still drying on Turkey's deal with Pakistan for 30 T129 tactical reconnaissance and attack helicopters (ATAKs) when it appeared US sanctions could jeopardise the sale. Alan Warnes reports.

SANCTIONS HOLD UP THE PLAN OF ATAK

US export licenses could be declined for the ATAK's T800 turboshaft engines produced by the Light Helicopter Turbine Engine Company (LHTEC), a joint venture between Rolls-Royce and US company, Honeywell.

After trying to close the Pakistan Army contract for eight years, Turkish Aerospace Industries (TAI), thought its biggest export deal had finally been nailed.

But US President Donald Trump had already suspended all security assistance with Pakistan on January 4, "until it takes action against the Afghan Taliban and Haqqani network terror groups".

Trump accused Pakistan of "deceit and lies" when working with the US Government.

It led to the first three of 12 Boeing-Bell AH-1Z Vipers destined for the Pakistan Army being halted. The helicopters had been flying and personnel were being trained in the US when everything was stopped.

Agreed a deal

Four months later, the Pakistan and Turkish governments agreed a deal on the 30 ATAKs, which would replace the obsolete and outdated Pakistan Army AH-1F/S Cobras.

Both Turkey and Pakistan are still confident that Trump's sanctions won't affect their business.

There is better news on the domestic front, however, with 86 T129 ATAKs on order – 59 for the Turkish Land Command (TLAC), 18 for the Gendarmerie General Command (GGC) and nine for the Polis.

A formal ceremony was held on April 19 to mark the introduction of the first three T129s for the GGC.

The attack helicopters will boost the service's close air support capability, while also being used for intelligence gathering and reconnaissance. They are expected to be operated close to the border with Iraq, where Turkey has an ongoing war with fighters of the Kurdistan Workers Party (KWP).



By mid-July 36 T129s had been delivered, 33 to the TLAC and three for the GGC.

This year's Farnborough International Airshow in July saw the first public appearance of TAI's proposed Hurjet jet trainer, albeit in mock-up form.

According to TAI's corporate marketing and vice president, Tamer Ozman, the single-engine jet is expected to make its first flight in 2022 and the first should enter Turkish Air Force service in 2025.

"We want to produce an aircraft that fits in between the Hurkus basic trainer and the fifth-generation Turkish Fighter (TF) that will fly in 2023. The Hurjet advanced jet trainer will fill that gap," he said.

The Turkish Government announced on July 22, the day after Farnborough ended, that TAI, the Undersecretariat for the Defence Industries (SSM), and the Turkish Air Force had signed the Hurjet project protocol agreement on July 2. The document agreed that there would be five Hurjet prototypes, manufactured in two

different configurations – an advanced jet trainer (AJT) and a light combat aircraft (LCA).

TAI intends to supply a jet that will allow fighter pilots to move seamlessly from the turboprop trainer to the jet. The T-38s that TAI upgraded between 2011-2016 will not be able to soldier on much past 2025.

The US Air Force is already planning to buy around 350 dual-seat jet trainers to replace its T-38Cs that were upgraded in the late-90s.

Under its T-X programme, Lockheed Martin and Korea Aerospace Industries have teamed up to offer the T-50A; Boeing and Saab are collaborating on a clean sheet design; while Leonardo is offering a version of its M-346 trainer known as the T-100.

But TAI is set to offer an international traffic in arms regulations (ITAR)-free solution that will help it boost its new engineering, development and engineering skills. It knows what the solution is, as Ozman explained: "It will be a 5-6 ton class aircraft, similar in size to the F-16, with a 13 metre fuselage, 10 metre



Three T129 ATKs were formally handed over on April 19. There are 86 T129s now ordered by Turkey.

Left: Turkish Aerospace sent a T129 ATK helicopter to Pakistan for hot-and-high trials in May 2016. The Pakistan Government placed an order for 30 T129s in May.

PICTURES: TA.

wingspan and 4 metres high. It will be powered by an engine that will allow it to go supersonic, at around Mach 1.2.”

The search is now ongoing for an engine, which is likely to include the usual suspects like General Electric (GE), Rolls-Royce and Safran. They all offered options to power the TF, with Rolls-Royce the likeliest to emerge as winner given the keenness of the UK Government to play a part in developing the new fighter.

Overseeing the selection is the newly established domestic company, TR Motor, tasked to design and manufacture Turkey’s military jet engines.

Set up by SSM, TR Motor now has its work cut out with the search, development and integration of the powerplants for both the TF and Hurjet projects.

The Hurjet will also call upon Turkish avionics and weapons, and initially act as a lead-in fighter trainer (LIFT) for the F-16 and maybe the F-35, as well as TF.

Just like the Hurkus, there will also be a light

attack variant, known as the Hurjet-C. According to Ozman, it will incorporate all the systems to satisfy the light attack aircraft requirements of the modern warfare, which will include a radar.

According to TAI, the Hurjet-C will have an “extensive payload” capacity of 6,000lbs that will include locally built 250lb, 500lb, 1,000lb conventional and guided munitions.

Conformal gunpod

There is also set to be a conformal gunpod, targeting pod, and within visual range (WVR) and beyond visual range (BVR) missiles.

Aselsan and Havelsan are both set to figure highly in the aircraft’s development.

The new jet trainer was initially being funded by TAI, but the July 2 protocol agreement seems to have changed that. “We are looking for partners and believe there is a big market,” Ozman added

Questioned about Qatar’s possible involvement, given that it has so many fighters on

order (36 Rafales, 36 F-15QAs and 24 Eurofighters), Ozman would only say that they have been talking to Qatar about LIFT and a light attack aircraft.

TAI announced at Farnborough that six Anka-S medium altitude long endurance (MALE) systems had been delivered to the Turkish Air Force.

All six systems, handed over in February, March and April, can be controlled simultaneously via satellite. Each has two air vehicles thought to be equipped with the FLIR Systems Star SAFIRE 380HLD payload rather than the Aselsan-developed common aperture targeting system (CATS) planned for the Anka.

Meanwhile, the Anka-B has entered service with Turkish Naval Forces Command (TNFC) at Dalaman Naval Air Base.

TAI is believed to be operating the Anka-B under a lease contract, with the first operational flight over the Aegean Sea taking place on March 27. The gendarmerie and army are also expected to take deliveries of the Anka-B in the future. ■

The first F-35A destined for the Turkish Air Force made its maiden flight on 10 May 2018, and on 28 August, Major Halit Oktay became the first Turkish Air Force pilot to fly an F-35.

Inset: Major Halit Oktay and Major Mustafa Onur Kara, seen here with their detachment commander in the US, were the first Turkish F-35 pilots.



Turkish F-35 flies into turbulence



Steadily worsening relations between the two countries has seen the US Congress pass legislation temporarily banning deliveries of the Lockheed Martin F-35 Lightning II to Turkey.
Jon Lake reports.

On May 10 2018, the first F-35A destined for the Turkish Air Force made its maiden flight at Fort Worth in the hands of US Navy test pilot, Commander Tony Wilson.

The first two F-35 MTUs were formally handed over in a ceremony at Fort Worth on June 21, and represented the first fifth-generation fighters in the Turkish Air Force Command inventory. They were then flown to Luke AFB for pilot training to begin.

But, with steadily worsening relations between the USA and Turkey, on August 2 the US Congress passed legislation temporarily banning deliveries of the aircraft, which, in Turkey, is better known as the F-35 Mı terek Taarruz Uça ı (MTU) rather than the more familiar Joint Strike Fighter (JSF).

Under the fiscal year 2019 (FY 2019) National Defense Authorization Act, F-35 deliveries to Turkey were barred for 90 days. They will remain suspended until the US Department of Defense can deliver a report assessing the impact of removing Turkey from the F-35 programme altogether.

To permanently stop F-35 deliveries to Turkey, additional legislation would be required.

The move to ban F-35 deliveries to Turkey was the result of a number of problems. Opposition to the delivery of F-35s was exacerbated by Turkish plans to acquire Russian S-400 surface-to-air missiles. This prompted concerns that sensitive F-35 data could be compromised.

Charged with espionage

Turkey's refusal to release American evangelical pastor Andrew Brunson, charged with espionage by Turkey, further aggravated the situation, and the US imposed some economic sanctions against Turkey on August 10.

Turkey is one of eight partners in the F-35 programme, having invested \$195 million into the system development and demonstration (SDD) phase. This made it the highest-spending of the five tier-3 partners.

Turkey has already ordered 30 F-35As of an expected requirement for about 100, and 10 Turkish companies are heavily involved in the programme.

Turkish Aerospace is a second source for the centre fuselage and will manufacture composite skins and weapon bay doors, and air inlet ducts, as well as 45% of the F-35's air-to-ground weapons pylons and adapters.

Other Turkish participants include Alp Aviation, which manufactures F-35 airframe structures, landing gear components and engine parts, while Fokker Elmo manufactures electrical wiring systems. Kale Aerospace is supplying F-35 airframe structures and assemblies and landing gear uplock assemblies.

MiKES has delivered F-35 aircraft components and assemblies for BAE Systems and Northrop Grumman, while Aselsan is working with Northrop Grumman on components for the electro optical targeting system, while Ayesa is the sole supplier of the panoramic cockpit display.

Turkey was also slated to host the first of three regional engine depot overhaul facilities in Europe. This will form part of the Turkish Air Force's 1st HIBM in Eskisehir, in north-western Turkey, where Turkish F135 engines were also to have been assembled.

Lower costs to the programme

The country's involvement was not only good for Turkey, but offered lower costs to the programme. Turkey's military procurement chief, Murad Bayar, said that TAI, already scheduled to build 400 F-35 centre fuselages, could complete 624 more for no extra investment cost. Turkey's lower labour costs would save the programme \$3.5 billion.

US Defense Secretary, James Mattis, urged congress not to interfere with Turkey's F-35 acquisition, noting that it would take between 18 and 24 months to "re-source parts and recover" if Turkey was dropped from the programme, and that finding substitute manufacturers could delay the global F-35 procurement chain by six to 18 months. His advice was ignored.

Though there were initial reports that all Turkish F-35 training activity had been suspended, this was not the case and, on August 28, Major Halit Oktay became the first Turkish Air Force pilot to fly an F-35.

Turkey is expected to receive six F-35 jets by 2020, and the remainder of its initial 30 aircraft order by 2024. Four of these are due to remain in the US for training until 2020, with two due to transfer to Malatya in eastern Turkey in September 2019.

Some analysts believe that the Turkish F-35s have been paid for and cannot legally be confiscated, although the US could effectively prevent their delivery by withdrawing its assistance and cooperation. ■

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The Middle East conflict zones are being used for testing and evaluating UAV and counter-UAV technologies from more than a dozen countries. David Oliver reports

THE DRONE RANGERS

The so-called Islamic State of Iraq and the Levant (ISIL)'s ability to drop targeted explosives from the air marks a new challenge for coalition forces engaged in supporting local forces in Iraq.

Recently, the US Department of Defense (DoD) asked Congress for an extra \$20 million to help equip US troops with anti-drone technology.

This followed the threat posed by ISIL's use of small commercial quadrotor unmanned aerial vehicles (UAVs) with small munitions attached.

New countermeasures have already been implemented, including Battelle's drone defender, a hand-held directed-energy device that can neutralise drones at a distance of 400 metres. The device has already been deployed with US troops in Iraq.

The counter-UAV (C-UAV) system disrupts the adversary's control of the drone so that no remote action, including detonation, can occur, minimising damage and risk to deployed forces.

The device utilises a non-kinetic solution to defend airspace against small quadrotor and hexarotor drones without compromising safety or risking collateral damage. The lightweight, point-and-shoot system requires no extensive training.

Another counter-drone variant deployed to the region is the anti-UAV defence system (AUDS) developed by a consortium of UK defence companies including Blighter Surveillance Systems, Chess Dynamics and Enterprise Control Systems.

Track, identify, and defeat

The AUDS can detect, track, identify and defeat a UAV in approximately 15 seconds at a range of up to six miles and is in service with the US forces in both its field mast configuration and installed on Stryker vehicles.

It has more than 700 confirmed 'kills' and has been on continuous combat operations since it deployed to Iraq almost two years ago. It is designed to disrupt and neutralise UAVs, remotely piloted aircraft systems (RPAS), or unmanned aircraft systems (UAS), engaged in hostile airborne surveillance and potentially lethal activity.

Russia is heavily engaged in military



Russian bases in Syria were attacked by a swarm of UAVs in January 2017, most of which were forced to land before detonating their weapon payloads.

PICTURE: RUSSIAN MOD.

operations in Syria and its forces have been targets for hostile UAV attacks. In January 2018, Russia claimed to have identified the launch location from where a swarm of armed drones began an attack on two of its military bases in western Syria.

Ten fixed-wing UAVs, rigged with explosive devices, descended over Russia's Hmeimim Air Base, while a further three targeted the Russian Naval facility in the nearby city of Tartus.

Russia said it shot down seven drones using anti-aircraft missiles, while the other six were taken under control and force-landed by its military.

Neither casualties nor significant damage were caused by the attack, which was reportedly launched from the village of Muwazarra in the southern Idlib province. The area around the village was designated a 'de-escalation zone' under an agreement between Russia, Turkey and Iran but had been an area of conflict between forces loyal to Syrian President Bashar al-Assad and rebel forces backed by Turkey.

The Russian military base in Tajikistan held a special exercise to repel an attack of simulated enemy UAVs at night.

Russian counter-UAV systems, such as the Zhitel automatic jamming station, and Silok-01 UAV detection system, have been operationally

tested in Syria, while the hand-held REX-1 counter-UAV system man-portable jammer, developed by Kalashnikov Group subsidiary ZALA Aero Group, is being issued to Russian Federation airborne troops.

The device relies on the jammer's ability to cut the UAV off from its operator, communications bearer, and autonomous navigation capability, to neutralise the threat.

UAVs have also been playing an increasingly large part in another on-going military conflict in the Middle East – Operation Decisive Storm – which is the military campaign by the Saudi-led Arab coalition against the Iranian-backed Yemeni Houthis.

More than 20 Arab coalition UAVs are reported to have been brought down since its air strikes on Yemen began more than three years ago.

Last October, the Houthis shot down a US MQ-9 Reaper long endurance unmanned combat aerial vehicle (UCAV) over the Yemeni capital, Saana. It was later revealed that the Houthis used an obsolete Soviet-era SA-2 Guideline (S-75) surface-to-air missile to shoot down the drone.

On August 30 this year, the Houthis shot down a Chinese CH-4 UCAV operated by the Saudi-led coalition over the al-Tul border crossing south of the Saudi province of Jizan, according to the



Left: US troops involved in operations against ISIL fighters have been issued with hand-held DroneDefence counter-UAV systems.

PICTURE: US ARMY.

Above: The Russian hand-held REX-1 counter-UAV systems have been deployed to Russian troops in Syria.

PICTURE: RUSSIAN MOD.

Yemeni al-Masirah TV, although the weapons used were not revealed.

The CASC CH-4 is a tactical armed medium-altitude long endurance (MALE) UAV being built under licence in Saudi Arabia. The pro-Houthi TV channel, Al-Masirah, said that coalition warplanes bombed the UCAV crash site to prevent the Houthis from acquiring any sensitive components.

Not only are the Houthis having some success in shooting down coalition UAVs, they are also attacking coalition targets in their own countries.

In May 2018, a spokesman for the Coalition to Restore Legitimacy in Yemen said that an air defence unit assigned to Saudi Arabia's Abha International Airport detected an unidentified flying object heading towards the airport. The unit engaged the target and it was destroyed.

On inspection, the wreckage was identified as an Ababil UAV, a single-engine fixed-wing tactical UAV manufactured by Iran Aircraft Manufacturing Industrial Company (HESA).

A development of the Ababil, the Qasef-1, is also operated by Houthi forces, who have used it to attack the radar components of the coalition's MIM-104 Patriot surface-to-air missiles.

In November 2016, UAE Presidential Guard forces intercepted a truck carrying six partially

assembled Qasef-1 UAVs in Yemen's Ma'rib Governorate.

According to press reports, a Yemeni Qasef-1 UAV had carried out a similar attack on Abha International Airport in April 2018, temporarily closing it.

In July, security sources in Yemen confirmed that Arab coalition air defences had shot down a Houthi UAV after it attempted to target its headquarters in al-Braïqa, northwest of Aden. The sources said no casualties resulted from shooting down the drone, while the legitimate Yemeni forces shot down a third Iran-made Houthi UAV carrying explosives in the Durahemi district in Hodeidah.

Attacks by Yemen's Houthi forces on transport infrastructure and economic targets in Saudi Arabia and coalition supporter, the UAE, have also been claimed.

On July 17 2018, the Yemeni Shiite militants attacked the Saudi Aramco refinery in Riyadh using a UAV. Although the claim was denied by the Saudi authorities, Aramco admitted that its fire control teams and the Saudi civil defence had contained a limited fire that erupted in a storage container at the refinery.

On July 26, the Houthi's SABA news agency reported that one of its UAVs had carried out an

attack on Abu Dhabi International Airport. Citing a military official, it said the raid was carried out by a fixed-wing Sammad-3 UAV that had recently been added to the Houthi arsenal.

A month later, Houthi media released a statement saying a Sammad-3 UAV had inflicted heavy losses in a raid on Dubai International Airport. The group said the FlightRadar24 website, which tracks aircraft worldwide using their transponders, had confirmed that several flights had been delayed at Dubai.

The UAE's General Civil Aviation Authority (GCAA) later denied the Yemeni rebel claim and stated that air traffic movement was normal with no disruptions.

Counter-UAV capability

Both Saudi Arabia and the UAE are looking to increase their counter-UAV capability and the Australian company, DroneShield, recently reported that it had taken an order for 70 DroneGuns worth \$5.2 million from an unnamed Middle East country, which it described as allied with western governments.

DroneGun Tactical is a hand-held device that provides a safe countermeasure against a wide range of UAVs, allowing for the controlled management of payloads, such as explosives.

In addition, a UAE delegation recently visited a number of companies that manufacture anti-drone systems in France and Finland.

One of the French companies, Communications & Systèmes, is a specialist in mission-critical systems that builds the Milad mobile counter-UAV system, which is a military version of its Boreades civil system.

Communications & Systèmes is the integrator of the Milad system that includes a 360-degree 3-D radar from the Canadian unit of FLIR Systems, which also supplies the cameras. The company has demonstrated its Boreades system to delegations from both Saudi Arabia the UAE. ■

DIAMOND'S DART-550 AIMED AT THE BULLSEYE

Diamond Aircraft Industries GmbH has enjoyed great success across the MENA region with its twin-engined DA42 Twin Star. Now, writes *Jon Lake*, it hopes to repeat this success with its new range of Diamond Aircraft reconnaissance trainer (DART) aerobatic turboprop aircraft.

This trainer aircraft made its regional debut (as the 450hp DART-450) at the Dubai Air Show in November 2017.

MENA air forces and flying training providers are now looking at the latest member of the family, the DART-550, which made its public debut at the Farnborough International Airshow 2018, just two months after Niko Daroussis and Ingmar Mayerbuch undertook the new variant's maiden flight on May 3.

The DART trainer is intended for those countries that might be unable to afford the latest tandem-seat turboprop trainers, while offering similar performance and handling characteristics.

It achieves this primarily by making much greater use of composites than its rivals – indeed the DART-450 was claimed to be the world's first all-carbon fibre, tandem, two-seat aerobatic civilian-certified trainer aircraft.

With a price tag of less than \$4 million, Diamond CEO, Christian Dries, claimed that the DART-450 would cost less than half the price of a Pilatus PC-9, while its innovative all-composite construction would give significantly lower support and through-life costs.

The DART series was first announced at the Farnborough show in 2014, and the DART-450 made its debut at Farnborough in 2016, after a maiden flight on May 17 that year.

The DART series was always planned to be available as a range of variants with different engine



Diamond says the DART-450 is a deal at half the price of its rival. Below: Successful first flight.



power ratings, seat configurations and avionics options to meet diverse customer requirements.

The latest member of the family, the DART-550, is powered by a 550hp General Electric (former Walter) H75-100 engine, with an electronic engine and propeller control (EEPC) system, and a fully feathering and fully reversible five-bladed MT propeller.

The aircraft is fitted with a state-of-the-art glass cockpit with Garmin G3000 integrated avionics systems, sidestick controls and Martin Baker Mk 16 ejection seats. The DART-550 is expected to offer a maximum speed of 247kts, and an eight-hour endurance.

HEZBOLLAH DRONE OPERATIONS CELEBRATED IN MUSEUM

The Mleeta Resistance Tourist Landmark, also called the Mleeta Museum for Resistance Tourism, is widely referred to as the 'Hezbollah Museum'.

It now displays a 'squadron' of drones used by Hezbollah during the Zionist war against Lebanon in 2006 and during the anti-Islamic State campaign on the Lebanon-Syria border in 2017, some of them carrying the insignia of the so-called Hezbollah air force.

The museum is located in southern Lebanon, about 45 kilometres north of the border with Israel, and is run by the Lebanese Association for Tourism and Tradition.

□□□□□

Both Hezbollah and Hamas have used drones – more properly known as unmanned aerial vehicles or remotely piloted air systems (UAVs or RPASs), in their operations against Israel. These have mainly been Iranian-supplied systems, and Hezbollah is understood to have worked alongside the Iranian Revolutionary Guard Corps at Iranian drone bases in Syria.

Hezbollah made its first recorded use of a drone in 2004, dispatching an Iranian Mirsad UAV on an 18-minute reconnaissance mission over Israel, before returning to Lebanon undetected.

Iranian-built drones were also used by Hezbollah during the 2006 war with Israel, though these UAVs all crashed or were shot down by the Israeli Air Force.



Hezbollah's museum piece.

In October 2012, Hezbollah flew a more successful UAV reconnaissance mission to southern Israel – a distance of several hundred miles – over Gaza and the Negev Desert. The aircraft, an Iranian Shahed 129, was again shot down.

Hezbollah's use of UAVs has developed and advanced since its involvement in the Syrian war (in which it has fought in support of the regime of Bashar al-Assad).

In 2014, Hezbollah launched its first successful armed drone attack against the headquarters of the Nusra Front near the Lebanese/Syrian border.

Increasingly, Hezbollah has turned its attention to the use of commercial off-the-shelf micro drones, using these to drop grenades, IEDs and Chinese-made MZD-2 sub-munitions or 'shrapnel bombs'. The MZD-2 typically contains an explosive charge, wrapped in tiny plastic or metal balls.



F-5 fleet on red alert for aggressor role

Turning Bahrain's F-5s into a Red Air squadron to serve the needs of other local air forces would be an ideal training solution.

PICTURE: ALAN WARNES

Most Middle East countries are beefing up their combat capabilities with new generation fighters as the threat from Russian and Iranian systems is a real concern to them. So, asks Alan Warnes, has the time come for a dedicated aggressor squadron to be set up in the region?

It would appear that the Royal Bahrain Air Force (RBAF) F-5 fleet could make an ideal aggressor squadron solution.

They will need an avionics upgrade and upgrading all 12 aircraft would be the same price as a new F-16 Block 70.

The small supersonic F-5 is renowned as a great 'red air' foe and the RBAF ones are the only examples now left operating with the GCC air forces.

All the Royal Saudi Air Force (RSAF) jets were retired several years back, and the bulk of them are now stored on old taxiways at Taif Air Base. Being left in the open in a pretty brutal environment means there would be little hope of getting them airborne again.

Once the RBAF's 16 Block 70 F-16s start rolling off Lockheed Martin's new Greenville production line in South Carolina in December 2021, the F-5s are likely to be withdrawn from use. So, setting them up in the aggressor role, serving the needs of the UAE Air Force and Air Defence (UAEAF&AD) and RSAF if required, could even lead to them funding any upgrade work.

Invest massively

The UAE and Saudi Arabia are looking to invest massively into their own air warfare centre and electronic warfare (EW) ranges. But they are not keen to let foreign companies fly in their restricted areas, particularly when it comes to EW training, so working with a friendly neighbour like the RBAF, with the F-5, would be a good option.

Both Europe and the US understand the need for aggressor aircraft, and that's why the likes of Draken International and ATAC in the US, and Top Aces in Canada, are building up their businesses.

The US Air Force has around 40,000 hours of this 'red air' work that is being contracted out. There are more than 60 F-5s flying in the US in the aggressor role, with the likes of the US Marine Corps (11), US Navy (30) and

TacAir (which is upgrading 21 ex-Royal Jordan Air Force F-5s with fourth-generation capabilities) in the aggressor role. It's a proven red air jet.

The RBAF's fleet of eight F-5Es and four dual-seat F-5Fs have been in service with 6 Squadron, since 1985. While the RBAF has six Hawks, it prefers to use the F-5s to train F-16 pilots as it believes the lightweight supersonic fighter is a better F-16 lead-in fighter trainer than the Hawk.

It means that if any of the Bahrain pilots are trained in the UK, UAE or Saudi Arabia on Hawks, they will spend some time flying the after-burning F-5s. But most of the new F-16 block 70 pilots will train in the US, so that role will be reduced too.

Missile seekers

Being highly manoeuvrable and fitted with podded EW systems and adversary missile seekers would be ideal for the red air role.

One source told me: "If you want to fight the likes of the Russians and the Iranians with your new generation fighters and systems, then you need to hone the tactics and the F-5s could be part of a bigger solution for the GCC forces."

The source went on: "There is an increased need for specialised advanced training where it is no longer blue versus blue, but red on blue. So Saudi and UAE are buying more equipment to simulate and challenge to their systems against Russian air defence systems and fighters."

The Saudis may have looked at the S-400 air defence system, but the Russians will never sell it because they know the Saudis would share much of the knowledge with the US.

It's the same with the UAE flirting with the Russians for the Su-35. The Russians know that they only want to learn about the system so they can defeat it. That's why they have to find alternative solutions. One of them looks to be on their doorstep! ■

After upgrade, Jordan's Cobras will have a new Northrop Grumman Integrated Mission Equipment package (IMEP), based on the Integrated Avionics System installed in the Bell UH-1Y, Bell AH-1Z and Sikorsky UH-60V.



Modernised Cobras give RJAF extra bite

Jordan is upgrading an initial batch of 12 of its Bell AH-1 Cobras for continued service, extending their useful lives by at least 20 years.

Jon Lake
reports.

Two of the upgraded Bell AH-1 Cobras were returned to Jordan in April, where one was exhibited at the SOFEX special operations exhibition.

Live firing trials began in the autumn, and all 12 aircraft are due to return to Jordan by the end of the year.

US company, Science & Engineering Services (SES), was awarded the contract to upgrade 12 of the Royal Jordanian Air Force's (RJAF's) original AH-1S Cobras after a competitive process.

SES designed and engineered the AH-1F modifications itself, and stripped down, inspected, and repaired each aircraft as required, rewiring and reconditioning them at its facility at Huntsville, Alabama.

SES worked closely with the airframe original equipment manufacturer, Bell, and Honeywell, the engine supplier, throughout the modernisation effort.

SES's upgrade programme encompasses three areas – airframe, avionics and weapons.

Each aircraft was then fitted with a new Northrop Grumman integrated mission equipment package (IMEP). This avionics suite is based on the integrated avionics system installed in the Bell UH-1Y, Bell AH-1Z and Sikorsky UH-60V.

It consists of a commercially available FlightPro Gen III mission computer, new L-3 LCD multifunction displays, a smaller Rockwell Collins back-up screen, an embedded Northrop Grumman GPS/INS with a fibre-optic gyro and an embedded software digital map, and new navigation controls. Rockwell Collins ARC-210 radios are also installed.

Northrop Grumman oversaw the design and embodiment of the avionics upgrade, which is based on a modular, open architecture that will facilitate the rapid integration of third-party hardware and software for future upgrades and capability insertion.

The integrated design and lightweight components of the new avionics system cut the aircraft's weight by 300lbs when compared to the unmodernised Jordanian AH-1F/S.

The original television sight unit (TSU) of the AH-1S and

F is replaced by an L-3 Wescam MX-15D electro-optical/infrared (EO/IR) turret.

The upgrade has added new weapons, including Lockheed Martin M310 launchers for the AGM-114R Hellfire missile and seven- or 19-round 2.75in (70mm) rocket pods for BAE Systems APKWS laser-guided rockets.

New defensive aids and countermeasures include the Orbital ATK AAR-47 missile approach warning system and Extant Aerospace AN/ALE-47 chaff/flare dispensers.

The RJAF received 24 AH-1S Cobras in 1985, and then nine surplus US Army AH-1Fs from 2000. At least one Cobra S was lost in service, and either eight or 16 aircraft were delivered to Pakistan in about 2011.

Night targeting system

Jordan then received 15-16 Israeli AH-1 Tzefa aircraft, equipped with a new night targeting system installed in place of the original Cobra TSU or TV sighting unit. The former Israeli aircraft arrived in late 2014, and have been used in operations against Daesh, alongside the RJAF's AH-1S helicopters.

Jordan has now put 20 of its Cobras up for sale, probably representing all of the aircraft not being upgraded. Two or three aircraft have already been transferred to Kenya and two or four have been earmarked for transfer to the Philippines.

The uncertain size of the diversion to Pakistan makes it hard to assess the actual size of the Jordanian Cobra fleet today. It may be that the RJAF will only operate the 12 recently modernised AH-1S Cobras with No10 Squadron at King Abdullah II Air Base near Gabawi, and that all other examples of the type (currently equipping No12 Squadron) will be sold off.

In the long term, Jordan hopes to replace its AH-1S Cobras with a new attack helicopter. The Bell AH-1Z is known to be on the air force's wish-list, as well as larger helicopters like the armed Blackhawk.

Jordan is the first Cobra operator to modernise the avionics of the AH-1F/S, but SES is now promoting its Cobra modernisation to other operators of the type. ■

SKYTRUCKS KEEP ON TRUCKING

One of the Royal Jordanian Air Force's (RJAF's) PZL M28 Skytruck light transport aircraft has returned from upgrade in the US and modification of the second is due to be completed later this year, writes Jon Lake.

The RJAF's No3 Squadron operates the aircraft alongside 10 C-130 Hercules and a pair of C295s from Amman-Marka Air Base.

The Skytrucks were delivered in late 2014 and late 2015, and are used for a variety of light utility tasks.

They are being upgraded to allow them to be used in support of Jordanian and allied special forces and by Jordan's quick reaction force, as well as for border patrol missions.

The completed aircraft was displayed at Jordan's SOFEX exhibition in May 2018, having flown to the US for upgrade in August 2016.

The \$10 million-plus upgrade was carried out by Sierra Nevada Corp, of Sparks, Nevada, and was contracted by the US Air Force's 645th Aeronautical Systems Group at Wright Patterson Air Force Base in Ohio – the so-called Big Safari programme office responsible for most USAF intelligence, surveillance, and reconnaissance (ISR) and special forces aircraft modifications and upgrades.

The price included the modification of one aircraft, aircraft ferrying, spares, and field service representative support for 12 months after delivery. Sierra Nevada performed the necessary work at its facility in Centennial, Colorado, and in Amman, Jordan.

The upgrade brought the aircraft to a similar standard to the C-145s used by US Special Operations Command in Afghanistan and elsewhere.



Jordan's M28 Skytrucks are being upgraded to the same standard as the USAF's Special Operations C-145s.

The upgraded aircraft gained an enhanced communications suite, with a Raytheon ARC-231 Skyfire communications system and two Harris SY-117 radios, as well as an Iridium satellite phone for communications in remote areas. It was also fitted with APX-119 identification friend or foe (IFF) equipment, a missile warning system, and new countermeasures dispensers.

Inside the cabin, a ruggedised utility flooring system is installed, allowing standard passenger seats or inward-facing paratroops seats to be fitted.

The aircraft now features a roof-mounted 700kg (1,545lb) winch/crane running on fore and aft rails and operated using a hand crank.

It also incorporates power charging points for various equipment, including soldier-worn systems.

HUD UPGRADE FOR UAE FIGHTING FALCONS

BAE Systems and Raytheon have teamed up to provide a new head-up display (HUD) for the 80 or so F-16 Fighting Falcon fighter aircraft operated by the UAE Armed Forces, as part of a wider \$1.63 billion upgrade being undertaken by Lockheed Martin.

Placed immediately in front of the pilot's line of sight, a HUD superimposes real-time essential flight information and mission-critical data on the pilot's view of the real world.

The HUD allows pilots to digest vital data while maintaining a 'head-up, eyes-out' approach. Symbology is focused at infinity, so the pilot does not have to refocus eyes in order to read information being presented.

Traditional HUDs use analogue cathode ray tube (CRT) technology to project symbology on to the HUD's glass screen. However, BAE Systems has developed a modular, electro-optic digital upgrade, known as the digital light engine (DLE) HUD. This replaces the CRT that powers a legacy system.

The new HUD provides high-resolution symbology viewable under any flight conditions with consistent luminance throughout its life. It can provide daylight video capability and can accommodate today's requirement for increased symbology and improved video capabilities. It is compatible with existing in-service night-vision goggles.

BAE Systems has been a leader in HUD development and production for more than 60 years.



It has produced more than 15,000 HUDs for more than 50 different aircraft types in service in over 50 countries, recently providing a DLE HUD upgrade for the USAF's F-22 Raptor.

The company claims that the DLE HUD is backward compatible to any existing aircraft interface, offering minimal impact on display performance. Crucially, it reduces lifecycle costs by 20% and offers at least four times better reliability with an increased mean time between failures, while addressing obsolescence

issues associated with conventional CRT technology.

The DLE upgrade integrates easily and effectively into the F-16's existing HUD space, retaining the existing optics, video camera, and control panel and requiring no changes to the aircraft's cabling and computing.

On July 19 2018 BAE Systems announced that it had selected Raytheon ELCAN Optical Technologies' projector for the F-16 DLE HUD, noting that this reflected "Raytheon's expertise in precision optics".

Some believe that the Qatari Hawks may incorporate features from the new Advanced Hawk, which offers significantly improved performance.



HAWKS HELP FILL QATAR'S TRAINING GAP

*With a massive air force expansion under way, the Qatar Emiri Air Force (QEAF) will need to significantly boost its training system. As **Jon Lake** reports, BAE Systems hopes that its Hawk will provide the solution to the emerging requirement.*

An air force that operates just 12 jet fighters (Mirage 2000-5EDAs and DDAs) is set to receive 36 Boeing F-15QA Advanced Eagles, 36 Dassault Rafales and 24 Eurofighter Typhoons – an eight-fold increase!

The air force's transport element is doubling in size, while rotorcraft numbers are set to increase from about 44 aircraft to around 70. All of this will require a dramatic growth in pilot numbers, and Qatar is building a new flying training system.

It has already acquired 24 Pilatus PC-21 aircraft, together with synthetic ground-based training devices.

The air force's existing fleet of six Alpha Jets are now showing their age, and require urgent replacement.

The £5 billion (\$6.56bn) contract with BAE Systems for 24 Typhoon fighters and nine Hawk advanced trainers, together with in-service support and initial training, became effective on Tuesday September 18 after the company received its first payment.

Although Qatar had signed the contract in December 2017, it had taken some time to 'activate', requiring the issuance of a royal decree relating to Qatar's financing of the contract.

On the UK side, the deal had to be underwritten by UK Export Finance, the government's credit guarantee agency.

□□□□□

Qatar had originally indicated what BAE called a "clear intention to proceed with the purchase of six Hawk aircraft". But, during a speech at the Royal United Services Institute in London in June 2018, Qatari Defence Minister, Khalid bin Mohammad Al Attiyah, announced that the emirate would increase its order from six to nine aircraft.

Hawk deliveries are scheduled to begin in 2021, with the first Typhoons following in 2022.

If the new Hawks are to fulfil all of Qatar's lead-in fighter training requirements, a fleet of nine aircraft would seem to be much too small for a fighter force of 96 aircraft, and many expect further advanced trainers to be procured.

Logic would dictate further Hawk orders to maximise commonality and reduce support costs. But,

after acquiring three types of fighter, it might not be a complete surprise if Qatar bought more than one advanced trainer type.

The US T-X trainer might be procured to support F-15QA training needs, and another aircraft could be acquired to train pilots for the Rafale. But the three-way fighter purchase has already 'bought' Qatar influence with three supplier nations, as well as providing the QEAF with opportunities to train with three different fighter 'communities'. A more efficient single type solution may still be pursued for the lead-in fighter training requirement.

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The Hawk has been developed to more closely reflect the challenges or operating a modern four-plus-generation fighter, such as those now being procured.

The original BAE Systems Hawk advanced trainer spawned a succession of increasingly capable and advanced variants, and this has kept the type viable and competitive with sales continuing to mount up, even 44 years after its maiden flight.

The latest Middle Eastern customers, Oman and Saudi Arabia, have selected variants of the Hawk Advanced Jet Trainer (AJT), which is powered by the 6,500lb thrust Rolls-Royce Adour 951 engine and has a new wing, forward and centre fuselage, fin and tailplane, compared to earlier versions.

The AJT has only 10% commonality with the first generation Hawk, and has four times the fatigue life of the original aircraft. The 951 engine has an all-new fan and combustor, revised HP and LP turbines, and introduces full authority digital engine control (FADEC). It has twice the life compared to the Adour 871.

But Qatar may have opted for the new Advanced Hawk, which has an all-new cockpit with a LiteHUD low-profile head-up display and a large area display, similar to that used on the F-35 Joint Strike Fighter, as well as a redesigned wing conferring increased climb, turn, angle of attack and take-off and landing performance.

The new variant is the first Hawk with a full frontline combat potential, with beyond-visual-range and precision-strike capabilities.

*The Sikorsky S-70 is increasingly becoming the backbone of Saudi Arabia's rotary-wing fleet and, as **Jon Lake** reports, a number of S-70 and UH-60 variants are now spread across several of the kingdom's military and parapublic air arms.*

On September 13, Sikorsky delivered the first MH-60R Seahawk maritime helicopter for the Royal Saudi Naval Forces (RSNF) during a ceremony in Owego, New York. The Seahawk, or S-70B, is the navalised version of the S-70 family.

Procurement of the Seahawk was launched in 2013, and a \$1.9 billion intergovernmental foreign military sales (FMS) agreement for the purchase of 10 MH-60R helicopters was signed at the end of 2015. The contract stipulated that the first helicopter would be delivered by October 31 2018.

The new helicopter was required to equip the four multi-mission surface combatant (MMSC) ships ordered for the Saudi Eastern Fleet. These vessels are based on the US Navy's Freedom-class Littoral Combat Ship (LCS) design.

The new Seahawks will join an existing rotary-winged fleet that includes 12 Airbus Helicopters AS 532SC Cougars, 15 Airbus Helicopters AS365F Dauphins, and six Airbus Helicopters AS565MB Panthers.

The Seahawks will be equipped with AN/APS-153(V) multi-mode radar, AN/AAS-44C(V) multi-spectral targeting systems forward-looking infrared sensors, and APX-125 IFF transponders.

They will be supplied with 1,000 AN/SSQ-36/53/62 sonobuoys and weapons, including the AGM-114 Hellfire missile, APKWS II 70mm laser-guided rockets, and Raytheon Mk 54



Sikorsky's Seahawks on the crest of a Saudi wave

lightweight hybrid torpedoes, as well as M240D and GAU-21 door gunners.

General Fahd bin Abdullah Al-Ghufaili, commander of the Royal Saudi Naval Forces (RSNF), said that the Seahawks would enhance the forces' capabilities and would enable them to meet all regional challenges and threats, while contributing to partnerships with other navies to enhance maritime security in the region.

The navy's Seahawks will join about 50 S-70A/UH-60 Blackhawks operated by the Royal Saudi Land Forces.

About 80 aircraft – S-70A Black Hawks, some of which are designated as UH- and MH-60s and S-70i International Black Hawks – have already been delivered to the Royal Saudi Land Forces, the Ministry of Interior's General Civil Defence Agency (GCDA) and the newly established air element of the Saudi Arabian National Guard.

The land forces acquired a single S-70A VIP helicopter, 12 S-70A-1 Desert Hawk utility helicopters, eight S-70A-1L medevac

helicopters, eight ex-US Army UH-60As, transferred during Desert Storm, and about 24 UH-60Ls, delivered between 2008 and 2014.

Between three and five S-70i International Black Hawks are assigned to the GCDA – the paramilitary wing of the Ministry of Interior. These augment 16 S-92s in providing helicopter support to the kingdom's counter-terrorism forces.

About 24 UH-60Ms serve with the Saudi Arabian National Guard, and more are due to be delivered.

The major 2010 arms deal with the US included authorisation for 72 Sikorsky UH-60M Black Hawks, but so far the only contracts have been for the 24 aircraft referred to above, that are now in service, and a 2018 contract for 17 further UH-60M aircraft – eight for the National Guard and nine for the Royal Saudi Land Forces Airborne Special Security Forces.

Saudi S-70 numbers are set to soar following the 2016 signing of an agreement between Sikorsky and Taqnia Aeronautics, which aimed to establish a

joint venture that will explore helicopter production opportunities in Saudi Arabia.

In May 2017, a further agreement saw the kingdom express an intent to procure more than \$28 billion worth of equipment from Lockheed Martin, including integrated air and missile defence systems, combat ships, tactical aircraft and helicopters. The new agreement included \$6 billion for around 150 S-70 Black Hawk utility helicopters, with final assembly and completion by Taqnia.

Alan Chinoda, chief executive of Lockheed Martin Saudi Arabia said: "This would be Black Hawk helicopters produced by Saudis for Saudi Arabia; we plan to invest more than a million hours in this endeavour."

The programme supported Saudi Arabia's 'vision 2030' by creating 450 jobs in the kingdom and by developing local capabilities through technology and skills transfer, thereby enhancing the US-Saudi global security partnership.

Deliveries were scheduled to begin in October 2017 and to conclude by the end of June, 2022, but this programme appears to have been delayed. ■



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It's a Who's Who of aviation and innovation

The Middle East's top business aviation conference and exhibition returns to Dubai World Central (DWC) in December. Dave Calderwood looks forward to the event.

The biennial Middle East and North Africa Business Aviation Association (MEBAA) Conference & Exhibition Dubai will be staged for the eighth time this year, returning to the purpose-built exhibition centre at Dubai World Central from December 10-12.

For the first time, the conference will be incorporated on to the show floor, along with a host of other new ideas.

The conference will be split into four different sessions across two days – Tuesday and Wednesday December 11-12 – and will include both a UAE market focus and analysis of the worldwide business aviation market.

There will be panel discussions and presentations on topics such as what is being done to drive business aviation forward, the latest trends and regulations, identifying how best to take advantage, plus business aviation insurance and how it is changing, including protection against new potential threats.

It seems no conference these days is complete without a discussion on blockchain – simply put, a secure digital ledger of economic transactions. The conference will examine how it's being used in other industries and how it might be applied in business aviation.

The other initiatives include an executive club lounge for business aviation operators – an exclusive area dedicated to meetings and networking – the jetsetter welcome reception in

the afternoon of the first day, and a product demonstration theatre, where exhibitors are invited to show off their latest innovations.

DWC is the natural location for the show since it outgrew its original site at Dubai International. Not only is there plenty of space, both in the exhibition hall and on the flightline, but it's in the heart of the rapidly developing Dubai South area.

Many of Dubai business aviation companies are just a few minutes away, including the award-winning VIP terminals and FBOs.

As before, MEBAA is expected to draw an audience of around 10,000 business aviation professionals from across the Middle East, Europe, eastern Europe and Russia, and, of course, the USA.

The show not only showcases the companies based in the Middle East but is also a meeting point for original equipment manufacturers (OEMs), suppliers and services across the world.

Ali Alnaqbi, founding and executive chairman of MEBAA, said: "The MEBAA show is the largest business aviation event in the MENA region. The growth seen over the years is testament to the value it brings the exhibitors and attendees.

"Face-to-face meetings are a key part of doing business in the region and the show provides a much-needed platform for the industry to meet, network and do business.

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on Page 60



Dassault (left) and Gulfstream will both be at MEBAA.

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“The addition of new features for 2018, such as the aircraft operators executive club lounge, jetsetter welcome reception, and product demonstration theatre, will provide further opportunities for attendees to achieve this.

“The business aviation industry in the MENA region continues to grow. Jetex estimated that there were about 30,600 private jet flights out of Dubai alone in 2017, while the Dubai Airports combined see around 50,000 ultra-high-net-worth passengers per year. The expansion of airports in the UAE will facilitate this industry growth, and movements are anticipated to continue to increase.”

That growth is reflected in the exhibitor list, which reads like a who’s who of business aviation, and is expected to total around 500 companies.

Latest aircraft

All of the business aircraft manufacturers are attending, most bringing some of their latest aircraft, though at the time of writing these had still to be confirmed.

Manufacturers attending include Bombardier, Boeing, Dassault, Diamond Aircraft, Embraer, Gulfstream and Textron Aviation.

Major specialist suppliers such as Pratt & Whitney Canada, Rockwell Collins, CAE and Jeppesen, are attending to present their latest technology and services.

Services and maintenance, repair and overhaul (MRO) organisations include completions experts AMAC Aerospace, Citadel, Comlux and Jet Aviation.

Of course, operators are at the heart of MEBAA, and include such major players such as DC Aviation, ExecuJet, Falcon Aviation Services, GAMA Aviation, Saudi Private Aviation, Gainjet, Harrods Aviation, Seaprime and TAG UK.

Many new exhibitors have also signed up for this year’s event. They include internet connectivity experts Airmont of France, UAE-based aviation services Airports World Company, AvFuel, Aviation Jobsearch, Citadel Completions, and the Emirates National Oil Company, ENOC.

MEBAA Conference & Exhibition Dubai 2018

When: December 10-12 2018

Doors open: 11:00 - 18:00

Where: DWC

Registration online: www.mebaa.aero

DUBAI CONFERENCE AGENDA

■ Tuesday December 11

09.30-10.00: Registration and welcome coffee.

10.00-10.02: National anthem.

Session one – UAE market focus

10.02-10.10: Opening comments.

10.10-10.30: What is being done to drive business aviation forward?

10.30-11.10: Panel discussion – business aviation insurance, what should you know for 2018?

11.10-11.30: Coffee and networking break.

Session two – global business aviation

11.30-11.55: Blockchain in business aviation.

11.55-12.35: Cyber security – what more can be done to protect yourself?

12.35-13.00: Aviation finance – is debt financing the future?

■ Wednesday 12 December

09.30-10.00: Registration and welcome coffee.

Session three – UAE market focus

10.00-10.10: Opening comments.

10.10-10.40: Innovation in the business aviation industry.

10.40-11.10: Drones and the UAE’s business aviation market.

11.10-11.30: Coffee and networking break.

Session four – global business aviation

11.30-12.00: Improving passenger experience through connectivity.

12.00-12.45: Panel discussion – the future of private aircraft design.

12.45-13.00: Closing remarks and speaker presentation.

Belgium’s FlyingGroup opened a base at Dubai South in 2017 and will be attending MEBAA for the first time.

“Dubai South was a natural choice to start our Middle East operations, given Dubai’s geographical location and the industry-leading aviation ecosystem Dubai South has established at DWC,” said Mark Hardman, managing director of FlyingGroup Middle East.

“Furthermore, we strongly believe that DWC is the future of business aviation in Dubai, with 65% of fixed-base operation (FBO) movements already operating from the new airport.”

German MRO specialist, MSI, set up a base in Dubai as long ago as 1998, and it will be exhibiting at MEBAA for the first time.

First timer

Another first-timer from Europe, this time Switzerland, is Nomad Aviation.

It offers aircraft management, charter and maintenance services and operates a mixed fleet of aircraft, ranging from light to ultra-long-range jets, including Gulfstream 650 and 450, Bombardier CRJ100SE, Global 5000, Challenger 604, Embraer Legacy 650 and 600, and Cessna CJ2+ and CJ1+.

Nomad started to offer maintenance and hangarage services at its Basel, Switzerland facility from the beginning of August 2018, dealing with aircraft up to the size of an A320 or B737.

Slightly more specialised are two US companies at MEBAA for the first time – Signature Plating, which offers high-quality plating and materials finishing for aircraft and yacht interiors, and Tronair, a ground-support equipment company.

Tronair was named Gulfstream Supplier of the Year earlier this year, which places it in a select band of suppliers to Gulfstream Aerospace. Among its products is the Jetporter Softcapture towbarless vehicle, which has no need of straps or contact with the aircraft’s nosegear.

The latest model is the electric eJP-10, capable of towing aircraft up to 125,000lb in weight.

All this and much more will be coming to MEBAA this December. ■



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“Other companies are too inflexible. They have one training model. If we ever get like that, it will be the beginning of the end.”

ABDULLAH AL-SAYED



AND FOR MY

*If you can't find a suitable partner to provide ground services for your executive jet offering, why not create your own? Continue by opening training academies, start organising airlines... and then set up one yourself. That, as **Alan Dron** reports, is the remarkable story of Saudi Arabia's Nexus.*

When Abdullah Al-Sayed was running the Middle East operations of the world's largest executive jet company, he had a constant concern: What organisation could provide him with the type of ground-based services to match the quality that his aircraft were providing in the air?

"When I was CEO of NetJets Middle East, I was always asking my team: 'Do we have a company to which we can sub-contract, so we can hand over all the flight operations to them?' We couldn't find such a company."

Perhaps no surprise, then, that in 2010, when Al-Sayed left NetJets, he decided to set up Nexus, his own flight services company. "People said I was crazy," he admitted. They doubted that any organisation would trust his new company with their flight operations services.

The breakthrough came with a major oil company, which was known to have high standards and against which Nexus benchmarked itself. "I said to them: 'Just give us a try' and they gave us the opportunity." The relationship lasted for several years and has recently been renewed.

Jeddah-based Nexus does not own aircraft itself, but it manages them for others and handles every aspect of ground-based flight services, from flight-planning, dispatching and in-flight catering to obtaining visas, arranging ground transportation and maintenance.

It does this with a staff that has grown from seven to 700 in eight years and which now operates from 14 locations in 11 countries. Some are purely representative offices, but seven – Jeddah, Dammam, Mumbai, Kigali, Houston, Chengdu and Manila – provide the full range of services.

One region currently not covered by Nexus is Latin America, and that is something that Al-Sayed hopes to remedy shortly. "We are looking at it right now. We've gone to Mexico, Brazil and Colombia and are still evaluating those," he said.

Right local partner

"The challenge is always finding the right local partner who can understand our business and be with us for the long term. All our partners outside the Middle East have been with us for a long time. This is especially important now, as we've built a brand and image, so you become more careful about selecting people and learning about their previous business relationships."

Although the Middle East has an image of high-value individuals flying around in their luxurious privately owned business jets, Al-Sayed believes that this is going to change.

"I believe that the trend in private aviation is very strongly into fractional ownership and block charters, rather than individuals owning their aircraft," he said. This follows the path that has been marked out by NetJets: "I believe that if companies like NetJets and VistaJet push more aggressively into the Middle East, the needs there are tremendous."

Also, he feels that, whereas Arab executive aircraft owners previously looked for luxury, today there is a move towards the western pattern of using them as business tools, to allow senior personnel to conduct their business more efficiently by travelling faster than the service provided on commercial airlines.

Although Nexus is best known for the flight operations side of the business, it is increasingly focusing on training future aviation professionals at its academies in Saudi Arabia, Africa and China. The academies cover all aspects of the ground services for which Nexus is known, including safety

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NEXUS TRICK...

CONTINUED FROM PAGE 63

training, crew resource management, maintenance and flight dispatcher and scheduling service.

Simulators for pilot training, meanwhile, are located at Kigali in Rwanda and Chengdu in China.

The academies have become “the bread and butter” of the group’s activities, said Al-Sayed. Not only are their overheads relatively low compared to the flight operations services side of the business, but “training and development are becoming priority number one for many regions, such as China and Africa”.

One of Nexus’ advantages over rivals in the field, he believes, is its flexibility in tailoring training courses to the needs of individual clients – commercial organisations, government ministries or air forces: “Other companies are too inflexible. They have one training model. If we ever get like that, it will be the beginning of the end.”

This flexibility extends to the aircraft under Nexus’ management. Some rivals have their logo all over their clients’ aircraft, even down to the cutlery and the cabin crew’s uniforms. Passengers in aircraft managed by Al-Sayed’s company, however, will find it difficult to locate any trace of Nexus’ presence. “We even tailor the uniforms of staff to the colours of each aircraft – and sometimes to the taste of the owner’s wife. As one client said: ‘I have to feel that it’s my aircraft, my home.’”

Diversify its economy

Nexus is heavily involved in supporting the Saudi Arabian Government’s efforts to diversify its economy by training Saudi nationals in the skills necessary to run its flight operations.

“The government has many initiatives. They subsidise your training if you’re training Saudis. We request people who would be suitable for certain positions. The government send us CVs, we interview the applicants and choose the most suitable. All we then have to do is tell the government that these individuals are working for us and they will pay their salary for one year. After that year, we have the ability to keep them, or ask them to leave.

“It’s a very smart initiative; if the individual is good and we keep him, he already understands our system. It’s good for him and it’s good for us.”

One added incentive for Saudi nationals paying their own fees at Nexus, rather than having them paid by a company or the government, is that the three best-performing self-funded students are guaranteed jobs. This encourages them to really focus on their studies.

It is also one reason why Nexus exceeds the Saudi Government’s requirements for the percentage of Saudi nationals employed.

One of the biggest opportunities open to Nexus, believes Al-Sayed, will be the growth of religious tourism. Numbers of pilgrims coming to Saudi Arabia for the Hajj and Umrah have

Could Gabon be the next RwandAir?

Among the group’s most interesting current projects is helping to establish a new national airline for Gabon. The central African nation has not had a national carrier since Air Gabon collapsed in 2006 but, with the African airline scene at its most exciting for years, the government in Libreville is keen to establish its own flag-carrier once again. Nexus has been shortlisted as organiser.

Al-Sayed is keen to get involved. However, with the history of African airlines being littered with the failures of state-run companies, he wants to ensure that both the private and public sectors are involved. “The government has to be a partner, but we also have to give opportunities to Gabon’s private sector as well.” This, he said, is because private enterprises tend to be less burdened by bureaucratic processes and can move faster in seizing opportunities.

“Gabon has been talking to us for two years and we’re in the process of signing a memorandum of understanding (MoU) to put a joint venture together.” A timescale for establishing the airline has yet to be agreed, but he should have a clearer idea by the end of the year, he said.

The Gabon opportunity came along because of Nexus’ successful involvement in setting up RwandAir, one of the continent’s most promising young airlines.

When Nexus got involved in the project it realised that, although it came from a region with some of the world’s most successful airlines, its strategy in Africa had to be different from that in the Middle East.

“It’s no secret that Africa is one of the best ‘virgin continents’ in the world in terms of ambition. They are so hungry to develop their countries, but they usually get it wrong with their international partners.” The other major problem in the continent was corruption, he added.

The lack of corruption in Rwanda was notable, said Al-Sayed, and was a result of policy from the very top.

“I give credit to HE President Paul Kagame,” he said. In the past 17 years, since the tragedy of Rwanda’s civil war, his government had taken the small central African nation to the point where it was now the second or third-fastest growing economy in the world, said Al-Sayed.

“One of the factors that encouraged us to go into Rwanda was that it’s one of the least corrupt countries. I told my team that if we got a successful model with RwandAir, we could use it in other countries.

“We support RwandAir completely,” said Al-Sayed. “We started out supporting 90% of it with our personnel. Today we are down to 10% and our objective is to train local people, then manage them.

“We provided flight operations support and ground operations. It’s been an excellent relationship and gave us excellent experience and insight in how to run an airline.”

The success of RwandAir, which has established a small but efficient fleet of Airbus A330s, Boeing 737-700s and -800s, plus Bombardier CRJ900 regional jets and Q400 turboprops, has not gone unnoticed. As well as Gabon, Nexus has been personally approached by Burkina Faso’s president to set up and manage a new airline there and two other countries are also talking to the Saudi company about its involvement in new or existing airlines.

been rising steadily in recent years and this growth is forecast to be maintained, or even accelerate, in coming years.

In 2017, more than 13 million pilgrims came to the kingdom and the Saudi authorities are targeting 30 million by 2030.

“This means you need a huge transport system and aircraft will become very important. I believe religious tourism will be one of the biggest contributors to our economy in Saudi Arabia,” said Al-Sayed.

Pilgrim traffic is “the only sustainable business you will never have to worry about or advertise. Dubai, Abu Dhabi, Bahrain – they all have to advertise to get you to fly there, but Hajj and Umrah is one location where you don’t need to persuade anyone to visit.”

Nexus is working on its business plan to tap into this stream of traffic. It hopes to submit an application in 2019 to the Saudi aviation regulator, the General Authority for Civil Aviation (GACA), for a Part 121 licence for unscheduled air services to allow it to transport pilgrims.

Current plans call for the airline to start operations with four narrow-body jets, with Egypt, Iraq, Nigeria, India and Pakistan the new carrier’s initial destinations. All five countries are currently under-served by charter providers, said Al-Sayed.

Reduce operating costs

The aircraft will be pre-owned, leased models to reduce operating costs. Nexus is weighing up the merits of Boeing and Airbus models, with financial calculations at present favouring the European manufacturer.

Nexus hopes to start pilgrim flights by late-2019; probably under a name other than that of the parent company.

Consultants who have been analysing Nexus’ business have said that it will be unusually quick to get into the air, as its existing flight service organisation is already fully staffed and in place. “They said: ‘You’re not going to have to spend money to hire staff, because they already exist.’”

Similarly, the company has prior experience of running an airline in the shape of RwandAir. Talking about commercial aviation in the region more generally, Al-Sayed said that, as with executive aviation, Saudi airline passengers were now adopting many of the same traits as their North American and European counterparts, with ticket prices and timetables becoming increasingly important factors.

That constant flow of business from pilgrims is also one of the factors that Nexus believes will help it launch its initial public offering (IPO) in the near future. Contracts with governments and oil companies can eventually expire, but not the demand for transport to Islam’s holiest shrines.

An IPO office has been established within Nexus, staffed by a senior member of one of the world’s leading banks, a human resources policies and procedures specialist, and, on the technical side, an aviation specialist. ■

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*Private aircraft ownership comes with its own set of considerations, all focused on maintaining airworthiness through planned and unplanned events. **Chuck Grieve** spoke to leading Middle East maintenance, repair and overhaul (MRO) operators for their insights.*

PRIVATE – AT A PRICE

The Middle East MRO market for business aircraft is recovering from a “significant” drop-off in demand seen at the end of 2017, mainly from the Saudi Arabian-installed base but also from visiting aircraft.

Nick Weber, maintenance director of ExecuJet Middle East in Dubai, said the tempo is “still not the same” year-on-year from 2017, when the market experienced a “significant uptick” from 2016.

“Markets are very price-sensitive,” he said. “At the moment, cost is definitely the driver for MRO decisions.

“The Middle East installed base gets a lot of offers from Europe and, to a certain extent, from Asia. We have to counter this with better services within the region, tailored offerings depending on fleet size, and ensuring our pricing is competitive.”

Competition is also increasing from original equipment manufacturers (OEMs) targeting the aftermarket for maintenance and servicing, he added. “This is putting pressure on authorised service facilities like ourselves. The OEM can offer preferential pricing on parts, warranty, supplemental type certificates (STCs), avionics upgrades – areas where we find it a lot more difficult to compete.”

European operators continue to use regional MROs, such as ExecuJet, for scheduled maintenance when their aircraft are in-region. “We still have to be very mindful of pricing,” said Weber, “otherwise the option of repositioning the aircraft back to Europe enters the picture”.

As Gama Aviation’s Oliver Hewson sees it, the major MRO challenge for business aircraft owners and operators in the region is the lack of infrastructure dedicated to business jets at large, popular, international airports.

Continued
on Page 68



Markets are very price-sensitive. At the moment, cost is definitely the driver for MRO decisions.

NICK WEBER

CONTINUED FROM PAGE 67

Hewson, the company's Middle East commercial manager, said Gama recognised an opportunity in that situation. "While other maintenance organisations have engineers committed to scheduled base inputs, with tight deadlines, we set up our aircraft on the ground (AOG) support service with a mobile unit of line engineers."

Equipped with airside passes and appropriate visas for airports in the GCC region, the Gama team can mobilise from its line station at Sharjah International at short notice, weekends and holidays included, to rescue clients. Last year alone they handled AOG support in the Democratic Republic of Congo, Nigeria, Saudi Arabia, Jordan, Kuwait and Lebanon.

Small team

"Our small regional team of engineers quickly earned a stellar reputation for AOG support in the Middle East and Africa, and is now supporting urgent defect rectification on a monthly basis, rescuing aircraft and their passengers from being stuck and grounded down route," said Hewson.

"Perhaps the most memorable mission we had this year was to dispatch an engineer from the UAE to Kuwait within a matter of hours in order to fix a lavatory on a charter aircraft before they flew a very discerning VIP to Europe. Needless to say, the passenger and operator were very grateful for the fast response."

ExecuJet's Weber said among the company's business jet customers, who tend to be single-



aircraft owners, there's been an increase in the number of newer long-range wide-bodies, such as Global Express and Gulfstream models.

One quandary facing owners is balancing the lower cost of buying an older model aircraft with the higher cost of its maintenance.

Not understanding the market is a pitfall, especially for first-time owners, said Weber. Many "seem to be taken by surprise" at the cost of maintaining an aircraft through mandatory light and heavy checks, such as the 96-month inspection.

This can be problematic for an MRO if an owner thinks he's being taken advantage of.

"We see owners approaching their aircraft MRO requirements as they would the servicing of a motor vehicle, where they may decide to skip one or delay it until a more convenient time.

They don't understand that, with an aircraft, you have to comply with all regulations and STCs."

But, he added, the business aircraft industry in the Middle East has matured since ExecuJet opened its doors as an MRO in 2006, as have the management companies. "It's an educational process," he said. "Now fewer owners will let their multi-million-dollar aircraft stand outside at the mercy of the heat and climatic conditions we experience in the Gulf."

Utilisation of business aircraft in the Middle East fleet tends to be seasonal, with activity peaking in the cooler winter months when there are more conferences and events to draw people to Europe and North America. The summer lull is compounded by a tendency of some owners to relocate themselves and their aircraft in Europe and Asia over that period. ■

Storm looming over mandatory upgrade

A perfect storm of mandatory upgrades and compliance is building on the business jet horizon – and a surprising number of owners and operators remain unaware or unconcerned by its implications.

When the automatic dependent surveillance-broadcast (ADS-B) Out mandate comes into force in 2020 in Europe, the US, the UAE, and other countries, aircraft that fly higher than 2,500ft must be able to transmit positioning information in compliance with ADS-B Out regulations.

MRO bases in the Middle East are already warning of an impossible clash of deadlines, workshop time and availability of parts a year from now.

Aircraft that do not comply with the mandate could be effectively grounded.

With ADS-B Out, the aircraft continuously transmits its position regardless of whether it is being interrogated by ground radar or the traffic alert and collision avoidance systems (TCAS) of other aircraft.

ADS-B Out is described as generally more accurate than current radar systems, which it is expected to replace. The overarching ambition of the world aviation community is to use it to safely control increasingly congested airspace worldwide.

Observers note that many owners have been slow to react to the mandates, perhaps hoping for a deadline extension or reductions in the price of equipment, which can rise well beyond \$100,000.

GAMA Aviation's Oliver Hewson said the deadline has already been extended from 2017 to 2020, making

further extensions extremely unlikely. "The Federal Aviation Administration (FAA) has been clear in its policy that any aircraft entering controlled airspace after the deadline must be compliant," he said.

ExecuJet's Nick Weber said owners – mostly through their management companies – are starting to "wake up" to the implications of missing the deadline for compliance. The significant cost of upgrades has led many to delay the work, although his company has also modified about six aircraft already in its Dubai workshop.

The newer aircraft are more likely to have complied already, he said.

□□□□

"It's worrying for OEMs, as well as MROs, that everybody will wait until the 11th hour, when there will be issues of supply, increased downtime and available slots at service centres," said Weber. "Extended downtime has an impact on operations, from the owners' perspective, especially if the aircraft is out on charter. It also has a knock-on effect in service centres for aircraft coming in for scheduled maintenance.

"We're trying to encourage operators and owners to book the work now."

Upgrades usually ground an aircraft from one to three weeks, depending on the time it takes to remove the relevant components, send them to the OEM for modification, and reinstall and test them on their

return. Weber expects downtime will increase as pressure builds on OEMs with the anticipated volume of modification work.

Stephen Alcock, Honeywell Aerospace's senior director for business and general aviation in Europe, Middle East, Africa and India, said planning ahead was key.

"Any delay in securing ADS-B compliance increases the risk that products won't be available or that service centres won't have the capacity to meet aircraft requirements ahead of the FAA and European Aviation Safety Agency (EASA) deadlines," said Alcock. "In the long term, this will hamper aircraft access to more direct routes and stop aircraft owners from achieving fuel savings."

As one of the major cockpit technology suppliers, Honeywell offers numerous upgrade options and incentives. "For example," said Alcock, "Lear 40/45 operators, who buy at least two DU-875/885 LCD displays to replace their current CRT displays, can use our supplemental type certificate for ADS-B Out without charge."

Selling an aircraft to escape the cost of updating its avionics carries its own liabilities. Aviation sales brokers note that aircraft without the advanced avionics will be artificially depreciated when they come into the market, undermining negotiations on price. The longer they stay on the ground, the more difficult it will be to find a buyer – and the maintenance costs will not disappear.

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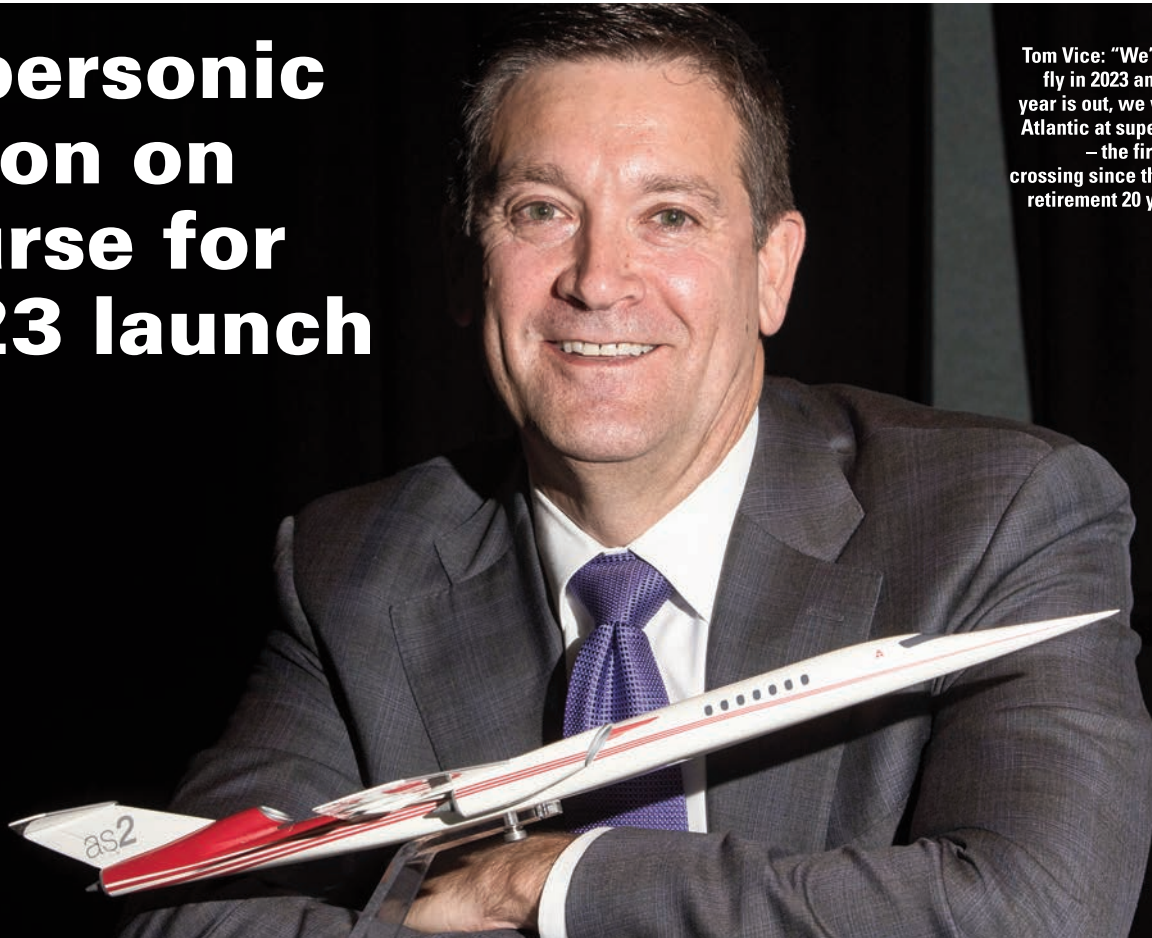
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Alan Peaford reports from October's National Business Aviation Association Business Aviation Convention & Exhibition (NBAA-BACE) show in Orlando, Florida.

Supersonic vision on course for 2023 launch

Tom Vice: "We're on track to fly in 2023 and, before that year is out, we will cross the Atlantic at supersonic speed – the first supersonic crossing since the Concorde's retirement 20 years earlier."



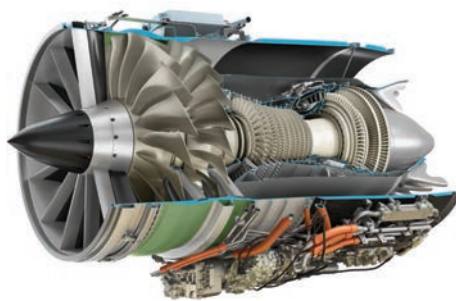
Supersonic business aviation took a giant step forward at the NBAA-BACE show. Aerion chief executive, Tom Vice, announced a firm timeline for the first flight of his company's AS2 supersonic business jet.

The world's first faster-than-sound business jet will have a new engine variant from GE and what was described as a "revolutionary" new cockpit design from Honeywell.

"We're on track to fly in 2023 and, before that year is out, we will cross the Atlantic at supersonic speed – the first supersonic crossing since the Concorde's retirement 20 years earlier," Vice said.

"Aerion and our AS2 industry team, which comprises Lockheed Martin, GE Aviation, and Honeywell, have solved many of the tremendous challenges in creating a supersonic renaissance."

Engine-maker GE unveiled the name of the new turbofan for the supersonic jet. The Affinity is described by GE's vice president of business and general aviation, Brad Mottier, as a new class of full authority digital engine control (FADEC) medium bypass ratio engines that, he said, would provide exceptional and balanced performance to enable efficient supersonic flight over water and efficient subsonic flight over land, without requiring



The Affinity - the turbofan for the supersonic jet.

modifications to existing compliance regulations.

"We've overcome some huge technical hurdles and we're confident we'll meet stage 5 take-off and landing noise requirements. We've made strides in structures and systems. We're recruiting top-tier suppliers. And we're attracting the best and brightest engineering talent to the programme as we grow our organisation," Vice said.

Aerion also revealed Honeywell as the design partner for the cockpit and major cabin systems.

"Honeywell will deliver a comprehensive connected aircraft solution that will enable

operators to reach their destinations faster than ever before, maximising their productivity, while providing an exceptional travel experience," said Carl Esposito, president, electronic solutions.

"This is a fantastic opportunity to pioneer a new segment of aviation with Aerion."

Like GE, Honeywell has a wide experience of supersonic-tested equipment, with most supersonic military aircraft in the western world utilising its various avionics systems and components.

Vice said he is looking beyond the AS2 in a business jet role. "The aircraft is the first step on a roadmap to making supersonic travel efficient, sustainable, and widely available," he said.

"Today, we are at the limits of available technology.

"We are starting with a business jet because the technology closes and the business case closes – we see a viable market for the AS2. It will be our springboard to larger and faster designs, both for business aviation and commercial airliners."

When the Aerion supersonic jet was first launched, Middle Eastern buyers were among the early customers for the event. ■

The Genesis of a new era is unveiled

The first BBJ Max has been delivered to a completion centre, understood to be Comlux Completions in Indianapolis.

"We are excited to begin delivering a longer-range and more capable version of the world's most popular business jetliner," said Greg Laxton, head of Boeing Business Jets. "There has been great market interest and anticipation for the BBJ Max and our valued customers will soon be able to see the new standard in business travel."

To commemorate the first delivery, Boeing Business Jets unveiled a new interior concept from aviation design firm SkyStyle. The concept, named Genesis, represents the company's debut in BBJ MAX design.

"From an aviation designer's perspective, the BBJ MAX is incredibly appealing because there is so much more interior space to realise one's vision," said designer Max Pardo. "And since the MAX flies ultra distances, the owners are looking for a comfortable lounge, multi function conference area and a large master suite to ensure the ultimate flight experience."

Greg Laxton says there is great interest in the latest BBJ Max and new interiors



ACJ bags that extra bit of performance

Airbus Corporate Jets (ACJ) had good news for its new ACJ319neo customers who need that extra bit of luggage for their long-range flights.

Speaking at the show, ACJ marketing director, David Velupillai, said the latest performance indicators for the aircraft – which is due for first delivery in Q2 next year – are showing an increase in maximum take-off weight (MTOW) of 900kgs. "That takes it up to 78.2 tonnes and gives the customer all that additional payload."

The aircraft will be capable of flying eight passengers 12,500km (6,750nm) or more than 15 hours.



Ahead of the ACJ319neo in the delivery schedules is the ACJ320neo, which is due for first delivery before the end of this year, according to Velupillai. Customers include Acropolis Aviation, Comlux and K5 Aviation.

The ACJ320neo will fly 25 passengers 6,000nm/11,100km or more than 13 hours.

K5's ACJ319 was on display at the static park. Available for VVIP charter from the German operator, the aircraft was making its NBAA show debut.

Velupillai said that the ACJ's low utilisation programme (LUP) was also showing benefits for owners. Because the aircraft are based on the tried and tested airliner – there are almost 8,500 in service – maintenance checks had been based on the same as for airliner usage.



The LUP programme has now adjusted that to take account of the fewer hours flown in corporate service, so C-checks move from every two years to every four, while full structural checks have been revised from six years to 12.

"We are in a position now where the ACJ320 family features the widest and tallest cabins compared to large traditional business jets, while being similar in size and costing about the same or less to fly," said Velupillai.

He added that although the ACJs were heavier than the traditional business jets, when taking into account maintenance and crew expenses, including recurrent training, owners could save up to 10% in operating costs. "It's a win-win situation for them," he said.



Blackhawk revs up for engine 'game-changer'

Blackhawk Modifications is weaving its magic for King Air 300 owners and operators who want to get around quicker. The Texas-based company announced that flight-testing is under way for the XP67A Engine+ upgrade for the Beechcraft classic.

"The XP67A will transform the King Air 300 from a turboprop into a rocket ship," said Jim Allmon, Blackhawk chief executive.

"The expected climb performance, cruise speeds, and load-carrying capability will be unlike anything we've produced at Blackhawk thus far. The XP67A will elevate the King Air 300 into a league all its own, unmatched by any turboprop or light jet available today."

This project will certify the installation of factory-new Pratt & Whitney Canada (P&WC) PT6A-67A engines to replace the stock PT6A-60A engines on 12,500lb and 14,000lb gross weight models of the King Air 300. Both engine models are rated at 1,050 horsepower at sea level in standard day conditions.

However, Blackhawk's XP67A Engine+ upgrade delivers more available power at higher density altitudes, with very impressive levels of take-off, climb, and cruise performance well into the flight levels.

Allmon said he expected the King Air 300 XP67A upgrade to surpass its big brother – the XP67A-powered King Air 350 – in the race for the world's fastest King Air title, due to the lighter-weight airframe.

He expected maximum cruise speeds of 345-350KTAS, and time to climb from sea level to FL350 of less than 17 minutes.



Embraer reveals new family member

Embraer has introduced a new family of aircraft – unveiling the Praetor 500 midsize and Praetor 600 super-midsize business jets at the show

The Praetors fit into the company's eight-strong product line between the Legacy 500 and Legacy 650E.

Development began more than a year ago, based on "extensive interaction", with customers of the company's Legacy 450 and Legacy 500, of which they are derivatives, sharing the same fuselage and wing structure.

"These are not clean-sheet aircraft but they were developed based on the proven Legacy 450 and 500 platforms – introduced in 2015 and 2014 respectively – for which there are more than 100 aircraft in operation to date," Embraer executive's CEO, Michael Amalfitano, explained.

The Praetor jets will introduce unprecedented range into their categories. The Praetor 600 will be the farthest-flying super-midsize business jet, which allows nonstop flights between London and New York; the Praetor 500 will be the fastest midsize aircraft, capable of reaching Europe from the west coast of the US with a single stop.

With four passengers and National Business Aviation Association (NBAA) IFR reserves, the Praetor 600 will have an intercontinental range of 3,900nm (7,223km). The Praetor 500 will lead the midsize class with a continental range of 3,250 nm (6,019km).

FlightAware's global view

FlightAware, the world's largest flight-tracking data company, said at the show that it is now able to track aircraft anywhere in the world, including positions in the air and activity on the ground.

"Since most disruption happens while an aircraft is on the ground, there's tremendous value in having insight into what's going on before and after take-off, particularly for our business aviation customers," said founder and chief executive, Daniel Baker.

FlightAware's terrestrial ADS-B network has grown by more than 35% this year, with in excess of 19,000 sites in nearly 190 countries. This terrestrial network will provide surface coverage at more than 1,000 airports and 2,000 FBOs.

Citation order boosts Textron

Textron Aviation was given a huge boost for its latest Cessna Citation orderbook when US fractional ownership company, NetJets, announced the purchase of 325 Citation business jets – 175 super-midsize Cessna Citation Longitudes and up to 150 large-cabin Hemispheres, for which it will be the launch customer. First deliveries are anticipated in the second half of 2019.

Through the fog

Gulfstream operators could soon be able to dispatch and begin instrument approaches in low-visibility conditions below published approach minima.

This follows "industry first" approvals in the USA for visual advantage credit on the enhanced flight visual system (EFVS) on Gulfstream's in-production aircraft.

Other regulatory bodies could follow.

Gulfstream's large-cabin aircraft have also completed their certification flight-testing for EFVS to touch-down and rollout operations. FAA certification and operational approvals for the Gulfstream G500 and Gulfstream G600 are expected by the end of this year.



Extra range boost for Gulfstream's G600

Gulfstream announced a 14% increase in range from its original projections for the all-new G600 business jet, which is nearing certification.

Company president, Mark Burns, said the long-range class jet would now deliver a range of 10,186km (5,500nm) at its high-speed cruise of Mach 0.90.

"The incredible high-speed performance of the G600 is a testament to our engineering and design teams," Burns said. "As part of our continuous improvement culture, they have enhanced this aircraft's capabilities, ensuring we continue to better our customer's expectations."

"We started with a range projection of 4,800nm at Mach 0.90, increased that to 5,100nm in 2017, and are now at 5,500 – proving once again that delivering more than we promised is a Gulfstream tradition."

With its range increase, the G600 can now fly nonstop from London to Los Angeles, São Paulo to

Aspen, or Hong Kong to Vienna at Mach 0.90. At its long-range cruise speed of Mach 0.85, it can extend range to 6,500nm.

In an update of the certification process, Burns said the five aircraft in the flight-test programme had accumulated more than 2,600 flight hours, with over more than 685 flights.

There is only crew workload, flight into known icing, and function and reliability tests remaining before certification.

Gulfstream has recently certificated the Gulfstream G500, which joined the G600 on display at Orlando static park. It was launched simultaneously with the G600 four years ago and earned its type and production certificates from the US FAA in July, entering service on September 27.

It is now awaiting type certification from the European Aviation Safety Agency.



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The AgustaWestland AW139 and the AW109E (right).

Another milestone for Aramco fleet

Aramco Overseas Company has selected Leonardo Helicopters and Milestone Aviation Group, a subsidiary of aviation leasing specialist GE Capital Aviation Services (GECAS), to renew its medium helicopter fleet. Jon Lake reports.

In July 2018, Leonardo and Milestone signed a contract for the supply of 17 Leonardo AgustaWestland AW139 helicopters (plus four options) to Aramco.

The helicopters will include aircraft in both offshore transport and search-and-rescue configurations.

Aramco expects to take delivery of the aircraft over the next three years, starting this year.

Aramco is one of the largest operators of Leonardo's helicopters in the Middle East, having operated the AW109 light twin since 2006 and the AW139 intermediate twin-engined helicopter since 2008.

It acquired a fleet of some 17 AW139s (initially 14) to replace the Bell 214STs that had served the company for more than 20 years. They are used primarily to perform offshore transport missions in support of Saudi Arabia's oil and gas industry.

Right combination

The AW139 was selected because it offered the right combination of safety, performance, endurance, multi-mission capability, customer comfort and product support. Its outstanding one engine inoperative capabilities, even in hot and high operating conditions, made it ideally-suited to Aramco's operations.

When the aircraft were delivered, the Aramco pilots who flew the helicopters from Italy to Saudi Arabia in a 20-hour, multi-leg flight, praised the "modern technology that not only increases the safety margin by reducing pilot fatigue but also contributes to customers' egress in emergency situations, as well as their comfort and satisfaction".

Aramco's fleet renewal programme, using new AW139s, will ensure that it continues to operate advanced technology helicopters with class-leading performance, reliability, safety, versatility and cabin space. This is according to Gian Piero Cutillo, Leonardo Helicopters' managing director,

who also expressed his delight that Aramco had: "continued to put its trust in the AW139 to meet its helicopter needs".

More recently, in September 2018, Airbus Helicopters and Milestone signed an agreement to provide five H145 helicopters (previously known as the EC145T2) to Aramco. The aircraft will be delivered over the next 12 months and are being sourced from Milestone's existing orderbook with Airbus.

They will replace Aramco's AW109E Power helicopters, seven of which were received, one later being lost in service.

The older aircraft were completed and customized at AgustaWestland's facility in Philadelphia and were configured with a six-seat convertible utility interior that allows for the carriage of two litters in the emergency medical transport role. They were equipped with emergency floats with integrated life rafts that were specially developed for Aramco, and fitted with the helicopter emergency egress lighting system (HEELS) and a MaxViz EVS1000 enhanced vision system.



The A109's fully articulated rotor head gives a very smooth ride, and the retractable undercarriage makes it a faster machine, but the H145 is a superb choice for high-intensity operations like offshore oil and gas support.

Compared to the A109, the H145 offers greater cabin space and more seats, and the rear clamshell doors and flat floor confer great versatility and make loading easier. It is often believed to be more rugged, too.

Airbus claims that the H145 has the lowest maintenance costs in its class, and highlights the type's powerful engines and Helionix digital avionics suite.

Aramco currently has 24 aircraft on lease from Milestone. The company's relationship with the leasing specialist began in 2016 with the lease of three new AW139s, which represented Aramco's first helicopter lease transaction.

Milestone is the largest owner or financier of civil Leonardo helicopters in the world, and leased its first AgustaWestland helicopter in 2010. Its fleet will include more than 100 Leonardo helicopters once the Aramco AW139s are delivered.

Milestone supports around 44 customers in more than 30 countries and its helicopter fleet is valued at something in excess of \$4.5 billion. The company has a forward order book of firm orders and options with an estimated total value of more than \$3 billion.

Aramco's decision to turn to leased helicopters may, in part, reflect its desire to streamline its operations before a proposed and long-awaited initial public offering. ■

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Electric aircraft: Myth or reality?

Jetex is partnering with US start-up, Wright Electric, to revolutionise private jet aviation and support electric aircraft for short-haul flights.

Anuradha Deenapanray and Vincent Chappard look at other projects enabling people to envisage flying without using jet fuel.

The challenges surrounding CO2 emissions, noise pollution, and the price of kerosene have pushed aircraft and engine manufacturers, and airlines, to look for possible new designs and explore the potential of electric aircraft.

There are now concrete projects for electric civil aircraft that could fly between 2020 and 2027.

In 2017, EasyJet launched a project, in collaboration with Wright Electric, to put an electric aircraft into service by 2027.

Wright Electric already has a two-seater aircraft able to demonstrate how the technology works. The next step is to scale this technology up to a 10-seater and, eventually, to a single aisle short-haul commercial aircraft.

“We look forward to commercialising our electric aircraft for the large and growing short-haul flight markets,” said Jeffrey Engler, CEO and founder of Wright Electric.

Its goal is to make every short-haul flight a zero-emissions enterprise within 20 years. According to Wright, its aircraft will be 50% quieter and 10% less expensive to operate. They

would have a maximum range of 540km with a capacity ranging from 120 to 220 seats.

Jetex gave a major push to the project last April through its partnership with Wright Electric. It will be the first general aviation company globally to support electric aircraft for short-haul flights.

Jetex will implement the charging infrastructure and full support for electric jets, expanding throughout the vast Jetex Global fixed-base operations (FBO) network, starting in Dubai.

New reality

Jetex president and CEO, Adel Mardini, recently stated that his company is constantly building a new reality in the aviation industry.

For Jetex, there is a need to explore new technologies and new methods for the travel segment. Many companies from all around the world understand that this need exists and are investing in it. However, they have not considered a fundamental aspect: infrastructure.

To operate the electric aircraft it's important to find ways to quickly recharge the batteries or change them easily so that they can make multiple trips in one day.



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The Airbus E-Fan X is scheduled to fly in 2020.

comprehensive ground-test campaign on a BAE 146 flying testbed. “We see hybrid-electric propulsion as a compelling technology for the future of aviation,” explained Paul Eremenko, Airbus chief technology officer.

The E-Fan X demonstrator will explore the challenges of high-power propulsion systems on electric systems and electromagnetic compatibility issues.

Hybrid-powered aircraft

For its part, Boeing has launched a hybrid-powered aircraft project by partnering with start-up Zunum Aero and JetBlue Technology Ventures. The partners are developing a regional hybrid-electric aircraft for the early 2020s, offering unmatched door-to-door speeds and reduced costs for flights from 700 miles at launch, to more than 1,000 miles by 2030. In early October Safran was selected to provide the ZA-10 electric engine. .

For Boeing “these 10-50 seat aircraft will pave the way to a golden era of fast and affordable electric air travel, reversing the 70-year consolidation of air services”.

“We are working on the setting up of electrical charging stations, as well as on logistics like parking,” a Jetex spokesperson said. “We predict that travelling in an electric aircraft will be more convenient for the private jet travellers. This innovative aircraft will provide our busy customers with an unparalleled flight experience.”

Airbus and Boeing are also working on similar projects.

Airbus began its journey towards electric flight in 2011 with the E-Fan technology demonstrator, the world’s first all-electric two-engine aircraft to take off by its own power.

In 2015, it successfully crossed the British Channel, some 106 years after Louis Blériot’s epic flight from France to England.

In 2017, Airbus teamed up with Siemens and Rolls-Royce to launch the E-Fan X. It is scheduled to fly in 2020, following a



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QAIA was elected best airport in the Middle East in its category for two consecutive years.



Queen Alia becomes ADP's jewel in the crown

Groupe ADP, through its 100% subsidiary ADP International, has acquired the exclusive control of Airport International Group, which runs Queen Alia International Airport in Amman, Jordan.

Anuradha Deenapanray
reports.

Queen Alia International Airport (QAIA) was first inaugurated in 1985 to become Jordan's key access to the world.

Located 35 kilometres from the heart of the capital, Amman, it provides passenger, air cargo and aviation support services. It gives direct access to major business and travel destinations in Europe, Asia, North America and the Middle East, and heritage sites like Petra, the Dead Sea and the Wadi Rum Desert.

In 2007, under the terms of a 25-year concession agreement, Airport International Group (AIG) became responsible for the operation of QAIA, the rehabilitation of the airport's facilities, and the construction of a new passenger terminal.

In addition to AIG's total capital commitment of \$850 million, funding was secured through the commercial arm of the World Bank, the International Finance Corporation (IFC), the Islamic Development Bank, a syndication of commercial leaders, and shareholder equity.

By 2012, the airport was serving 6.2 million passengers.

The new Foster+Partners-designed terminal was inaugurated in 2013 with the aim of increasing passenger capacity from 3.5 million to 9 million in phase one, and to 12 million in phase

two. A few months later, ISO-certified QAIA became the second airport in the Middle East to gain airport carbon accreditation.

Groupe ADP took control of AIG by becoming a 51% shareholder in April. Its new co-shareholders are the infrastructure investment funds, Meridiam, and IDB Infrastructure Fund II. The Engineering and Development Group (Edgo) also remains a co-shareholder.

The French group has invested \$265 million consolidating its position in the region and encrusting its DNA there, especially through ADP Ingénierie.

"By becoming the majority shareholder with 51% of AIG's capital, Groupe ADP sends a strong signal. We are in Jordan for a long-term industrial project and we want to pursue the development of the airport with a greater leeway," said Fernando Echegaray, CEO of ADP International.

He sees QAIA as a jewel in terms of infrastructure and services. During two consecutive years – 2015 and 2016 – it was elected best airport in the Middle East in its category at the Airports Council International (ACI) airport service quality (ASQ) awards.

The group is exploring the

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on Page 80

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possibility of further expanding QAIA's capacity, which is well above 12 million per year today, given the growth forecasts in the short and medium term. Meanwhile, the airport's network continues to grow, which opens up new opportunities for the kingdom.

Echegaray pointed out that, despite the Syrian conflict, passenger traffic has been increasing by 6.5% annually since the beginning of the concession.

"As an airport operator, our challenge is to continuously develop traffic by encouraging airlines, through a route development strategy supported by the international network of Groupe ADP, to open new routes from Amman or to expand their activities. We have also focused on increasing non-aeronautical revenues (businesses and real estate), training and job creation for Jordanians."

Reaffirming AIG's commitment towards constantly enlarging QAIA's network, the airport welcomed Norwegian Airlines last May, marking the start of bi-weekly flights between Amman and Copenhagen. According to AIG, this move "paves the way for several more Scandinavian destinations while partnering with one of the largest low-cost carriers globally, as well as one of the world's fastest growing airlines".

Beneficial effects

AIG believes that establishing such diverse routes to new destinations will result in beneficial effects on the kingdom's tourism sector, subsequently strengthening the local economy, while providing tourists and citizens alike with more options.

"As Jordan's prime gateway to the world, we strive to facilitate comfortable, convenient and economical travel for all our passengers travelling through QAIA, by partnering with world-renowned carriers such as Norwegian Airlines," underlined airport CEO, Kjeld Binger.

He was optimistic regarding new routes and the airport's ability to maintain "a consistent growth" to respond efficiently to future demand.

Bjorn Kjos, chairman and CEO of Norwegian, said he believed in his strategy "to make travel more accessible to a greater number of people through competitive prices and quality service to passengers". The Scandinavian market is opening and growing fast and stretching further south.

QAIA further cemented its standing as an active contributor to the national economy, as well as the transport and tourism sectors, by registering a 7.5% year-on-year increase for the first six months of 2018.

The airport also witnessed an increase in aircraft movements and cargo activity by 1.1% and 1.5% respectively. Top destinations contributing to the growth were Alexandria, Antalya, Baghdad, Cairo, Doha, Istanbul, Kuwait, Paphos and Rome.

Traffic prospects in the Middle East are

interesting. According to International Air Transport Association (IATA) forecasts, the annual average growth is expected to reach 5% over the 2016-2035 period. The market will reach 517 million passengers in 20 years, creating a strong demand for infrastructure.

ADP International and ADP Ingénierie are well positioned to further penetrate the Middle East market, where they are currently running major design, extension or renovation projects.

"We got the contract for the extension of Sharjah Airport in the United Arab Emirates as a result of our strong presence in the Middle East, epitomised by our approach for more geographical proximity and a long-term



partnership with our customers," said Gratien Maire, ADP Ingénierie CEO.

The company is also present in Oman, both in Muscat and Salalah, and at four other regional airports.

In addition to the upgrading of the C satellite at Dubai International Airport, ADP Ingénierie will be in charge of extension works at the passenger terminal of the new Al Maktoum International Airport.

It also won the contract for the extension of Bahrain Airport's passenger terminal and the design of the new regional air traffic control centre.

Furthermore, Groupe ADP has a long-standing presence in Saudi Arabia. Since 2007, it has been operating and maintaining the Hajj terminal in Jeddah.

ADP Ingénierie has also designed the new Jeddah International Airport, which will be operational soon, and carried out studies and design for the modernisation of the security systems at 27 civil airports throughout the kingdom.

Upcoming opportunities

"We will look carefully at upcoming opportunities in Saudi Arabia to capitalise on our experience and know-how. Air traffic is growing rapidly around the world and the Middle East

zone is among the most active. The Lebanese Government plans to put Beirut International Airport under concession and will launch a tender, most probably in 2019, to ensure the growth of this platform," said Echegaray.

He added that Groupe ADP is very much interested in the privatisation programme under study concerning some of the kingdom's airports.

Due to its geographical location, Turkey is another country with golden opportunities. The group has, thus, decided to strengthen its stake in TAV Airports, which operates more than 15 facilities in the region, including seven in Turkey.

"This acquisition gives Groupe ADP a unique experience in international expansion and the implementation of airport concessions," said Echegaray.

Even though, currently, there's no greenfield airport project in the Middle East, all the countries need airport expertise to harmoniously combine efficiency and creativity with anticipated future challenges, while meeting immediate needs. ■

Fernando Echegaray:
"We have also focused on increasing non-aeronautical revenues, training and job creation for Jordanians."

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INA PUSHES ISTANBUL

The opening of one of the world's largest airports brings a new competitor for the existing Gulf hubs. Alan Dron reports.

By the time these words are read, the passenger terminals at Istanbul Ataturk Airport should have closed their doors for the last time.

The once-thrumming concourses will be eerily quiet, the aprons empty of aircraft, and the homeowners of the nearby residential districts will be adjusting to the unaccustomed sound of silence.

If everything has gone according to plan, at around 2pm on October 31, a Turkish Airlines captain will have opened the throttles of his Ankara-bound aircraft and become the first pilot to fly a scheduled commercial service from Istanbul New Airport (INA).

On its opening, INA will instantly become one of the world's busiest airports. With an initial two terminals and two runways (a third will open by the end of 2018) it will have a passenger capacity of 90 million annually. More importantly, it will have the space to double its runways to six and to more than double its passenger throughput to 200 million by 2030, if demand requires.

When its predecessor, Ataturk, opened its main terminal in 2000, nobody could have predicted it would need to be replaced so quickly.

Its short lifespan is due to several factors, but

a major one has been the explosive growth of its main occupant, Turkish Airlines.

Some 63 million passengers used Ataturk in 2017 – well above its design capacity and, with the national carrier continuing to expand rapidly, the airport that contributed greatly to its growth is now constraining it. Turkish is aiming to carry 74 million passengers this year and is targeting 120 million by 2023 – an astonishing rate of growth.

Reaching our targets

“Unlike the current airport that is not capable of advancing the future growth of our company in the medium to long term with regard to slot restrictions, our new home will be one of the most important factors in reaching our targets,” said Turkish Airlines’ CEO, Bilal Eksi.

There will be an immediate boost in moving from Ataturk’s two runways to INA’s three, he added. This will allow the airline both to add new routes to its network and to increase frequencies on existing ones.

The additional capacity will also help improve Turkish Airlines’ on-time performance, he added. This has become an increasing problem at Ataturk due to the growing congestion there.

A further factor in improving efficiency will be the greater number of airbridges used to board

and disembark passengers. At INA, 80% of passengers will be able to emplane directly from the terminal through around 90 airbridges, rather than having to be bussed to remote stands.

“Turkish weren’t able to put peak arrivals on top of peak departures for the banks of flights they were trying to put together,” said Kata Cserep, vice-president of airports at international consultancy ICF. Whereas some countries have tried to increase airport capacity by expanding their existing airports, Turkey decided to go for a completely new site; this will set up Turkish Airlines for long-term growth, she added.

Much of ICF’s work involves behind-the-scenes ‘number-crunching’ and Turkish and the ‘Middle East 3’ of Emirates, Etihad and Qatar Airways “have grown spectacularly in the past 15 years”, noted Cserep. “By historic standards, it’s unprecedented growth.”

She added that her understanding was that expansions to INA’s basic 90 million passenger capacity would take place when ‘traffic triggers’ were reached: “For example, when the new airport reaches 80 million per year, they may start constructing the next phase to take it smoothly over the 90 million mark.”

However, despite the greater number of airbridges, some airlines – particularly low-cost carriers – will prefer to continue to operate from remote stands, as this entitles them to reduced airport fees, she said.

As for Ataturk, the fate of the old airport is currently uncertain. In the past, president Recep

Day and night. Istanbul's new airport will open for business soon.



ON TO WORLD STAGE...

Tayyip Erdogan has talked of the government building a large 'people's garden' on the site. However, given its location close to densely populated Istanbul, Cserep thought it more likely the site would be redeveloped for residential or business purposes.

Although the ceremony formally opening INA was due to take place on October 29, the switchover of operations from Ataturk to INA was scheduled to begin at 3am on October 30 and end at 11.59pm on October 31.

Thousands of airport vehicles travelled by road to their new home, the climax of months of logistical training sessions covering more than 50,000 people and several increasingly large training scenarios over September and October that built up to using 5,000 volunteer 'passengers' and more than 1,000 airport staff to test INA's new systems and procedures.

The last of these tests included putting 10,000 items of luggage through the 42km-long baggage handling system that will, at maximum capacity, be capable of handling 30,000 items an hour.

"The move to Istanbul New Airport will be the biggest ever airport transfer in the world," INA's CEO and general manager, Kadri Samsunlu, told the Turkish press in September. "There have been no airports transferred further than 45km in the world. At this point, we have finished the training of airlines, particularly Turkish Airlines, ground services and other stakeholders, all in order to ensure their orientation to the airport."

During the switchover, more than 170 of Turkish Airlines' 300-plus fleet were scheduled to transfer without passengers from Ataturk to INA and other airports. Aircraft that departed Ataturk before the switchover began were due to land back at INA on their return flights.

However, the first passenger aircraft to officially land on INA's runways did so in June, when a Turkish Government Airbus A318 executive jet, carrying president Erdogan, touched down to the traditional water arch salute. The president disembarked, thanking airport workers for their efforts in readying the huge facility so quickly, and declaring that INA would be of benefit not only to the country but also to the world's travelling public.

Four phases

The airport's operating company says that once all four phases of airport construction are completed and the facility is operating to its full potential, it will contribute 5% of the nation's GDP.

Does this make INA a major competitor to the major Gulf hubs – Dubai International, Dubai World Central, Abu Dhabi International and Hamad International? "Without a doubt," said Cserep. "If you speak to Turkish Airlines, they already consider themselves as part of a 'Middle East 4'. They operate exactly that model and that vision of connecting the world over their hub.

"Their top market is western Europe; long-haul, it's into Asia and Africa, and they are at

least as well-located, if not better located [than the Gulf airports], for some of those larger flow markets.

"They do differ, in that they have a much higher proportion of short-haul aircraft than the Middle East 3. They have many more destinations in the Middle East and near East, including the very large Turkish domestic market. That's a key differentiator to the Middle East 3."

With more than 30 regional airports and a large, young, population of more than 80 million, aviation has been replacing long-distance buses as the preferred means of long-haul domestic travel over the past decade.

Supplying the airport with enough fuel for the huge number of flights it will handle has seen INA adopt the unusual solution of creating a dedicated marine terminal. Tankers will offload fuel at the terminal, from where it will be piped 12km to the airport. If this method had not been adopted, more than 300 fuel tankers would have to travel by road to INA every day.

Generally, Cserep added, the international travelling public were "quite indifferent" regarding which hub they used to connect for long-haul flights. They looked first and foremost at the price of tickets and the shortest total journey time. So Gulf airports enjoy no particular advantage, despite their high standard of facilities.

In Turkish Airlines, the Gulf carriers already have a formidable competitor. Now their hub airports have one, too. ■

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Will runway closure awaken Dubai's slumbering giant?

In May 2019, Dubai International Airport is closing one of its two runways for 45 days. Alan Dron wonders if this will encourage airline customers to try out the under-used Dubai World Central?

Dubai World Central's (DWC) long-term plans call for it to be the world's largest airport, capable of handling 240 million passengers by 2040-2050. At present, however, its annual passenger throughput is rather more modest; in 2017, it handled just 905,000 travellers.

That has not stopped Dubai Airports, which operates both DWC and Dubai International Airport (DXB), from completing the first major phase in DWC's expansion, taking its capacity to 26 million.

That may seem a huge amount of over-capacity, but Dubai Airports believes it will be needed in coming years and wants to be ready. "We don't want the capacity of our facilities to slow down the growth of the aviation sector," said Khalil Lamrabet, director of aviation business management at Dubai Airports.

Anyone who uses DXB regularly knows how busy it can be, particularly in the small hours of the morning. Despite major expansion programmes over the years, DXB can only now improve the efficiency of its existing terminals and runways, as nearby roads and residential districts make physical expansion of the site impossible.

Major components

Dubai's two airports are major components in the emirate's plans to have the aerospace sector provide an astonishing 45% of its GDP by 2030. For that reason, DWC provides vital additional capacity that will be required sooner or later.

But how soon? Although DWC has been open for passenger flights since October 2013, it currently handles only around 150 flights a week, a figure that some major airports would reach in two to three hours.

Next May, one of DXB's two runways is scheduled to close for resurfacing for 45 days. Will the resulting inevitable short-term reduction in capacity encourage some airlines to move at least some of their services to DWC – and perhaps even stay there after the runway reopens?

"It may give them the nudge that they need," said Kata Cserep, vice-president, airports, of international consultancy ICF. In her experience, she said, airlines tend to have a built-in inertia against moving from their existing airports, particularly if they are hubs.

Reasons not to move can include having all their ground support services at their existing airport and not wanting to be the 'odd one out' by moving to a new site.

Even airlines that flew to DXB as just one spoke in their networks still benefited from being in the proximity of other airlines, where passengers could make connections, she said.

That proximity could mean that they picked up an extra half-dozen passengers from going through that hub.

First mover advantage

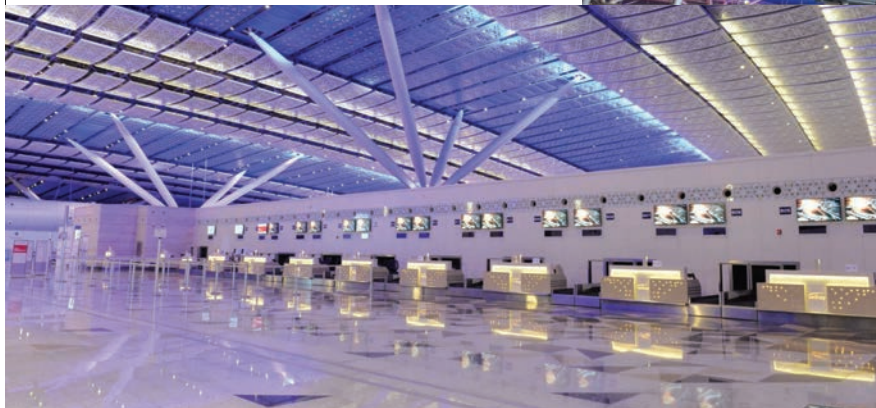
One factor that may encourage airlines to opt for Dubai World Central, she suggested, was 'first mover advantage'. An airline that moves into a new airport at an early stage in its development can pick up the best arrival and departure slots.

Lamrabet noted that an 80-day runway resurfacing at DXB in 2014 led to 13 carriers moving a portion of their flights to DWC for the duration. At that point, DWC had only been accepting passenger flights for a year. Today, with the benefit of four more years' experience under its belt and far larger infrastructure in place, he is confident that more airlines will move at least some of their operations to the new facility.

However, Dubai Airports will not attempt to dictate to airlines that they should move their operations – such a decision has to be made by the carriers themselves, he said.

New operators flying into Dubai for the first time were more likely to opt for DWC, he believed. Those ensconced at DXB were more likely to split their flights between the two airports, rather than move their entire operation to the sleeping giant on the southern side of the city. ■

SITA is powering up for the IT advances at Saudi Arabia's major gateways.



Growth drives high-tech boost

A major renewal of the technological infrastructure at Saudi Arabia's airports is under way.

Alan Dron
reports.

The Saudi aviation regulator, the General Authority of Civil Aviation (GACA), has asked Swiss IT provider SITA to install new airport management and communication technologies at 26 sites in the kingdom. The aim is to help the airports manage the rapidly increasing numbers of passengers using the facilities.

The liberalisation of Saudi Arabia's domestic airline market, which has seen three new carriers open their doors over the past two years, is leading to growth of the marketplace as more citizens are enticed to fly, rather than drive, between cities.

In addition, the country is experiencing substantial growth in religious tourism, particularly through Jeddah and Medina airports, growth that is expected to continue in coming years.

Overall, passenger traffic through the country's airport network grew to 92 million in 2017, a 7.7% rise over 2016.

"GACA has mapped out a clear future for Saudi airports, enabling us to meet our continued passenger growth while maintaining the world's best airport facilities," said Abdulhakim bin Muhammad Al-Tamimi, GACA's president.

SITA "have worked closely with us to implement our requirements for each airport and provide the right solution".

A major boost to the country's airport capacity is arriving with the gradual opening of the new terminal at King Abdulaziz International Airport at Jeddah, the nation's commercial centre. The existing terminal is recognised as having become increasingly overcrowded in recent years and is operating well beyond its design capacity.

The new airport is in the midst of a multi-month 'soft opening', during which time more flights will gradually be

transferred to it. The airport is due to be fully open by early 2019 and will initially be able to handle 30 million passengers a year, with future expansion phases able to increase that figure to 80 million.

To help make the most of the new terminal's potential, SITA is deploying several systems there.

It is installing its airport management technology and flight information display system to provide real-time information across the airport that will help managers make the best possible use of resources. These will assist the airport's operations personnel to anticipate events before they occur and allow them to plan for them. The airport management system will also be rolled out to 21 further Saudi airports by the end of 2018.

Jeddah's new airport is also the site for the introduction of SITA's Airport iValidate gates, which authenticate travellers' documents and speed up passenger processing by verifying all types of boarding passes, including those previously printed at the passengers' home or held in electronic format on their mobile devices.

This system will also be introduced at Riyadh's King Khalid International Airport.

Self-service kiosks

Across GACA's network of airports, meanwhile, SITA will install its AirportConnect open platform, which allows the use of common facilities for passengers checking themselves in at self-service kiosks. This will include the provision of biometric single-token travel and common-use payment systems.

Passengers will also have their airport experience significantly improved by the installation of two new systems.

Connectivity will be improved by the installation of new wide area network and local area network systems, which will enable travellers to connect to the internet more quickly and easily. Additionally, baggage-handling will be improved by a new system that will assist airlines' ability to track luggage from check-in, through loading on to aircraft, transfer at intermediate airports, and eventual delivery to travellers at their destinations.

"Our investment in new technology underpins the development of smart airport infrastructure across Saudi Arabia and is an important part in realising GACA's strategy of improving the passenger experience across its airport network," said Engineer Suleiman Al Bassam, GACA's vice-president for information technology & telecommunications.

"Time and again, we have seen how technology can transform an airport, improving the flow of passengers and, therefore, elevating the whole airport experience," added Hani El-Assaad, SITA's president, Middle East, India and Africa. ■

TUNISIA EVOLUTION IN FULL SWING

Tenders for a feasibility study into a new international airport for Tunis are expected to be launched soon, writes **Vincent Chappard**.

Tunisian Minister of Transport, Radhouane Ayara, recently announced the construction of a new international airport for an estimated cost of €690 million (\$809m). It will cater for 10 million passengers by 2030.

With a brighter economic outlook and the country's security situation improving, passenger traffic is on a steady increase. Plans for 'open sky' agreements make prospects for the segment even better.

"We are enjoying great momentum at most Tunisian airports and are confident regarding the evolution of air transport," said Mohamed Walid Ben Ghachem, director of communication and public relations at the Tunisian Civil Aviation & Airports Authority (OACA).

OACA is a public body in charge of the management, development and operation of the country's seven international airports – Tunis-Carthage, Djerba-Zarzis, Sfax-Thyna, Tozeur-



Tunis-Carthage International has been operating well over capacity for several years.

Nefta, Tabarka-Ain Draham, Gafsa-Ksar and Gabès Matmata. It recorded a 13% increase in passenger traffic from January to May.

Tunis-Carthage International captures 80% of national traffic. According to forecasts, it is expected to accommodate around 6.5 million passengers this year.

However, it has been operating well over capacity for several years. The imminent start of modernisation works, as part of the 2016-2020 development strategy, should bring some relief.

"The extension of the terminal with an

enlargement of the check-in areas and a new baggage sorting area will allow the airport to accommodate 7.5 million passengers by 2020/2021 and streamline the flow of passengers," said Ghachem.

Upgrading of airstrips at Djerba and Gatsa airports is also part of the development strategy.

OACA banks on the know-how of its staff and training to acquire international expertise.

Africa remains a potential market for Tunisia. The country also projects to develop its air freight.



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Dr Ramin Khadem:
“There is now a huge opportunity to colonise lunar bases within the next 20 years.”

PICTURE: PHILIP GABRIEL
 PHOTOGRAPHY.

Moon bases could be on the horizon

One of the founding fathers of the satellite industry says we can expect to see a lot more innovation in the space sector, including manned colonies on the moon and space stations that could be used as stepping stones for future Mars missions. Steve Nichols reports.

Dr Ramin Khadem, who helped to set up Inmarsat back in the 1980s and had 25 years’ service with the company, now lives in the UAE. He says the discovery of water ice at the Moon’s poles means we now have a source that could support life, or even be used to produce rocket fuel.

“There is now a huge opportunity to colonise lunar bases within the next 20 years and set up space stations at the Lagrange points between the Earth and the Moon,” Khadem said.

The Lagrange points are those where the Moon and Earth’s gravity balances so you have a stable orbit.

Khadem, a former chief financial officer with Inmarsat who was involved in its transition to a public company, now acts as a consultant to the space industry and is an independent board director for a number of enterprises.

He says this is also an exciting time for the satellite industry, with up to 11 different proposals on the table for mega constellations of low-Earth orbiting (LEO) satellites, plus rising interest in smallsats and cubesats.

So does he think these are a threat to the conventional geostationary satellite market?

“The order numbers for geostationary satellites are

reducing and everyone wants to get into the smallsat business, so potentially it could be,” Khadem said.

“It only takes three or four geostationary satellites to provide global operations, so your commitment is not huge. It is big, but it is not like the multiple billions required for comprehensive low-Earth orbit constellations.”

For example, in 2015, OneWeb set a goal of building 900 satellites for \$500,000 each or less, with the total estimated cost of building, launching and operating the constellation at \$3.5 billion.

Speaking in September at Euroconsult’s World Satellite Business Week conference, OneWeb president and chief operating officer, Eric Béranger, refused to confirm its satellite unit costs or total programme costs despite industry speculation that both have grown well beyond the starting estimates.

“We do not communicate about the overall cost of system,” Béranger said during a panel discussion.

Béranger said the satellites are “below \$1 million” per unit but wouldn’t be drawn further.

Thousands of spacecraft

Elon Musk’s Starlink network, being developed by SpaceX, will comprise thousands of spacecraft providing a broadband internet service to people around the world, but will also likely cost “billions of dollars”.

Khadem warns entrepreneurs that any scheme they come up with has to be sustainable financially.

“The question is as how many of these projects are really viable and how much money needs to be thrown at them, not to mention spectrum needs and coordination of its use worldwide,” he said.

Khadem also says the UAE’s space industry is a perfect example of what you can achieve if you are focused on what you want. He says it is an inspiration to Emirati youngsters and a beacon for the region.

“I was at a conference in New York recently and was amazed at the number of people who came up to me to talk about UAE’s achievements and its future plans, including the ‘Hope’ Mars probe, which will study the planet when it arrives seven months after its launch in 2020,” said Khadem.

“The UAE Space Agency was only set up in 2014, so this is an amazing accomplishment. It is an inspiration to young Emiratis and the science, technology, engineering and mathematics (STEM) opportunities available from this and the other projects are invaluable.”

Khadem is no stranger to inspiring the next generation of space entrepreneurs.

For several years he served as chairman of the board of trustees of the International Space University (ISU), based in Strasbourg, France and as chairman of Odyssey Moon Limited, the first team to register for the Google Lunar X Prize competition in 2007. ■

The UAE is gearing up to put the first Emirati astronaut into space.

Steve Nichols has been finding out more.

UAE SET TO NAME ITS FIRST FOUR ASTRONAUTS

Earlier this year, the UAE signed an agreement with the Russian Federation to send the first UAE astronaut to the International Space Station (ISS).

In March, the UAE Space Agency signed a letter of intent with both Russia and Kazakhstan to cooperate in various fields of space exploration and to collaborate on future space projects.

The signing took place at the Baikonur Cosmodrome in Kazakhstan, where the UAE delegation also witnessed the successful launch of the Soyuz MS-08, a manned spacecraft carrying crew and equipment to the ISS.

A recruitment website set up by the Mohammed Bin Rashid Space Centre says it expects to make an announcement as to the final four candidates chosen for the Emirati astronaut corps by the end of 2018.

In June it said the UAE astronaut programme had shortlisted 95 potential astronauts from more than 4,000 applicants. Seventy-five of the shortlist are men and 20 are women.

By the time the final announcement is made, the candidates will have undergone medicals and psychometric testing, as well as attending panel interviews.

The website encouraged interested applicants to “carry the pride of the nation as you make history and become the first UAE national to go to space”.

Basic training

Once the astronaut corps has been selected, basic training will begin. This starts with a one-year module that provides an overview of the UAE space programme, and the foundation learning of disciplines, such as space engineering and scientific research.

As the basic training progresses, the astronauts will go on to learn about life aboard the ISS, which includes learning about procedures and systems, as well as the launch process.

The final components involve training for a spacewalk or extra vehicular activity (EVA) – which is conducted underwater – rendezvous and docking, and performance training. This is expected to continue until 2020.

Advanced training will then run for one to two years and covers disciplines crucial to day-to-day life on the space station. These include operations, maintenance, and payloads.

Specialist skills will also be learned during the course of the year that relate to robotics, EVA, navigation, medical and resources.

The training will also include mission-specific operations, where the astronauts will learn how to conduct different scientific experiments.

Mohammed Nasser Al Ahababi, director general of the UAE Space Agency, said the agreement put the UAE “on the threshold of a new phase of its vision for the space sector”.

“A few months have passed since the launch of the UAE astronaut programme until we found ourselves today being able to choose the best candidates,” said Al Ahababi. “This



“The UAE is on the threshold of a new phase of its vision for the space sector.”

**MOHAMMED NASSER
AL AHBABI**

was achieved in a record time that was admired by the world.

“The UAE team of astronauts will play a major role in spreading the message of good, peace and tolerance borne by the UAE to the world, as well as scientific and research contributions through participation in various manned space missions and scientific experiments.”

Visit space

There is some confusion over when the first Emirati will visit space. The astronaut training website suggests this won't be until at least 2021. But a Roscosmos announcement said it could be as early as April 2019 – it is unlikely that the astronaut training could be completed that quickly.

The UAE Space Agency has also announced a paid internship programme with the National Aeronautics and Space Administration (NASA) that will see a number of highly qualified UAE students work alongside students from the United States.

The NASA international internship programme provides an environment for US and non-US university undergraduate-level or graduate-level students to work collaboratively on NASA-relevant research with a mentor at the NASA – Ames Research Center in Moffett Field, California.

The programme, which is open to UAE citizens and is being fully funded by the space agency, offers 13 projects that students can choose from covering everything from microsatellites, orbital mechanics and biosensors to life-support systems.

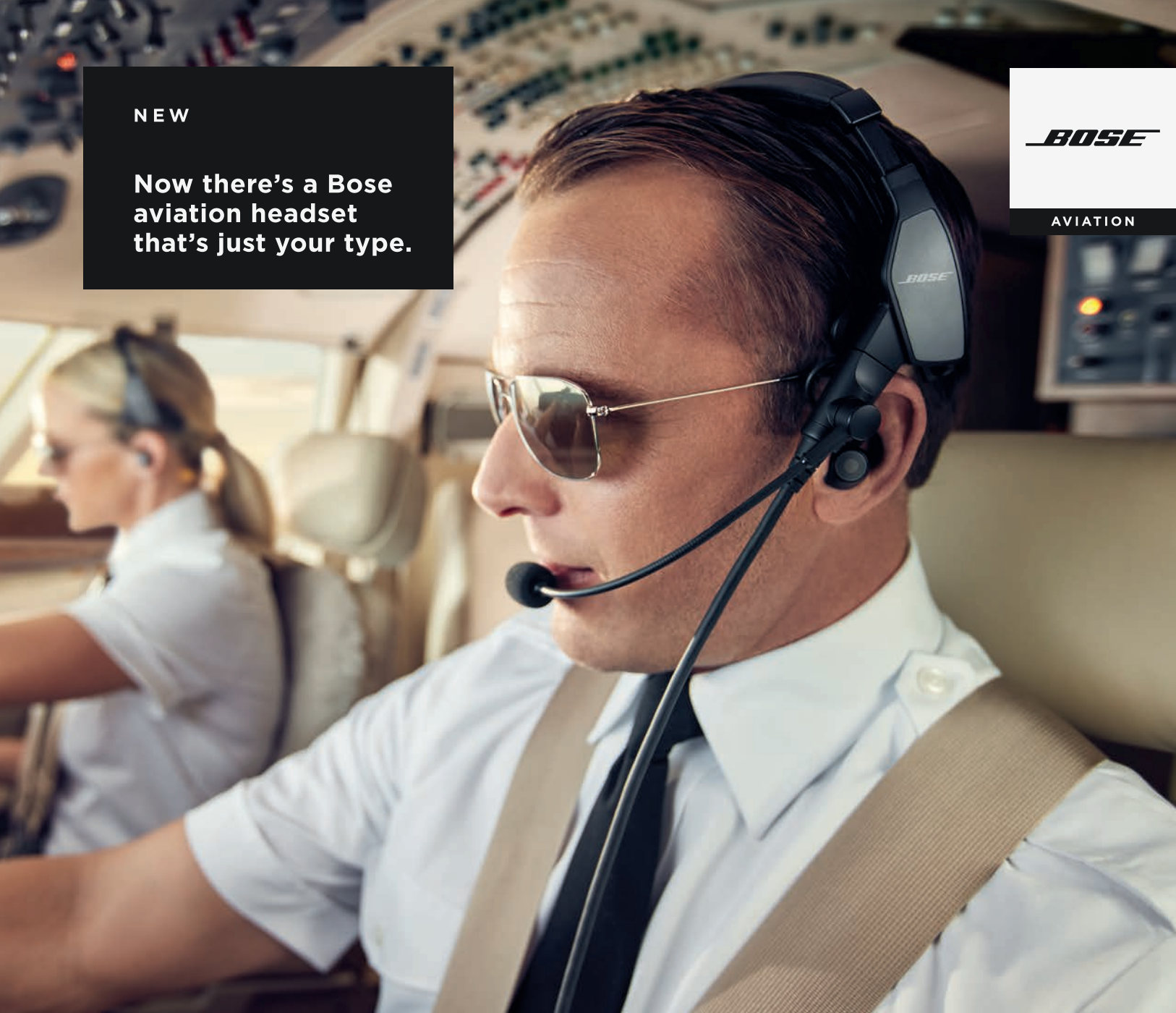
The internships will run from January to April 2019. ■

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Summit for everyone as Kigali hosts Aviation Africa

The successful Aviation Africa Summit & Exhibition takes place in February. Alan Peaford reports.

Africa remains one of the greatest potential markets for air transport in the world – and with centuries of trading links between the Arab world to the north and east, sub-Saharan Africa offers a host of opportunities for Middle East and north African airlines and aviation services.

In February, companies from Egypt, the UAE, Saudi Arabia, Sudan, Tunisia and Qatar will be among those heading to Rwanda's capital, Kigali, for the annual Aviation Africa Summit and Exhibition.

The event – which is run by Times Aerospace, the owners of *Arabian Aerospace* – began in Dubai four years ago. The UAE was selected because of its hub status and ease of visa rulings.

Visa-free entry

This is a philosophy shared by Rwanda, which offers a visa-free entry to African countries and entry on arrival to others, said Times Aerospace managing director Mark Brown. “The beauty of this means that we have visitors, speakers, exhibitors and key government delegations coming from all over Africa,” he said.

The February 27-28 2019 event is also co-located with the African Air Chiefs Conference, which, as a non-aligned event, will see the top staff from African air forces meeting manufacturers and service providers from the US, Russia, China, Europe and South Africa.

The International Air Transport Association (IATA) chairman, and the CEO of Qatar Airways, Akbar Al Baker, will be centre stage for the air transport segment of the summit.

“Qatar is one of the airlines that has been expanding



CEO of Qatar Airways, Akbar Al Baker, will be centre stage for the air transport segment of the summit in Kigali (above). PICTURE: VISIT RWANDA

into Africa in recent years,” Brown said. “There has often been concern expressed by African airlines about the growth of non-African airlines, but I think many of them may not have heard Mr Al Baker share his views. I know they are in for a treat.”

Airline leaders from across Africa – both from English-speaking and Francophone countries – will be talking at or visiting the summit, which will be addressing issues such as protectionism, search and rescue, infrastructure, airline finance, aviation services and regulation.

There will also be a chance to hear from Dr Adriana Marais, who has been selected to be among the first to have a one-way-ticket to Mars to establish a settlement on the Red Planet. Details of the event can be found on www.aviationafrica.aero

WHY MEASA IS THE REGION TO WATCH

The Middle East/Africa/South Asia (MEASA) Aviation Show takes place at The Ritz-Carlton in Dubai on November 13-14. Marcelle Nethersole reports

Show organiser, Terrapinn, sees MEASA as an important region for aviation.

“This is the MEASA region's only conference offering something for every airline and airport department, from low-cost travel to millennial marketing, from air retail to IT infrastructure,” said Jamie Hosie, general manager.

“MEASA is set to be the fastest-growing aviation ecosystem of the world for the coming year, with the highest growth in terms of both new airline capacity and revenue passenger kilometres.

“The event is a dedicated platform for the entire aviation ecosystem to come together to learn, connect and build relationships with key stakeholders in the industry.”

Visitors can expect conference streams including

innovative business models, airport security, new regions and routes, and brand strategy. The event looks set to host the “largest” regional gathering of C-level executives, as well as interactive round tables, and international case studies.

“One major topic of discussion is how technology is changing the future of aviation – it already has done and will continue to do so,” said Hosie.

“Twenty years from now, technological advancements will be hundreds of thousands to a million times more advanced and, as the industry continues to expand, the future of the aviation business requires airlines and airports to provide original, fresh and dynamic offerings to communicate and engage with 21st century millennial travellers.”

The event has more than 100 speakers confirmed

including: Mohammed Ahli, director general of Dubai Civil Aviation Authority; Thierry Antinori, executive vice president and chief commercial officer of Emirates; Stefan Pichler, chief executive officer of Royal Jordanian Airlines; and Chadi Abou Daher, director of customer services, Middle East Airlines (MEA).

On November 12 the organisers will also host Africa briefing day.

“The African aviation market is thriving,” said Hosie. “With increasing population growth, higher demand for low-cost travel and the newly announced single connected sky to increase exposure to new regions, there are plenty of opportunities and disruptors to be discussed and debated at this event.”

The 2018 Airline Passenger Experience Association (Apex) Expo Exhibition and Education Conference took place in Boston, USA, in late September, attracting more than 5,000 visitors. Steve Nichols was there.

Apex hits the heights

A number of prominent airline CEOs made keynote presentations at the conference on the eve of the main exhibition.

They included Doug Parker, chairman and CEO, American Airlines; Stephen Kavanagh, CEO and executive director, Aer Lingus; Andrés Conesa, CEO, Aeromexico; Claudia Sender, CEO, LATAM Airlines Brasil; and Calin Rovinescu, president and CEO, Air Canada.

Untypically this year, there were no presentations by members of Middle Eastern airlines.

Topics included the importance of using net promoter scores (NPS) to monitor an airline's performance, the rise of in-flight connectivity as a must-have for passengers, and the threat of rising oil prices on airline profitability.

Sender, Brazil's first-ever female airline CEO, summed up the conference when she said her airline didn't just exist to be profitable, but was there to boost the region, both in terms of its economy and attractiveness to tourists.

The Middle East was recognised in the 2018 Apex Awards, which were presented on the eve of the expo.

Flydubai scooped the 'best cabin innovation' trophy for its Boeing 737 cabin. It also collected the award for 'best passenger comfort innovation'.

The judges praised Flydubai's "luxurious fabrics, long-haul seats in economy class, the first fully lie-flat business-class seats on a Boeing 737 and highly coordinated design in every aspect of the cabin interior".

For the second year, airline passengers were

also able to rate their flight experience on a five-star scale through the TripIt by Concur app. Middle Eastern airlines receiving a five-star rating were Etihad, Emirates, Qatar and Turkish.

Gulf Air, Oman Air and Royal Jordanian scooped four-star ratings in the major regional class.

In the passenger choice awards, Qatar Airways won 'best cabin service and best food and beverage' while Emirates took 'best entertainment'.

The expo itself, co-located with the International Flight Services Association Conference and Expo, and the Aircraft Interiors Expo, attracted more than 5,000 industry professionals, including representatives from nearly 100 airlines and 300 content providers, original equipment manufacturers, systems manufacturers, and other industry suppliers.

Big surprise

One big surprise was the announcement, just before Apex, that Inmarsat and Panasonic Avionics have agreed a new strategic collaboration, for an initial 10-year period, that enables them to combine services to offer broadband in-flight connectivity (IFC) paired with solutions and services to customers in the commercial aviation industry worldwide.

Panasonic will now be able to offer Inmarsat's high-speed, broadband connectivity service, GX Aviation, powered by Global Xpress.

Inmarsat and Panasonic have always been big rivals with frequent "wars of words" about their perceived "shortcomings" of each other's offerings.



Claudia Sender: "My airline is there to boost the region, both in terms of its economy and attractiveness to tourists."

But they say this collaboration will enable airlines, aircraft manufacturers and passengers to benefit from their combined expertise. Under the terms of the agreement, Inmarsat will become Panasonic's exclusive provider of its IFC for commercial aviation.

Panasonic says this doesn't mean it is giving up on its existing Ku-band eXConnect products, but quite how this will pan out in the future is unknown.

Panasonic says it will continue to invest in its own Ku-band network, with GX Aviation as a primary offering for new business.

Middle Eastern customers that currently use both Panasonic and Inmarsat's IFC products include Qatar, Etihad and Emirates.

As if to underline its commitment to Ku installs, especially in the Middle East, Panasonic Avionics announced an agreement to provide inflight entertainment and connectivity (IFEC) solutions for EgyptAir's new fleet of 15 A320neo aircraft.

Panasonic's X-Series IFEC platform was selected by the carrier to be line-fit installed on the new narrow-body aircraft, with the first aircraft due to enter service in 2020.

EgyptAir's passengers will enjoy 13in HD personal screens in business class complete with a video handset and high-power charging facilities at every seat. In economy, each passenger will have a 10in HD screen incorporating a USB power point, with charging facilities at each seat group.

Passengers will also be able to stay connected with Panasonic's in-flight Wi-Fi service, with fast



Jan-Peter Gaense, head of passenger experience products and solutions at Lufthansa Systems, who provided the FlyingLab.



Gregory Ouillon, chief technology officer, SITAOnAir: more "internet of things (IOT)" applications for airlines in the near future.

internet and video streaming, powered by its new satellite modem that offers bandwidth up to 20 times greater than previously.

EgyptAir's passengers will also be able to enjoy a host of other amenities, including in-flight shopping options and 3D flightpath moving maps.

Kontron announced its integrated IFEC equipment has been selected by digital solutions partner, Immfly, for deployment on Pegasus Airlines, a Turkish-based low-cost carrier.

Kontron and partners will supply all hardware for the system, with equipment being installed over the next two years on Pegasus' A320s and B737s – a current fleet of 81 aircraft.

Software and media platform

Immfly has developed a software and media platform for eCommerce, entertainment and connectivity on board aircraft that allows passengers to purchase last-minute activities and schedule transport for their destination mid-flight and at a special price.

The channel also offers more than 100 types of sponsored entertainment (including TV programmes, newspapers and news channels) along with travel guides for principal European destinations.

Digitalisation was a common theme at the expo, with a number of exhibitors showing how analysing passenger data can help airlines target better in-flight entertainment, duty free and even food options.

Companies including Thales, Panasonic Avionics, and Blackswan, said they are all

looking to "big data" to provide passenger-targeted solutions for the world's leading airlines.

Lufthansa and Lufthansa Systems got into the expo spirit by transporting 150 delegates from Munich to Boston for the event aboard its special Airbus A350 FlyingLab.

During the flight, passengers were invited to live-stream presentations given on board by various industry leaders using Lufthansa Systems' BoardConnect in-flight connectivity solution and a Panasonic Ku-band satellite connection. Passengers could also experience some of the latest innovations, including SkyLights' AlloSky VR headset.

The flight proved so popular that Lufthansa announced it plans to do a similar flight from Frankfurt to Los Angeles, using an Airbus A380 as its FlyingLab, for the 2019 Apex expo.

Jan-Peter Gaense, head of passenger experience products and solutions at Lufthansa Systems, said the FlyingLab provided the company with an excellent way to demonstrate its latest developments in a real-life environment.

SITAOnAir also announced it had forged a deal with mobile network operator, Etisalat, for in-flight cellular services being offered to airline passengers.

The partnership with the UAE-based telecommunications company means subscribers to Etisalat's business roaming packs, who fly with any airline using SITAOnAir's Mobile ONAIR network, will now be able to use their data and minutes in flight as part of their bundle at no extra cost.

It says the roaming agreement offers consumers a "stress-free, seamless mobile connectivity experience", whether they use their mobile on the ground or in the air.

As in-flight technology evolves from 2G, 3.5G and 4G networks, it says the agreement also represents a positive step in preparing for future in-flight connectivity provision from the UAE.

Gregory Ouillon, chief technology officer, SITAOnAir, said it was also working on digital applications for airlines and pilots, including electronic flight bag updates and the ability to download quick access recorder (QAR) flight data off the aircraft at the gate using a cellular connection.

Cargo temperature monitoring

Ouillon added that we can expect to see more "internet of things (IOT)" applications for airlines in the near future, including cargo temperature monitoring.

He said a typical use case might be for monitoring high-value vaccines in the cargo hold that must be kept below certain temperatures.

"Monitoring them, while in flight, might mean that new vaccines could be ordered ahead of the aircraft landing should they go above a critical temperature," Ouillon said. "We can expect a big rise in the number of IOT applications for airlines in the future.

"This is a good example of how the in-flight connectivity connection off an aircraft can add value beyond just passenger internet use."

Next year's Apex expo will be hosted in Los Angeles on September 9-12. ■

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The new Bodrum facility will allow AMAC to concentrate on business and VIP aircraft in the summer, and commercial aircraft in the winter.

AMAC pioneers MRO mixed model

*The Turkish Riviera may seem a strange place for a maintenance, repair and overhaul (MRO) operation, but AMAC Aerospace is convinced it has found the right strategy to make it pay off. Group executive chairman and CEO, Kadri Muhiddin, spoke to **Chuck Grieve**.*

The gateway to the Turkish Riviera on what's known as the Turquoise Coast is Milas-Bodrum Airport – and AMAC Aerospace has high expectations for its new MRO facility there.

Swiss-based AMAC celebrated the opening of its new 4,600sqm hangar in July. It's the first MRO facility at this growing airport on Turkey's south-western Mugla Province, which AMAC's chairman and CEO predicts will become a regional hub for aircraft maintenance.

As he explained, the “whole world” descends on Bodrum in the summer. During those six months, the airport clocks up about 2,500 rotations of corporate aircraft and the same number in commercial movements.

“We're the only maintenance facility on site,” he added. “We decided to start a small hangar with a single Boeing 737 bay. We've ended up with a hangar with bays for three 737s or one wide-body.”

He said the AMAC strategy is a “new model in the aviation world, where a VIP MRO expands to do commercial maintenance as well”.

The new Bodrum facility will allow AMAC to concentrate on business and VIP aircraft in the summer, swinging over to line and base maintenance on commercial aircraft in the quieter winter months and then back again to VIP as traffic picks up.

AMAC is counting on attracting private jet owners in the Middle East, who would otherwise

have to fly to an MRO in Europe. “We will be able to carry out the maintenance for all aircraft – from small jets to wide-body aircraft – while aircraft owners holiday,” he said.

While AMAC is developing its mixed business model, the landscape for heavy and light maintenance visits on the commercial side is also changing. Muhiddin is not convinced; nor is he worried about competition.

More aggressive

“We're seeing bigger airlines getting more aggressive to reduce maintenance costs,” he said. “They adopt their own schemes, which are approved by their authority. Where aircraft used to have a full overhaul every eight years, these checks are being integrated with the annual checks.

“Instead of 6-8 weeks on the ground with major checks, now they're reducing the time on the ground to 3-4 weeks.

“I can understand why they want to use every minute to fly – they compete on volume, not like the ‘good old days’ when ticket prices were high and revenues more predictable. Today, every penny they save is important to them.”

But, he said, this approach to MRO has an impact on aircraft and engines. In the corporate aviation world, owners tend to take a personal interest in their aircraft and its maintenance programme. “I'm not saying commercial [owners] don't,

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on Page 96

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but the route they take to maintaining the aircraft is shifting. We'll have to wait and see if it's better or not."

He was not concerned about potential competition from original equipment manufacturers (OEMs) in the aftermarket, branding it "probably just talk – in my view".

Airbus, he said, had already tried offering a one-stop-shop for aftermarket services with discounts on maintenance but had been unable to entice owners and operators. "MROs have to build bridges of trust with their clients. Once that's established, why would a client want to go elsewhere?"

Muhiddin, himself, has spent the better part of 42 years building those bridges – ever since he graduated from Bristol Technical College with a degree in aeronautical engineering from Kingston University in London. He's proud to say he's still current on all his licences.

After working for Iraqi Airlines from 1977-79, Kuwait Airways from 1980-90, and a UK MRO, in 1991 he set up his own consultancy, Gamit Ltd, in England. It manages heavy maintenance, freighter conversions, buying, selling and salvaging aircraft, spare parts supply worldwide, technical representation and now digital record archiving.

Those experiences taught him important lessons about customer expectations: service is paramount, even if, on occasion, it costs you a little.

More aggressive

Though AMAC is "the world's biggest privately-owned MRO", it retains many of the attributes of a smaller organisation. It has a flat management structure; the doors in its C-suite are always open; employees don't need an appointment; when what they need is an answer, they get one.

Such an approach leads to enviable corporate agility. "While other people are still thinking about something, we've done it," said Muhiddin. "We confer and take decisions in 5-10 minutes. We're always going forward in quick steps.

"I can give approval to do something worth millions on the phone. So can my management team.

"I don't think we take better decisions; we just take them instantly to suit the occasion. Others may take months, and meanwhile the customer is waiting.

"We rarely get it wrong, but when we do, we take responsibility for that decision.

"If we make a decision and we lose money on it and we have to write it off, we will. The customer will come back and if we are lucky we may make it up on the next job, but what's important is our customer's satisfaction.

"The feedback we get in the market is that customers like our quality, performance, delivery on time and on budget. We're happy that our clients recommend us."

Word of mouth has driven AMAC's growth over 10 years. It has branched out to six sites and

**AMAC has branched out to six sites and seven hangars.**

seven hangars – eight if it receives permission this autumn to expand at its home base in Basel, Switzerland.

The company employs nearly 1,000 people across the group. With its affiliated companies, which include Gamit and the wholly-owned Turkish airline Tailwind, the total headcount rises to about 1,500. Annual sales are reported to be in excess of \$2 billion.

February was a month for awards for AMAC, and for Muhiddin personally, although he doesn't see it that way.

What makes me successful is my people

When *Business Worldwide Magazine* named him 'best CEO in the private aviation services industry' in its 2017 Global Corporate Excellence awards, he demurred. "When it comes to such an award, it is the workforce that deserves it. I just collect it on their behalf. What makes me successful are my people. I set strategy; the company follows it."

The other award announced at the 2018 European Business Aviation Convention and Exhibition (EBACE) was for the best VIP aircraft interior design of the year, awarded for AMAC's work on a Boeing Business Jet (BBJ) demonstrator.

"To have a company like Boeing leave the US market and come to AMAC for the aircraft that is used by the chairman and board of directors speaks for itself. We delivered the aircraft on time, on budget and according to design," said Muhiddin.

What do the next five years hold for AMAC?

Muhiddin says with a laugh: "I can't tell you. It's not a secret – it just doesn't exist.

"We have a lot of requests, every month, from investors in Saudi Arabia, the UAE, Oman, the Far East, inviting us to their countries to set up AMAC facilities there. China is a growing market and hungry for such a set-up; they don't have this expertise themselves.

"We will move quickly if there is a solid reason for it. We don't expand for the fun of it."

If the Basel airport authority approves AMAC's application to build it, the company's fifth hangar at its home base will be used exclusively for Bombardier types following the company's receipt of authorised service facility (ASF) status.

AMAC is also weighing up the need for a third hangar in Bodrum.

"We like to build hangars," said Muhiddin. "This is not crazy expansion – a new hangar every two years is not bad."

Among its business activities, AMAC acts as a marketing agent.

A recent project involved managing the operation and transfer of a B747-8i from the Qatar Amiri Flight. After completing some preservation maintenance on the aircraft in Basel, AMAC facilitated its transfer to a new owner. The aircraft has since been despatched. A company spokesman said: "We are happy to have executed this service in a swift and meaningful manner." ■

10
MORE
YEARS

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Abu Dhabi's TS&S Aerospace is spreading its wings with fresh MRO contracts beyond its home territory. Acting CEO, Mansoor Janahi, tells Chuck Grieve what's driving this expansion.

Home and away, TS&S builds links to the future

Technology is proving a game-changer for TS&S Aerospace – but not the kind of technology normally associated with MRO activities.

Alongside investments in advanced equipment, such as its 100,000lb thrust test cell, TS&S is “ahead of the game” in adopting cutting-edge enabling technology that acting chief executive, Mansoor Janahi, believes gives the Abu Dhabi-based business an edge.

If proof were needed, it came in the form of a clutch of contracts TS&S announced at the Farnborough International Airshow in July.

The company used the UK show to announce engine maintenance contracts with three international airlines – Atlasglobal of Turkey, Yemen Airways, and Asiana, one of South Korea's two major airlines – for the V2500 engines that power their Airbus A320 fleets.

In July, it also announced partnership agreements with Ethiopian Airlines and IndiGo, the Indian low-cost carrier based in Haryana state, near Delhi.

Breakthrough agreements

TS&S said these “breakthrough” agreements highlight the MRO's strategy of partnering with rapidly growing carriers wherever they are based – which in this case is south-east Asia, Africa and the Middle East.

It also underscores the success of a strategy of investing in state-of-the-art technology that has been a feature of TS&S since Janahi joined the MRO in 2017 from his previous role as vice-president of Mubadala's aerospace, renewables and ICT platform.

The aerospace industry is fast-moving in its embrace of new technology, said Janahi, noting that a key objective of his move to TS&S was to ensure it was positioned to make full use of any opportunities unlocked by technological developments.

“A lot of people – original equipment manufacturers, MROs, airlines – talk about adopting the latest technology,” he said. “We're very serious about it.

“What we've done is establish a technology



The strategy of investing in state-of-the-art technology that has been a feature of TS&S since Janahi joined the MRO in 2017.

team. This isn't typical in MRO. We see technology as an enabler of growth. It enables us to increase our market share.

“With technology, we're working to improve turnaround times, increase efficiencies, and enhance our service levels to customers.”

He cited two recent deals with technology providers Honeywell and Atlas Copco as examples of this strategy in action. TS&S remains the only MRO in the Middle East to have adopted integrated voice recognition with Honeywell's maintenance and inspection (M&I) voice system, which supports a ‘hands-free, eyes-free’ workshop environment.

It is also the only MRO outside the US and Europe to implement Atlas Copco's smart connected assembly technology, which links all assembly-related processes in a single operational network to support productivity, safety and data traceability.

The Honeywell and Atlas Copco technologies are in use now, said Janahi, adding: “There are more in line to be adopted.

New markets

“As we grow our operations to new markets, implementing advanced technologies that enable process optimisation are critical in ensuring that we meet our growing demand to the highest compliance standards.”

Janahi credited the technological improvements put in at TS&S as a major part of the reason why it has been able to win contracts with top-tier airlines such as Asiana. “No airline wants to put its reputation on the line,” he said, so it was essential that new customers were comfortable with the MRO's accreditations, capacity and quality systems.

“We're competitive on a global scale,” he said, “with capacity and capabilities in line with any other shop in the world that does V2500 engine maintenance. Although TS&S is a business based in Abu Dhabi, someone out in Korea knows our capabilities.”

It's no mistake that the new partnerships announced at Farnborough take TS&S well out



Mansoor Janahi: "What we've done is establish a technology team. This isn't typical in MRO. We see technology as an enabler of growth. It enables us to increase our market share."

of its home territory. This developing global footprint simply underscores the company's focus on strategic, emerging and promising aviation markets. "In line with our long-term growth strategy, TS&S is pursuing opportunities that will expand its presence across several continents," said Janahi.

The Americas are among regions on TS&S' radar. "We're working very closely on the Americas," said Janahi. "Hopefully, something will materialise out of there."

"We're very active in south-east Asia," he added. "The contract with Asiana is a testament to the work we've done there."

"These are markets where we continue to spend time, effort and financial resource to make sure we cement our place in those parts of the world."

The investment in marketing appears to be paying off. The company has seen business triple in the last four years, during which time it has serviced more than 300 engines.

Janahi admits there's a "fine balance" to be maintained between winning the business and being able to deliver results. "We've taken this as a challenge," he said. "We've been able to manage this balance extremely well, thanks to the capabilities and team we have."

"I'm very proud of what our team has been able to deliver this year, and in previous years as well, keeping a focus on making sure we deliver engines to global standard."

TS&S operates from modern and well-equipped premises at Abu Dhabi Airport and employs nearly 300 specialists of 30 different nationalities. It is developing a pipeline of qualified technicians drawn from the emirate's own population through its innovative two-year training programme, 'Fani Wa Aftekher', run in conjunction with Abu Dhabi Polytechnic.

Earlier this year, TS&S achieved another breakthrough with its first major contract covering multiple engine types with a top leasing company.

The deal, with Dubai Aerospace Enterprise (DAE), will enable TS&S to service several engine types in DAE's extensive portfolio, including the Rolls-Royce Trent 700, General Electric GENx, and the International Aero Engines (IAE) workhorse, the V2500.

Janahi said this partnership was "only the beginning" and demonstrated that "our country is realising its potential in being an advanced, competitive and impactful aerospace hub", building on the MRO expertise it had developed over the last 30 years.

"Aerospace has been identified as a strategic sector in Abu Dhabi," said Janahi. "We're playing a role in that. We have top national UAE talent that is now part of our leadership team as well as our wider team. Making sure we have local talent is important to sustain, not just the business, but the industry as well." ■

Partners benefit from Mubadala Group links

A memorandum of understanding (MoU) with Ethiopian Airlines underscores the benefits to TS&S of collaboration between different Mubadala Group companies, in this case Sanad Aero Solutions.

Under the MoU, TS&S and Ethiopian will collaborate on establishing auxiliary power unit (APU) overhaul capabilities and engine on-wing care centres. Through Sanad, they will explore financing and leasing opportunities to support Ethiopian's growing fleet.

Sanad, which is Arabic for 'support', was launched by Mubadala in 2010 to offer "dynamic financial solutions" with a focus on spare engines and components. It supports a growing number of industry-leading partners with more than \$1 billion in assets.

Janahi acknowledged the benefits that arise from being part of Mubadala. He said: "We work closely with Sanad for opportunities where we can add value to our partner and the end-customer."

"In this instance, there was added value for us coming together to support and work with Ethiopian."

"We see ourselves as a leading engine MRO in the Middle East and north Africa – geographically, we don't want to restrict ourselves."

Africa has significant potential for TS&S, with opportunities to grow its market share along with the expected development of the continent's aviation sector. To take advantage of this, he said, there is "no better partner" than Ethiopian Airlines: "It has the largest and most modern fleet in Africa, a good management team and the ambition to establish its own MRO."

CFM International has agreed, under pressure from the International Air Transport Association (IATA), to open up the market for third-party parts and MRO on its best-selling engines. Chuck Grieve explores the reasons why and asks whether it could be the start of a sea change in aftermarket practices?

Will CFMI deal change the MRO landscape?

News of CFM International's agreement with IATA to loosen its grip on the aftermarket for its CFM56 engines has been cautiously welcomed by airlines, lessors, parts suppliers and MROs.

IATA described the deal as a set of policies that will enhance the opportunities available to third-party providers of engine parts and MRO services on the CFM56 and the new Leap series engines.

Those who stand to gain from CFMI's revised approach are generally adopting a "wait and see" attitude.

"I think it is a good opportunity, but I just caution you to not get overly excited about it until we see some of the results," Eric Mendelson, president of parts manufacturer approval (PMA) supplier Heico's parts-making division, was quoted as saying.

The CFM56 is acknowledged as the most successful aircraft engine of all time with more than 30,000 examples delivered over four decades. About 13,400 variants are currently in service, mainly powering Airbus A320 and Boeing 737 narrow-bodies. The GE/Safran joint venture's investment in developing its engines over that time is substantial.

A CFMI statement said the deal "reaffirms its commitment to maintain and foster robust and open competition within the MRO market", as well as the competitive nature of its MRO model.

The question some in the industry ask is why did it take a complaint to the European Commission, filed in 2016, for CFMI to act?

MRO sources in the Middle East and Africa, where CFM56-powered aircraft are abundant, point to the predicted logjam in CFM56 shop visits in the next 3-4 years

and the difficulties already being experienced in sourcing parts as an incentive for the original equipment manufacturer (OEM) to bow to airline pressure.

A source, who spoke on condition of anonymity, said MROs are now asking for advance notice of repair work; previously material could be sent and it would be processed on receipt. Typical lead time for CFM56 engine components is now 20 days or more. "This level of delay is unsustainable if the current level of demand persists, so it was only a matter of time before a permanent solution was needed."

Another contact suggested the deal is a direct consequence of the Southwest Airlines Flight 1380 tragedy in April, when the failure of a fan blade led to a passenger's death. The subsequent emergency airworthiness directives (EADs) on the CFM56-7B fleet affected an estimated 3,700 engines on aircraft of US registry alone.

Availability of parts

That highlighted a problem with the availability of parts from the OEM. "CFM doesn't have the capacity to produce as many as they need," said the source. CFM was aware of the problem, he said, and "obviously" was putting measures in place to boost its manufacturing output. But, meanwhile, "all parts providers are having difficult times getting these parts to meet customer requirements".

Some observers suggest just getting the policies down on paper may be the deal's most significant outcome. The conduct policies codify "an opaque set of guidelines" that contributed to what IATA alleged was an "anti-competitive marketplace".

Jim O'Sullivan, Heico's vice-president sales and business development in the Middle East, said: "We see this as a first step to reverse the longstanding restrictive practices by engine manufacturers that have resulted in higher costs for the industry and, therefore, the flying public. We expect that IATA, its airlines and suppliers alike, will be closely watching the implementation and results."

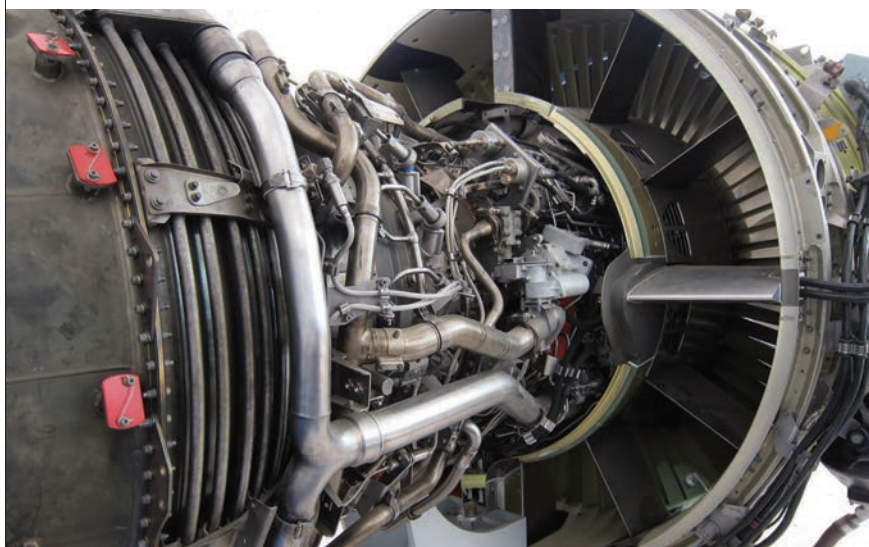
In his statement, Alexandre de Juniac, IATA's director general and CEO, said: "We hope that this agreement will be an example for other manufacturers to follow."

It remains to be seen if other OEMs will take the hint.

GE already has by promising to apply the principles of the conduct policies to its own engine programmes. Honeywell has not – despite being the one OEM that might have been expected to, given that its market-leading auxiliary power units (APUs) are the subject of a similar ongoing IATA complaint. "Honeywell believes that our practices are fair and in compliance with all relevant laws," a statement said. "We have and will continue to cooperate with the European Commission's preliminary inquiry."

The MRO industry watches with interest. ■

The CFM56 is acknowledged as the most successful aircraft engine of all time.



ROBOTICS FIRM TARGETS MIDDLE EAST



Tunisian start-up, Enova Robotics, is the first manufacturer of intelligent robots in Africa and the Maghreb, writes *Vincent Chappard*.

The company's adventure began in 2014 when its founder and general manager, Dr Anis

Sahbani (pictured above), decided to return to his homeland to realise his dream.

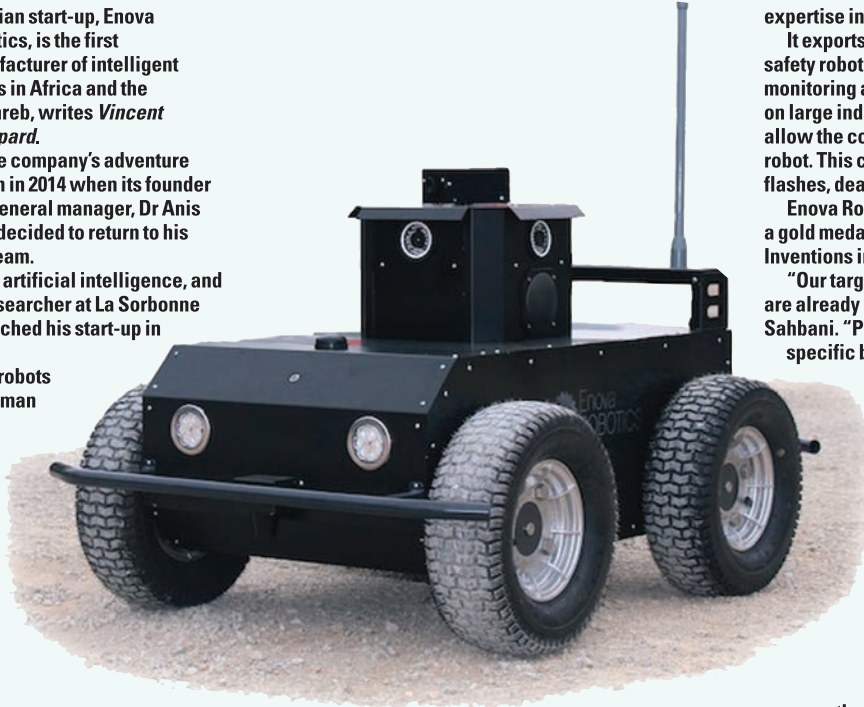
After writing a thesis on artificial intelligence, and 10 years as lecturer and researcher at La Sorbonne University in Paris, he launched his start-up in Sousse.

"My goal was to create robots that could help or assist human beings, not replace them," he said.

His first robot, Ogy, was designed to help people with their daily tasks.

In 2015, the company decided to diversify its activities, particularly in the security and defence sector.

Enova Robotics now specialises in robot design and manufacturing through combined



Pearl Guard: the world's first civil safety robot. PICTURE: ENOVA ROBOTICS

expertise in software, hardware and perception.

It exports what it claims is the world's first civil safety robot, the Pearl Guard, a mobile platform for monitoring and remote alert, used to detect intrusions on large industrial sites, launch arrest messages, and allow the command station to act remotely via the robot. This can slow down intrusion via blinding flashes, deafening noise or dense smoke.

Enova Robotics has won several awards, including a gold medal at the International Exhibition of Inventions in Geneva.

"Our target is essentially the security groups that are already established on industrial sites," explained Sahbani. "Pearl Guard can also be used to monitor specific borders or areas."

For Sahbani, the Middle East market is mature enough today to absorb this technology. "With Europe and the United States, this market is our priority. We currently sell 98% of our products in Europe and 2% in the Middle East. In 2019, we want to increase the deployment of our robots in the Middle East to reach 30%."

Enova Robotics just raised around €1.5million (\$1.76m) via the asset management company CAPSA to industrialise the chain supply process of the Pearl Guard and to set up a commercial and research and development entity in France.

SAUDI ARABIA STRENGTHENS INDUSTRIAL CAPACITY

Discussions are well under way on the construction of a light alloy and metal structure production plant near Riyadh, Saudi Arabia, following the signing of a memorandum of understanding between Figeac Aero Group, the Saudi National Industrial Clusters Development Program (NICDP), Al Salam Aerospace Industries, and AMIC earlier this year.

The project should come to fruition by mid-2019.

This agreement is an important step in implementing Saudi Arabia's 2030 development plan and the diversification of the kingdom's industrial base, particularly the aerospace sector and its ecosystem.



It aims to identify the market potential in the region and set up a specialised site to manufacture precision-machined aluminium and titanium parts and sub-assemblies, as well as creating a dedicated sales force.

For Figeac Aero, a leading producer of light alloy and hard metal structural parts, engine parts, landing gear parts and sub-assemblies, it's a huge opportunity.

After Latin America and north Africa, it now moves towards the Middle East market with new partners in Saudi Arabia – Al Salam Aerospace Industries, a specialist in MRO for civil and military aircraft, and AMIC, a subsidiary company of TASNEE, the second largest industrial company of the kingdom and the second largest producer of titanium oxide in the world.

"It's an opportunity to get into a new market in the Middle East and become a shareholder in a new



Partners together as Saudi Arabia opens new production plant for its growing manufacturing industry.

company," said Jean-Claude Maillard, Figeac Aero Group chairman and CEO.

"Saudi Arabia has an ambitious project to produce aerospace parts and sub-assemblies and there are currently few players in the region capable of responding to these needs."

According to Maillard, the production capacity in the Middle East is still low. "Countries in the region are investing massively in new civil and military

aircraft and there are significant opportunities for offsets."

He added that it is necessary to have an adequate industrial production capacity in the region to capture these offsets.

Figeac Aero plans to pursue its growth in the wake of air transport development and the global aerospace supply chain. The group also relies on the strengthening of its three factories in Morocco and Tunisia.

With Dubai positioning itself as a world hub for aviation, it makes complete sense to have a university dedicated to training young people for a career in the industry.

Dave Calderwood reports.

AVIATION UNIVERSITY EXPANDS INTO EUROPE

Emirates Aviation University (EAU) is the education arm of the Emirates Group, and licensed by the UAE Ministry of Education - Higher Education Affairs and the National Qualifications Authority.

But, like Dubai, EAU is outward-looking with partnerships across the world.

Two of its latest initiatives are with Germany's Lufthansa Technik and the UK's Coventry University.

The Lufthansa Technik tie-up is to provide more hands-on work experience for students taking up aircraft maintenance and engineering. EAU's School of Engineering will also work closely with Lufthansa Technik to enhance its curriculum and create post-graduation opportunities.

EAU has had a long relationship with Coventry University and the latest collaboration, announced last July, is the launch of a new research centre and doctoral training college.

Range of disciplines

The Dubai-based Research Centre for Digital Innovation and Artificial Intelligence will train its students to specialise in a range of disciplines, including aviation, management, security and smart cities.

Research students will be based in Dubai, but will also spend time in Coventry and receive support from Coventry University academics.

"Our partnership with Coventry has always added value to the education that our students received and it's proved to be successful," said Dr Ahmad Al Ali, vice-chancellor of EAU.

"The opening of the new research centre and doctoral training college is a testament to our growing commitment to always provide students with the best tools to develop their skills and capabilities."

The first tranche of post-graduate research students started in September. On course completion, they will receive a PhD from both universities.



No discrimination here: women have the same opportunities as men.

Qurat: the engineer's story



Qurat Ul Ain Muhammad Aslam graduated from EAU in May 2018 with a BSc in aeronautical engineering.

She said: "My journey was a four-year long delightful rollercoaster ride. The academics were astonishing, the projects, the resources, the on-job training... nothing failed to surprise me and the course always had me motivated for more.

"The environment was so warm and welcoming. I made some amazing friends and was guided by some of the most knowledgeable professors throughout the course of study. I never found myself left out.

"Less than a month after graduating, I found myself employed with one of the top aircraft leasing companies – Dubai Aerospace Enterprise (DAE). It made the entire EAU experience worth it."

"The shared expertise of our two universities in the aerospace and transport industries, and our joint ambition to advance knowledge and skills in these fields, have provided the perfect platform for the launch of this new doctoral training college and research centre," said Richard Dashwood, deputy vice-chancellor for research at Coventry University.

The new partnerships are additional to EAU's already outstanding opportunities for young people.

Students can choose from undergraduate and postgraduate programmes, combining the highest academic standards with the latest aviation industry developments and knowledge. Courses cover aeronautical engineering, aviation management, business management, aviation safety and security studies.

Purpose-built campus

All these courses are taught at a purpose-built campus in Dubai with superb modern facilities, an experienced faculty, and, importantly, a multi-national student body. As you'd expect in aviation, courses are 100% English-taught.

To make sure that people from a diverse range of backgrounds can attend, there are various scholarships and financial aid packages designed to assist academically distinguished students and those with limited financial resources. These include the chancellor's scholarship and vice-chancellor's scholarship, as well as fee discounts for dependents of the Emirates Group, corporate and university staff, and siblings of current students.

The chancellor of EAU is HH Sheikh Ahmed Bin Saeed Al Maktoum, who is also chairman and chief executive Emirates Airline & Group. He said: "Emirates and Dubai are symbols of supreme success against all odds and are fast becoming global icons. The extraordinary changes wrought by the travel industry in Dubai opens up a world of career opportunities, which is why the university has carefully designed its aviation programmes to equip people with the necessary academic underpinning and management skills." ■

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THE FIGHT IS ON TO TRAIN



Saudi Arabia was the first Middle East country to acquire the Eurofighter Typhoon. PICTURE: BAE SYSTEMS.

David Oliver looks at the various needs of the next-generation fighter pilots in the region.

Many of the world's air forces aspire to have a fleet of fourth-plus-generation combat aircraft in their inventory. However, few have the defence budgets to enable them to realise their ambition.

This is not the case for a number of Middle East countries, and those that belong to the Gulf Cooperation Council (GCC) in particular.

Members of the GCC include Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, all which have been in the forefront of an unprecedented expansion of their combat aircraft capabilities.

With the exception of Oman, the GCC nations are deployed to Operation Decisive



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NEW MIDDLE EAST PILOTS

Storm, the Saudi-led coalition against Houthi rebels in Yemen.

Saudi Arabia was the first to commit to a fourth-generation fighter aircraft in the region when it launched Project Al Salam in 2007 for the purchase of 72 tranche 2 Eurofighter Typhoons. At an estimated £4.43 billion, it was one of the largest defence procurement contracts ever signed.

In March 2018, Saudi Arabia confirmed a long-awaited procurement of an additional 48 Eurofighter Typhoons, with the signing of a memorandum of intent (MoI). It is also taking delivery of 84 new F-15SA Strike Eagles under an \$11.4 billion contract awarded to Boeing in 2012.

The first country to follow Saudi Arabia's lead was Oman, which signed a contract for 12 Typhoons.

After a lengthy evaluation of new fighter options, Kuwait signed a contract in April 2016 for 28 tranche 3 Eurofighters in a government-to-government deal with Italy. It has an option for 18 additional aircraft.

Political tensions

A series of multi-billion dollar contracts with France, the United Kingdom and the United States for fourth-plus-generation advanced combat aircraft are set to increase Qatar's current fighter fleet from 15 to 58! This is in spite of political tensions between Qatar and its GCC neighbours.

Under a 2015 €6.3 billion (\$7.39bn) contract, Qatar is taking delivery of 24 Dassault Rafales from France.

Then, in December 2017, BAE Systems was awarded a £5 billion (\$6.58bn) contract to deliver 25 tranche 3 Typhoons to Doha.

As part of Project Ababeel, the country has also ordered 36 Boeing F-15QA Strike Eagles in a \$6.2 billion US foreign military sales (FMS) contract. This variant will be based on the Saudi F-15SA.

The speed of the acquisition and delivery of such large numbers of advanced combat aircraft comes with an increased demand for high-intensity pilot training.

All of the contracts include comprehensive training programmes for aircrew and technicians.

As part of a £1.6 billion (\$2.10bn) Saudi-British defence cooperation programme, 22 Hawk Mk 165 Advanced Jet Trainers, plus simulators and training aids, have been delivered to the Royal Saudi Air Force (RSAF).

In February 2016, a new contract was signed for an additional 22 Hawk Mk 165s. Eighteen of the RSAF Typhoons are two-seaters.

The Royal Air Force of Oman (RAFO) will



The first Hawk Mk166 AJT and two-seat Typhoon to be delivered to the Royal Air Force of Oman.

PICTURE: BAE SYSTEMS.

receive three two-seat Typhoons and eight Hawk Mk166 AJTs from BAE Systems, while the Kuwait Air Force (KAF) will have six two-seaters.

Under the contract with the Italian Government, Leonardo will train eight KAF Typhoon instructor pilots, as well as ground personnel.

Facing the biggest challenge for its future pilot training is the Qatari Emiri Air Force (QEAF), which has only a small cadre of Mirage 2000 and Alfa Jet operational pilots to draw on, and has no AJTs in its inventory.

Training package

The French contract includes six Rafale DQ two-seaters and a training package based on that included in Egypt's purchase of 24 Rafales. This includes training 36 QEAF pilots and 100 technicians by the French Air Force at the Rafale Training Centre (CFR) at Mont-de-Marsan, although it is expected that the courses will be longer than those of the Egyptians.

In November 2017, The US State Department approved a support package for the QEAF's fleet of F-15QA Strike Eagles, worth a potential \$1.1 billion, which includes the building of new operations, maintenance and training facilities.

The BAE Systems contract for Typhoons, which includes two-seaters, was amended in June to include the supply of nine Hawk AJT

aircraft and an initial support package, with deliveries to begin in 2022. As part of this package, a joint UK-Qatari Typhoon squadron was stood-up in July. The Royal Air Force's No 12 Squadron will integrate QEAF personnel, including pilots and ground-crew, from 2019.

The personnel will be initially stationed at RAF Coningsby, and then in Qatar, undertaking a package of training and cooperation with their UK counterparts.

The joint squadron will provide the QEAF pilots with valuable operational experience and speed up their preparation for when the first QEAF Typhoons are delivered in 2022.

At the end of last year, RAF Typhoons took in a joint training exercise with the QEAF.

Operating from the headquarters of Qatar's fighter wing at Al Udeid Air Base, the exercise allowed Royal Air Force personnel to pass on their experiences flying and maintaining the Typhoon aircraft to their Qatari counterparts.

The four Typhoons were flown by pilots from No 29 (R) Squadron RAF, based at RAF Coningsby, which is currently the Operational Conversion Unit (OCU) for the Typhoon and also supplements UK air defence as part of the quick reaction alert (QRA) team.

Around 90 RAF engineering support staff were on-hand to support the exercise.

Many of the QEAF pilots that took part in the week-long exercise will be among the first trained to fly the Typhoon in the UK. ■

SEASPRITE SHOWS OFF IN EAGLE SALUTE

One of Egypt's veteran Kaman SH-2G Super Seasprite helicopters made a surprise appearance during Exercise Eagle Salute 18 in August. writes *Jon Lake*.

The aircraft was one of 10 SH-2Gs ordered in 1995 for use by the Egyptian Naval Force, and was delivered to Egypt in 1997.

Though two of Egypt's Super Seasprites had been built as SH-2Gs, the aircraft seen in the exercise was one of eight converted from US SH-2F aircraft, which were built for the US Navy in the early 1980s, and which saw extensive service there before being refurbished and converted for Egypt.

Four more SH-2Fs were supplied for use as spares in support of the active SH-2G fleet.

The SH-2Gs serve with No37 Squadron, part of the 545th Tactical Helicopter Brigade, at Alexandria's Borg Al Arab Air Base, operating alongside the navy's Westland Sea Kings. They are equipped with AQS-18A dipping sonar, a search radar, and an electronic support measures suite.

Exercise Eagle Salute 18 took place at the Safaga Red Sea Naval Base in Egypt, as a multilateral in-port and surface exercise intended to enhance the interoperability and war-fighting readiness of all participating units, as well as fortifying military-to-military relationships between nations.

Ships from Egypt, the UAE and the US conducted seven days of manoeuvres in the Red Sea, with multiple operational scenarios giving opportunities for surface gunnery, air defence, the protection of high-value units, and employing appropriate tactics against asymmetric threats.

Participating vessels included the Egyptian Naval Force (ENF) guided-missile frigate Sharm El-Sheikh (the former Oliver Hazard Perry-class frigate USS Fahrion, which was transferred to Egypt on March 15 1998) and the Arleigh Burke-class guided-missile destroyer USS Jason Dunham (DDG 109), which represented the US 5th Fleet's Task Force 55.



The Kaman SH-2G Super Seasprite helicopters are equipped with AQS-18A dipping sonar, a search radar, and an electronic support measures suite.

Avico invests in a Tunisian training academy

Avico, one of Europe's leading charter broker companies, recently took a significant stake in Safe Flight Academy (SFA), Tunisia's leading training centre for civil aviation and pilots, writes Vincent Chappard.

SFA operates from Monastir Airport with a fleet of Diamond Aircraft and a FNPT II DA42NG simulator.

Safe Flight Academy was founded in 2010 by TTS, Tunisia's first private aviation group, in partnership with aeronautical professionals and the British company, Brookfield Aviation.

□□□□

In 2015, the academy signed a partnership agreement with the French school Aéropyrénées Flight Center. It is now a renowned training centre, offering complete high-level pilot training accredited by the European Aviation Safety Agency (EASA) in Africa.

According to Gilles Gompertz, CEO of Avico, training remains one of the major components in a sector as technical as air transport. "Our subsidiary, Butterfly, has been offering online training for ground staff for more than 15 years and we are always eager to work on new projects in partnership with reliable players."



Gilles Gompertz: "We are always eager to work on new projects in partnership with reliable players."

The SFA training centre draws on all the know-how of TTS group and the Nouvelair airline to offer pilot training to the best international standard for both English and French-speaking students.

In the near future, Avico's main challenge will be to expand SFA's customer base abroad. Tunisia offers many advantages like simplified visa, weather conditions conducive to practical training, and very competitive costs.

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The Middle East and Africa, due to their diversity and structural need in air transport, are, therefore, key areas of development and growth for Avico Group. It carries out about 30% of its activity in the region and has three offices in Africa (Ivory Coast, Morocco and Senegal).

As a result, Avico has established a foothold in various countries and new ecosystems to provide a range of dedicated, seasonal or consolidated quality services to customers in Europe, Africa, the Middle East, Asia and the United States, as well as to national and regional low-cost, charter, cargo operators, and business aviation.

Avico's activities are geared towards increasing its productivity without excessive investment risks.

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BAHRAIN SUPREME!

The Bahrain International Airshow will take place this November with a senior government minister promising it will be the biggest to date.

Marcelle Nethersole finds what visitors can expect.

The Bahrain International Airshow (BIAS), in association with Farnborough International, takes place at Sakhir Airbase between November 14-16 this year.

For the first time, the event is adding an extra public day after considerable interest from the 2016 show.

“This is the fastest-growing air show in the Middle East and is reflected in figures for exhibitors and visitors to both trade and public days,” said His Excellency, Engineer Kamal Bin Ahmed Mohammed, Bahrain Minister of Transportation and Telecommunications.

“The 2018 show will be the biggest yet, with even more exhibitors and increased networking opportunities.

“With business generation at its core, this year’s show will also include elements showcasing innovation, inspiration and education in the aviation industry,” he said.

The exhibition hall will double in size this year, occupying the entire hangar at the base.

“As such, we have been able to accommodate even more exhibitors, with 120 participating in the show – a 70% increase on 2016,” said the minister.

“It is our most international show to date – 77% of participants are from overseas. We have country pavilions from the UAE, US, Russia, Taiwan, Saudi Arabia, Sudan, Romania and the United Kingdom.”

New international companies taking chalets at the show



His Excellency, Engineer Kamal Bin Ahmed Mohammed:

“It is our most international show to date – 77% of participants are from overseas.”

include Embraer, Bombardier, Saudi Arabia Military Industries, Etihad Airways Engineering, and Sukhoi.

As well as international businesses, BIAS chalets will also host significant regional participation including Bahrain’s Texel Air, Saudi GACA, Kuwait Airlines, and Turkish Aerospace Industries.

Bahrain will once again be hosting the Manama Air Power Symposium the day before the show. Organised by the Royal Bahraini Air Force, the event brings together air force chiefs and leading experts to address emerging threats across the region. All participants will also attend BIAS and will participate in the delegations programme.

“The development of our delegations programme is now in full swing and we expect to host a number of military and commercial delegations. We already have 20 confirmed commercial delegations,” added Mohammed.

BIAS 2018 will include two focused conferences for the exchange of new ideas and knowledge.

Mohammed explained: “On the second day of the show, we will host an airport conference entitled ‘Into the future – challenges and opportunities for Gulf region airports and airlines’.

“This event is targeted at the region’s fast-growing airport infrastructure industry and will bring together regional and global leaders to discuss

Continued
on Page 110



CONTINUED FROM PAGE 109

their experiences and expertise. We are delighted that Professor Rigas Doganis, leading aviation consultant and strategy advisor to a number of airlines, airports, banks and governments around the world, will be providing the opening address to the conference.”

On the third day, women in aviation will highlight issues affecting career development and identify solutions.

“This is an important forum for Middle Eastern women in the aviation industry and it will act as a beacon to the next generation of female aviation industry professionals looking for inspiration, leadership and guidance from those already in the field,” said the minister.

Knowledge theatre

“We will also be hosting a knowledge theatre on the exhibition floor in association with the Farnborough International News Network (FINN). The BIAS FINN sessions will provide exhibitors with an opportunity to can share their knowledge and experiences in an open-floor environment.”

BIAS is also using this year’s event to highlight the space industry, which will be showcased in the exhibition hall.

“Each year at BIAS, we aim to highlight an up-and-coming sector within the aviation landscape and it makes sense that it is space this year,” said Mohammed.

“A number of regional and international space research centres and organisations will be present, including the UAE Space Agency, Roscosmos, and Information Satellite Systems – a Reshetnev Company (ISS-Reshetnev), making it a valuable opportunity for networking, engaging with the space community, and learning about the latest trends in the industry in general and initiatives in the Middle East specifically.”

Bahrain, itself, will also be taking the opportunity to promote its own space

ambitions and will launch its national space science initiative. Details will be revealed during the show.

Mohammed added that there would also be a good turnout of aircraft on display. As Arabian Aerospace was going press, the figure was not confirmed, but Mohammed estimated that 100 aircraft would take part, including the latest types in both the commercial and military sectors.

There is also an impressive line-up of aerobatic teams confirmed for the show, including the Global Stars aerobatic display team, the Black Falcons parachute team, the Russian Knights display team and the UAE’s Al Fursan.

Mohammed added it was not just BIAS that has a lot of off business visitors, but also Bahrain as a country, as it is demonstrating with its on-going construction.

“The Bahraini Government and Economic Development Board looks at all areas to make the kingdom an attractive place to do business,” he said.

“Our long history as a strategic hub and gateway to the Gulf region is a major advantage. With efficient and cost-effective pan-GCC transport links and direct access to Saudi Arabia, our market access is unparalleled.

Visitors to the show will see a variety of aircraft ... and a conference as well.

“A fantastic example of this is Amazon Web Services’ (AWS’) decision to build the Middle East’s first hyper-scale data centre in Bahrain, which is due to open 2019.”

Bahrain is also home to the largest FinTech hub in the Middle East and Africa region. “We’re known as business-friendly Bahrain, with an agile government that comes together to problem solve and support the business environment to ensure that companies thrive. For example, running your business in Bahrain costs considerably less than other destinations in the region. We’re also fast to adapt our regulatory environment to ensure the kingdom remains competitive against global change,” said Mohammed.

Of course, one of the first impressions visitors flying into the capital, Manama, will get is at Bahrain International Airport, which is still undergoing its airport modernisation programme (AMP). Once complete, in 2019, the airport’s capacity will increase to accommodate 14 million passengers a year.

Four times larger

“Once ready, the new terminal will be four times larger than the current airport facility, with 130,000 air traffic movement yearly,” said Mohammed.

“The new terminal will start at the east end of the existing facility and move towards the control tower. This transformation will require a shift in mindset and additional training for existing staff, as well as new hires.

“One of AMP’s various initiatives includes a capacity building programme with Tamkeen to recruit a number of university graduates – from Bahraini and international universities alike – in different fields, such as engineering and business, to participate in two years of training.” Successful participants will be assigned to positions in various departments throughout Bahrain Airport Company, the operator of Bahrain International Airport.

The new infrastructure facilities include a 210,000sqm main passenger building, a new jet fuel farm and hydrant system, a central utility complex and 4X leadership in energy and environmental design (LEED) certification.

The AMP will also add a new multi-storey car park to offer a total capacity of 6,000 parking spaces for passengers and visitors.

“Bahrain is now a Middle Eastern country well and truly in the spotlight, and we look forward to welcoming BIAS visitors to the event, and our country,” concluded Mohammed. ■



FIRST FEMALE FIGHTER PILOT MAKES HISTORY

Pilot Officer Shaikha Aisha bint Rashid Al Khalifa has become the first Bahraini woman to fly a military aircraft in the history of the Royal Bahrain Air Force (RBAF), writes *Jon Lake*.

On July 11, 2018 she piloted a BAE Hawk trainer for a one-hour flight from Shaikh Isa Air Base. After landing, she described her achievement as being a "dividend of the motivating climate provided by the government for Bahraini women to take part and stand out in various domains of national work".

The Kingdom of Bahrain has made real efforts to empower its female citizens.

Nearly 20% of parliamentary seats are held by women, and 75% of Bahraini women reach a secondary or higher level of education compared to 80% of male Bahrainis.

Sheikha Aisha, who is the granddaughter of the prime minister, His Royal Highness Prince Khalifa bin Salman Al Khalifa, was also the first Bahraini woman to graduate from the UK's prestigious Royal Military Academy at Sandhurst.

She expressed her heartfelt thanks and gratitude to her grandfather for what she called his unlimited support, and pledged herself to even greater efforts in serving the nation under the leadership of the king, His Majesty King Hamad bin Isa Al Khalifa.



The prime minister took the opportunity to praise the Bahrain Defence Force (BDF) as a "national edifice", and said that royal support had allowed "multiple achievements". He added that the BDF was a source of great pride, thanks to its competencies and successful participation in regional operations, as well as protecting the nation and maintaining its security and stability, protecting legitimacy and promoting regional security and stability.

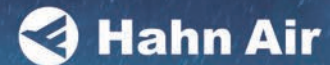
A number of members of the royal family

already serve with the RBAF, some of them as F-16 pilots, and Sheikha Aisha attended Sandhurst at the same time as Jordan's Crown Prince Hussein, who has trained as a helicopter pilot.


Sandhurst was also the alma mater of HH Sheikh Mohammed bin Rashid Al Maktoum, vice president of the UAE and ruler of Dubai, and his son, HH Sheikh Hamdan bin Mohammed Al Maktoum, Crown Prince of Dubai, with Sheikh Mohammed becoming a Mirage fighter pilot.

Logging in: Sheikha Aisha, the first Bahraini woman to fly a military aircraft in the history of the Royal Bahrain Air Force (RBAF)

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The airport modernisation programme (AMP) currently taking place at Bahrain International Airport (BIA) is of such importance that it's part of His Majesty King Hamad bin Isa Al Khalifa's vision for the country. Dave Calderwood reports.

AMP fuses the vision of growth and transformation

At a recent board meeting of the Bahrain Airport Company (BAC), which operates BAI, the king's representative, His Excellency the Minister of Transportation and Telecommunications, Engineer Kamal bin Ahmed Mohammed, first praised the efforts of the team involved in delivering the AMP, then stressed the importance of maintaining the pace of the project's progress.

No pressure then!

For BAC chief executive officer, Mohamed Yousif Al Binfalalah, who's in charge of the AMP, it's all part of the job.

Crunch time for Al Binfalalah will come in the second quarter of 2019, when the operational readiness trials are expected to take place. These will involve all of the new passenger terminal building's stakeholders, and put to the test all the work that's taken place since contractors first moved on to the site in July 2015.

This is not a 'tidy up and paint job' on the airport. No, this is a \$1 billion programme that includes the construction of a 214,000sqm passenger terminal building and adjoining multi-storey car parks, access roads and forecourts, central utilities complex, new aircraft stands and rehabilitation of existing aircraft stands and taxi lane.

That's just the fixed infrastructure. There's also all the equipment to make an airport capable of mass transit, including baggage-handling systems, loading bridges, conveying systems, security-



We believe that the on-going revamp of its operations, facilities, services, and critical infrastructure, will put it at par with the best airports in the world.

MOHAMED YOUSIF
AL BINFALALAH

screening equipment, and information and communications technology.

All these systems, manufactured, delivered and installed by a multitude of suppliers, not only have to work, but also communicate with each other if they are to cope with the expected 14 million passengers a year.

Al Binfalalah said: "Although BIA may not be the biggest airport in the region, we believe that the on-going revamp of its operations, facilities, services, and critical infrastructure, will put it at par with the best airports in the world."

Leading regional hub

"The AMP is a catalyst for transformation and growth that will maximise the aviation sector's contribution to the economy, in line with Bahrain's Vision 2030. Furthermore, it will cement BIA's position as a leading regional hub, increase the kingdom's global connectivity, and create new employment opportunities for its people."

"To achieve these important goals, we need to ensure the operational readiness of the new passenger terminal building and its on-schedule launch, which both hinge on the success of the operations readiness and airport transfer (ORAT) platform."

All this construction and refitting is taking place while the existing airport continues to operate and grow, especially air cargo traffic.

Figures released in early 2018 showed a 10% growth in cargo during 2017, an

important trend as the kingdom is attempting to grow its status as a logistics hub for the region.

New airlines are also connecting with BIA, including Ethiopian Airlines, Atlas Global Airlines, and Wataniya Airways, which not only means more landing fees but a greater footfall through the retail areas of the passenger terminal.

BAC's financial results for 2017, released in May this year, are impressive with a BD12.9 million (\$34m) net profit for 2017, compared to BD7.6 million the previous year. Revenue is split into aero (passenger service charges and landing fees, up 24%) and non-aero (retail concession income, up 14%).

Managing the business side of BAC is the responsibility of the chief commercial officer, Ayman Zainal. He explained the surge in revenues and profits: "The growth in aero revenue is attributable to an increase in passenger traffic and cargo activities at BIA. This reflects our efforts to enhance its services and to promote Bahrain as a hub for logistics services in the GCC and wider Middle East."

"The restructuring of BIA's airport taxes, which are still well below others in the region, is also a significant factor."

"As for non-aero revenue, BAC reviewed its legacy concessions and aligned them with industry standard practices and rates. This not only resulted in revenue growth, it also created a more commercially-oriented environment."



BIA is embarking on a \$1billion programme that includes the construction of a 214,000sqm passenger terminal building.

Additionally, BAC made its under-utilised assets available for commercial use.

“While enhancing its existing products and concessions, BAC is also actively working on new key offerings at the new passenger terminal building, which is expected to open in late 2019.

“In addition, we are working on various initiatives to position BIA as a cargo hub in the region, including the expansion of its cargo infrastructure and services.

“The new cargo facilities, coupled with new retail and food and beverage (F&B) offerings at the new passenger terminal building, are expected to drive further revenue growth in the coming years.

Enhanced infrastructure

“In simple terms, more passengers mean greater demand for retail goods and services. BAC’s strategy is to utilise the enhanced infrastructure and additional capacity by operating more flights out of BIA. This will result in more business in all areas, whether it is retail, F&B, passenger services, or cargo.

“We take great pride in calling the new passenger terminal building a ‘boutique airport’. Although it offers the same services and facilities as other regional airports, its relatively small size and ergonomic design will make BIA one of the most efficient airports in the region. Passengers enjoy an unparalleled sense of simplicity and comfort, and can traverse the terminal more quickly than at any other regional airport.”

FROM PEARLS TO CONCORDE

The first scheduled commercial flight arrived in Bahrain in October 1932 en-route from London to Delhi. The aircraft carried 24 passengers and had taken several days to reach Bahrain. Bahrain became established as the Gulf’s first international airport.

It wasn’t the first ever flight to Bahrain though. Imperial Airways, forerunner of British Overseas Airways Corporation (BOAC) and later British Airways, had operated several flights through the Gulf in the late 1920s. The first flight, so the story goes, was in August 1927, when a local pearl merchant chartered an aircraft from Baghdad to Iraq and back again.

In 1937, a passenger terminal, known as ‘Bahrein Marine Airport’ was established for commercial flying boats – the famous Short’s Empire seaplanes. They operated from a stretch of water between the Marina Club and Mina Salman Port.

Land-based air transport returned in 1950 when BOAC flew four-engine Argonauts from Europe to Muharraq three times a week. Jet traffic, led by Boeing’s 707, further boosted Bahrain with a new terminal built in 1961, but this had to be expanded 10 years later when Boeing 747s boosted the numbers of passengers.

Soon, Qantas, BA, Air India and Singapore Airlines were all using Bahrain International Airport as a major transit stop with their B747s. The year 1976 saw the start of regular supersonic flights on Concorde between London and Bahrain.

The expansion of Bahrain’s Gulf Air in the 1970s and 80s meant the airport had to grow again, and in 1994 a new \$100 million terminal was opened to handle up to 10 million passengers a year.

Fast forward 25 years and the next era for BIA is about to start.



Imperial Airways at Bahrain.

Zainal continued: “BAC has invested heavily in improving its team and expanding its expertise, whether it is through direct recruitment or by obtaining the services of industry leaders. We believe this will help the company to identify opportunities and enhance the overall customer experience.

“BAC has also adopted the Tahleeq programme, which puts fresh graduates through training to become part of our team. This bridges the gap between the classical way of thinking and the innovative mindset of the younger generation, which provides another assurance that BAC is able to recognise all potential opportunities.”

An example of BAC’s expertise being recognised is the recent election of Najwa Abdul Rahim, the company’s vice president of information and communication technology, to the Airports Council International (ACI) world airport IT standing committee (WAITSC) following a successful nomination by BIA.

In this role, she will help to develop recommended practices and standards for airport IT, and promote the digitisation of airports across the world.

So, AMP looks to be on time, successfully working with current operations, and the finances look rosy. The airport’s vision – inspired by Bahrain’s welcoming culture and heritage – to create a friendly and efficient environment is succeeding. ■



The new Falcon Gold cabin is laid out in a 2-2-2 configuration.



Gulf Air has a tough job. Based almost ‘next door’ to three of the world’s top-rated airlines – Etihad Airways, Emirates Airline and Qatar Airways – the competition is fierce to attract and keep passengers.

This is particularly the case with premium passengers, who have a choice of some of the world’s best business-class cabins.

So, when the Bahraini carrier decided to renew its Falcon Gold business-class cabins, it decided that something special was called for.

“I think our existing business-class still looks like most business-class seats, not only in the region, but worldwide,” said Gulf Air’s CEO, Krešimir Ku ko. Three years ago, as the airline started to prepare for the arrival of its new Boeing 787-9s, it decided that the new Boeing wide-body provided the ideal opportunity to formulate a new business-class product.

Benchmarked

Part of its strategy is to be ‘best in class’. As part of that goal, Ku ko decided that the new business-class seat should be benchmarked not against other business-class products, but against first-class seating.

In the ‘look and feel’ of the new cabin, said Ku ko, “Our aim was very brief: To be ‘smart with heart’.” The aim was to bring together modernity and luxury, but with a distinctive Arabian feel.

Spanish branding agency, Saffron, and UK design specialists, Tangerine – which created the then revolutionary British Airways business-class cabin in the 1990s – were brought in to work on the project. This involved a complete rebranding of the company’s livery, as well as a major upgrade of the premium cabin.

Bahrain’s national carrier is installing a new business-class cabin in its Boeing 787-9 wide-bodies as it seeks to attract and retain more premium passengers. Alan Dron reports.

A STEP UP IN CLASS

Tangerine was given what Matt Round, its chief creative officer, described as “an open brief” in terms of what change meant and how it should be delivered.

“Our proposal was to reference some of the traditional signifiers of Bahraini culture, but also to capture some of the modernity that exists within Bahrain and translate that into an elegant and sophisticated interior that could set them apart from other carriers.”

With that in mind, Tangerine’s proposal was designed to appeal to international passengers as well as Bahrainis. Rich blue seat fabric was given special stitch detailing that caused light to flare across the fabric, while gold colours – always popular in the Gulf – were made muted and matt.

To achieve this, Tangerine used a seat by Rockwell Collins, based on the latter company’s Serenity suite, but with “a significant degree” of customisation.

“In the seat there’s some really clever things done with the design of the space, compacting all the engineering into the smallest possible package, such as slim dividers between seats and a significant

amount of work done on the shape of the bed to deliver a more rectangular surface for better-quality sleeping space,” said Round.

To boost the impression of quality around the seat, all plastic shrouds were eliminated, replaced by natural leather or a lookalike synthetic version, to give it that ‘VIP’ feel.

The seat itself is 23 inches wide, with a remarkable 89-inch pitch. Converting it into a bed gives a resting area 78.25 inches long.

The new business-class cabin has a 2-2-2 configuration, with each seat semi-enclosed in a miniature ‘suite’, to give greater privacy. The outer pairs of seats on each side of the cabin are staggered, to allow direct aisle access to every passenger. For entertainment, each seat has a 22-inch Thales Avant IFE screen.

Biggest screens

“That’s one of the biggest screens in the market,” said Ku ko. “I tested it on the delivery flight from Seattle and the whole combination of the cabin and quality of the seat gives a really unique passenger experience.”

The whole process, from initial idea, through design, modification and certification to delivery, took three years, said the CEO. Gulf Air has ordered 10 787-9s, five of them scheduled to arrive this year.

The US aircraft are scheduled to replace the current six Airbus A330-200s that make up the long-haul component of Gulf Air’s fleet. However, Ku ko revealed that the company is looking at whether to retain the European aircraft.

“We’re still in the process of final evaluation about our A330 fleet. If a decision is taken to keep them then, of course, we will include a retrofit of the cabin.” ■

The Royal Bahraini Air Force (RBAF) will soon stand up a military transport element using a pair of second hand C-130J Hercules. Jon Lake reports.

LAND OF THE GIANTS

Two former British Royal Air Force Hercules C.Mk 5s, rendered surplus by the UK's acquisition of the Airbus A400M Atlas, were acquired by Bahrain under a reported £30 million (\$39.4m) government-to-government deal.

An initial batch of four Royal Bahraini Air Force personnel, including two pilots and two loadmasters, have undergone training with the Royal Air Force.

They completed six months of multi-engine training with No45 Squadron at RAF Cranwell, and then participated in a further three-month bespoke Bahraini C-130J conversion course at No XXIV Squadron, the RAF's air mobility operational conversion unit, at RAF Brize Norton.

The two Bahraini pilots – Lieutenant Colonel Alwazzan and Major Alshami – completed their final three-hour training sortie on May 9 2018 and were then awarded certificates by Wing Commander Gareth Burdett, officer commanding XXIV Squadron, who described the training as “a long and demanding course”, and who said that it had been: “an absolute privilege to work with the cream of the Bahraini aircrew cadre”.

Loadmaster training

The two loadmasters completed their training in June 2018, before further Bahraini pilots arrived in the UK to undergo 11 weeks of co-pilot training.

Both of the aircraft destined for Bahrain have been re-painted in full Royal Bahraini Air Force markings, with a light grey tailfin and rudder and nose radome over an overall medium grey finish. Royal Bahraini Air Force titles are applied behind the cockpit in English and Arabic.

The UK announced its intention to retire its 10 short-bodied Hercules C.Mk 5s in the 2015 strategic defence and security review (SDSR), retaining 14 stretched Hercules C.Mk 4s (C-130J-30s). One of the latter was written off in a heavy landing in Iraq, and one C.Mk 5 will be retained, but the remaining nine are being sold off.

Two have been sold to the Bangladesh Air Force to replace ageing C-130Bs (these will include a new medical evacuation fit), and one will be



Bahraini pilots are delighted with the C130 after long and demanding training course.

transferred to the US Navy to support the Blue Angels aerobatic display team.

But the first to go will be the aircraft for Bahrain, which were prepared for delivery by Marshall Aerospace at its facility at Teversham Airport on the outskirts of Cambridge.

It is believed that two more of the surplus RAF C-130Js may eventually be purchased by Bahrain, though the original deal to transfer two aircraft attracted

criticism in some quarters. The Campaign Against the Arms Trade, criticised the deal as an “unequivocal statement of political and military support for the Bahraini regime”, which it opposes on human rights grounds, and also expressed concern that the aircraft could be “used to aid the Saudi-led bombardment of Yemen”, which it said would “only intensify the humanitarian crisis”.

Britain is undertaking a centre-wing box (CWB) replacement for its remaining C-130Js, and a similar modification may be required by any surplus RAF aircraft if they are to be retained in service by new customers for an extended period.

Global flight

Bahrain will become the 18th C-130J operator in a global fleet that is approaching two million flying hours. But, perhaps more significantly, will join a GCC C-130J fleet that already includes the Kuwaiti, Omani, Qatari, and Saudi air forces.

Kuwait operates three KC-130J tanker transports and has an option to purchase three more, while the Royal Air Force of Oman has one stretched C-130J-30 and two short-bodied C-130Js in service. The Qatar Emiri Air Force has four stretched C-130J-30s.

Saudi Arabia's Hercules fleet is still mainly based on the ‘legacy’ C-130H, but the Royal Saudi Air Force has two KC-130Js in service, and, in 2012, requested a possible sale of 20 stretched C-130J-30 transports, and five KC-130J air refuelling aircraft to meet a requirement that remains ‘open’. ■



Lockheed Martin has received a \$1.12 billion contract from the US Government to produce 16 new advanced F-16 Block 70 fighters for the Royal Bahraini Air Force (RBAF).

Jon Lake reports.

LOCKHEED'S BLOCKBUSTERS

This sale makes Bahrain the first country to procure the newest F-16V – or Block 70 configuration – as a new build aircraft. Taiwan was the launch customer for an F-16V upgrade.

Lockheed Martin is offering the F-16V as both new-build machines and as an upgrade to older Block 40/50 aircraft.

The upgrade could be applied to earlier aircraft, but the process would be more invasive and might not be cost-effective for high-time aircraft, the company said, although Taiwan is upgrading 144 Block 20 F-16A/Bs to F-16V standards.

The F-16, officially known as the Fighting Falcon, has long been nicknamed the Viper, and that same Viper name has now been formally chosen by Lockheed Martin for the new variant.

Bahrain submitted a request for up to 19 further F-16s to the US Congress for approval in September 2016, but this was initially blocked by the White House on human rights grounds.

Approved the sale

The US State Department finally approved the sale of 19 Block 70 Lockheed Martin F-16V aircraft to Bahrain in September 2017. At the same time, approval was given to upgrade Bahrain's existing fleet of 20 Block 40 F-16C/D aircraft to the same standard. The two separate contracts had a combined value of \$3.86 billion.

Bahrain originally acquired 12 F-16C Fighting Falcons (including four two-seat F-16Ds) under the Peace Crown programme in 1990, and received 10 more (all single-seaters) under Peace Crown II in 2000.

Two aircraft have been lost in service, one of them while supporting the Saudi-led intervention in Yemen in December 2015.

The aircraft are used as multi-role tactical fighters. In the air defence role, they are armed with Sidewinder and

AMRAAM missiles, while they are also able to use 500lb GBU-12 and 2,000lb GBU-10 laser-guided bombs, as well as TV-guided AGM-65B and IR-guided AGM-65G Maverick missiles in the air-to-ground role.

Lockheed Martin AN/AAQ-14 Sharpshooter low-altitude navigation and targeting infrared for night (LANTIRN) targeting pods can also be carried.

Cost-reduction measures forced Bahrain to scale back its procurement from 19 to 16 aircraft by the time a Bahraini letter of agreement was received in late 2017, while the status of the proposed upgrade of its existing F-16Cs and F-16Ds remains uncertain.

Despite this cutback, the sale came at the right time for Lockheed Martin, which had not received an F-16 letter of acceptance from December 2012, when Iraq bought a second batch of 18 aircraft.

The final jet for Iraq was also the last F-16 to be built at Fort Worth ('Cowtown'), and it was delivered on November 14 2017. This brought to an end 40 years of F-16 production at the plant, during which Fort Worth delivered 3,620 F-16s, of the 4,588 aircraft built – the remainder being built by Fokker and SABCA in the Netherlands and Belgium, KAI/Samsung in Korea and TAI in Turkey.

The Bahraini order represented "Lockheed's pass to keep its F-16 production line open for the next three to five years", according to one senior RBAF officer, effectively facilitating further exports, since it is easier to sell from a 'hot' production line.

That production line will no longer be located at Fort Worth, however. Instead, Lockheed will produce the 16 aircraft on a new production line in Greenville, South Carolina, which is also home to the company's T-50 trainer programme. The Bahraini aircraft will be the first F-16s to

be produced at the new facility, with deliveries expected from 2021.

Orlando Carvalho, executive vice-president of aeronautics at Lockheed Martin, said the company had: "kept the supply chain sufficiently warm to enable the re-start of the production for Bahrain. Now that Bahrain has committed, we are fully moving forward with standing up the line again, energising the supply base to provide all the components."

The Block 70 F-16V, purchased by Bahrain, is the latest variant of the Fighting Falcon. It draws much of its technology from the fifth-generation F-35 Joint Strike Fighter, offering advanced combat capabilities in a scalable and affordable package, with a modern commercial off-the-shelf (COTS)-based open architecture avionics system with a high-volume, high-speed data bus to facilitate further upgrades and weapons and systems integration.

Host of features

The F-16V combines new technology with a host of features that have already been incorporated in the latest F-16s and F-16 upgrades, including conformal fuel tanks, an advanced helmet-mounted sight, the Sniper advanced targeting pod (ATP), and Link 16 datalink. It also addresses some obsolescence or diminishing manufacturing sources (DMS) issues, replacing those systems that might become harder to support in years to come.

The F-16V also incorporates structural upgrades to extend the life of the aircraft and the new variant has a 50% longer airframe life than previous variants (12,000 flying hours compared to 8,000 hours).

The aircraft has a revised, fully night vision imaging system (NVIS)-compatible cockpit with two 4-inch square side displays and a 6- by 8-inch high resolution centre pedestal display.

But, most notably, the F-16V is the first

The Bahraini order represented "Lockheed's pass to keep its F-16 production line open for the next three to five years."

The F-16V is the first of its type with an active electronically scanned array (AESA or E-scan) radar.



of its type with an active electronically scanned array (AESA or E-scan) radar. This is the Northrop Grumman AN/APG-83 scalable agile beam radar (SABR), an advanced AESA radar based on technology from the F-35's APG-81, with which it shares greater than 90% software commonality and more than 70% hardware commonality.

The APG-83 radar has greater detection and tracking ranges, and can simultaneously track more than 20 air-to-air targets. It offers high-resolution synthetic aperture radar (SAR) mapping and can simultaneously interweave air-to-air and air-to-surface modes, while being able to operate in dense radio frequency (RF) environments.

With fewer moving parts and an ability to function with some degraded transmit receive modules, it has been estimated that the solid-state AN/APG-83 radar will be three-to-five times more reliable than legacy mechanically scanned radars.

The F-16V prototype (a converted Taiwanese Block 20 aircraft, 93-0702)

made its maiden flight on October 16 2015, joining a US Air Force Block 40 F-16D (87-0392), which served as an AN/APG-83 radar testbed. Lockheed Martin is now more than two years into the flight-test phase of the programme.

Resurgence in interest

Randy Howard, Lockheed Martin's F-16 business development executive, said customer interest in the F-16V remains strong, particularly now that the F-16V programme is well into its flight-test phase, with a launch customer for the type and a hot production line at Greenville. "We're seeing a remarkable resurgence in interest in the F-16. A lot of it has to do with the Block 70."

Not every air force needs or can afford the Joint Strike Fighter – and some are unlikely to be cleared to purchase F-35s. In such cases, the F-16 Block 70 could be the most interoperable alternative available to US allies, giving it an edge over rivals like the Saab JAS39 Gripen.

The Slovak Republic has requested the

sale of 14 advanced Lockheed Martin F-16V Block 70/72 Fighting Falcon fighters to replace its ageing Mikoyan MiG-29 'Fulcrums' and Lockheed believes that there is a realistic prospect of selling more than 400 extra new-build F-16Vs in the coming years. The company is offering the type in Bulgaria, Colombia, India, Indonesia, and Poland.

Lockheed Martin, teamed with Tata Advanced Systems, has offered to move the production line to India, if the F-16 is selected. An Indian production line would then provide F-16s for any further international buyers that may emerge, perhaps with lower Indian labour costs allowing a price reduction.

Nearly 3,000 of the 4,588 F-16s built remain operational in 25 countries, providing a huge potential market for the F-16V as an upgrade configuration.

Howard has said that there are already four F-16V upgrade programmes under way, covering more than 400 aircraft. These include upgrades for Taiwan (144 aircraft), South Korea (134) and Greece (85). ■

Al Darmaki for Oman Air

Ghaith Mohammed Al Darmaki is the new senior vice president (SVP) of the IT department at Oman Air.

Al Darmaki said: "I am delighted to be joining Oman Air at such an exciting time. So much has already been achieved in 2018 alone, with the opening of the new airport terminal in Muscat and the ambitious fleet expansion.

"I am proud to accept the position of SVP and I am confident I have the right industry experience to deliver success. I look forward to working with the Oman Air team and contributing towards the dynamic development of the airline."

Guillaume Faury is next Airbus CEO

The Board of Directors of Airbus SE has selected Guillaume Faury as future Airbus Chief Executive Officer (CEO).

Faury, who currently

THOMPSON HEADS ABU DHABI AIRPORTS

Bryan Thompson has been appointed CEO of Abu Dhabi Airports.

Abubaker Seddiq Al Khouri, chairman of the board, said: "I am confident that his vast experience and excellent leadership will take Abu Dhabi Airports beyond the delivery and opening of one of the region's most ambitious infrastructure projects and on towards further establishing Abu Dhabi as a destination of choice for tourism, business travel and transit."

Thompson said: "I feel honoured to have been invited to join Abu Dhabi Airports at this remarkable time, as we prepare to unveil our ground-breaking project to the world and further highlight everything our unique brand of Arabian hospitality has to offer.

"My focus will be to build on the strong foundations already in place, further cementing Abu Dhabi Airports' role as a leading world hub and ensuring the company's growth in constructive partnership with all relevant stakeholders."



serves as President Airbus Commercial Aircraft, will succeed Tom Enders, 59, who remains CEO until the Annual General Meeting (AGM) on 10 April 2019, when the appointment of Faury as executive member of the Board will be submitted to shareholders.

Tom Enders, CEO of Airbus, said: "Guillaume is an excellent choice. He has gained broad industrial and aeronautic experience over many years and in many roles both inside and outside Airbus. With his strong values

and international mindset, Guillaume stands for the new generation of leaders that Airbus needs for the coming decade. He knows he can rely on me to facilitate a smooth transition."

VP for Thales Flight Avionics

Thales has appointed Jean-Paul Ebanga as vice-president of flight avionics activities.

He reports to Gil Michielin, executive vice-president for avionics.

"Jean-Paul will accelerate business model renewal

and digital transformation of our flight avionics activities to the benefit of long-term growth," said Michielin. "His sound experience in the aerospace domain and his track record of commercial and industrial successes worldwide will be key assets."

Boeing's interim comms leader

The Boeing Company has announced that Phil Musser, senior vice president of communications, will depart the company in November.

Anne Toulouse, current Boeing vice president of global brand management, will replace Musser on an interim basis.

"Phil has brought passion, creativity, energy and a digital mindset to Boeing communications," said Dennis Muilenburg, Boeing chairman, president and CEO. "He's made meaningful contributions to the company, leading important new investments in our social media strategy and digital and analytics capabilities, and driving a new Boeing brand platform."

He added: "Anne brings nearly 30 years of diverse company experience to the role, including leadership positions in media relations, employee communications, and global brand management and advertising, among other key areas."

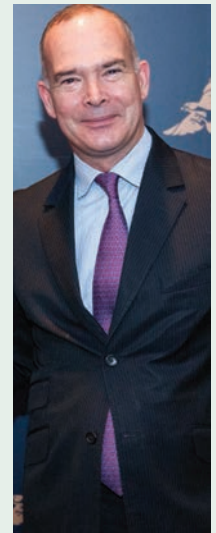
COSTE FOR GULF AIR

Gulf Air named Vincent Coste as the airline's new chief commercial officer in September.

Krešimir Ku ko, Gulf Air chief executive officer said: "Coste joins us at a significant time in the airline's history. The airline's executive management has defined 2018 as the year of change as it involved a new brand, new livery, new fleet, new uniform, new destinations and a new strategy.

"By the end of 2018, the airline will receive five Boeing 787-9 Dreamliners and one Airbus A320neo.

"The national carrier's incoming aircraft orders will ensure it maintains one of the youngest fleets in the region, while building upon its award-winning reliability, on-time performance and product and service standards."



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speaks to the founder and CEO of Click Aviation Network.



“Our platform connects key players from around the world.”

1

■ Can you tell me what Click Aviation Network does?

Click Aviation Network is a Dubai-based global network of aviation partners who offer an integrated array of services, from ground-handling, ground support, international trip support, aircraft charter and route analysis, to a revolutionary networking tool that empowers modern business: Click Omega.

Due to our extensive strategic partnerships and far-reaching connections, Click Omega is loaded with the most up-to-date information regarding permit requirements, fuel and handling rates, plus any additional details required in the trip-planning process. This immediate access to vital data reaps instant and effective results for users of Click Omega.

Our platform connects key players from around the world, bringing them under one roof to explore business opportunities, increase operational efficiency, eliminate risks, reduce costs and build credibility.

2

■ What inspired you to set the company up in 2015?

I had been working in the aviation industry for years prior to founding Click and, during this time, I had noticed that there was a significant gap in the industry.

We were severely lacking in strong connections among critical players, which adversely affected operational efficiency and communication around the world.

In 2015, I founded Click to effect positive change in the market that would connect aviation professionals instantly through a unique and global networking concept.

As a company, our vision is to serve as the engine for innovation and connectivity across the global aviation industry.

3

■ Who are your customers?

Our clients include charter brokers, operators, suppliers and other service providers in the international aviation industry. While the Middle East is a critical part of our targeted region, we are also targeting Europe, the CIS, Asia, and, more recently, America & Latin America.

4

■ As a young company, how are you doing in a competitive market?

Competitiveness is always a positive motivation for permanent business development.

Simply being in the service sector in a very competitive environment means that we offer the best services at the highest standards. Otherwise, we would not have a place in this market.

5

■ Will you be announcing anything at the Middle East Business Aviation Association (MEBAA) show in December?

Yes, we have recently added new services to the Click portfolio, which will be showcased during the MEBAA event this year.

We will also be telling our clients more about our exciting new global expansions.

6

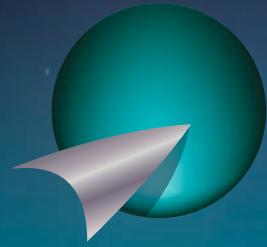
■ What does a typical day as CEO hold for you?

I don't have a typical day but I can say my day begins early, as I believe that "success comes with the sunlight". Every morning, I'll check company e-mails for any emergencies. Then, most days, I'll do 30-40 minutes of cardio before having breakfast and heading to work.

I always start by absorbing the latest news and information. Usually, I'm in my Dubai office, where I'll have a variety of meetings to discuss how the business is doing, new industry trends, vital issues, and so on. I also schedule daily video calls with my global team in the US, China, the CIS countries and Europe. Fortunately, I've got a fantastic management team behind me, so the job can be incredibly varied.

Exercising creativity when developing new solutions and techniques for clients offers exciting opportunities to use all of my skill set.

But, at the end of the day, an important part of my time goes to my family, as they are the real source of my refreshment and passion.



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