

ISSUE 1, VOLUME 11: FEBRUARY – APRIL 2019



# ARABIAN AEROSPACE

INTERNATIONAL  
AEROSPACE  
PUBLICATION OF THE YEAR

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

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25 years

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reaches  
for the  
skies

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A large, modern hangar with a blue exterior and a white interior. The hangar is filled with two large commercial aircraft, one in the foreground and one in the background. The aircraft are white with teal and blue accents. The hangar's interior is supported by a complex steel truss structure. The sky outside is a deep blue, suggesting dusk or dawn.

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## Why there's plenty to be optimistic about in 2019

Optimism took over as the world heralded 2019 with year-end results demonstrating that the global aerospace and defence industry had somewhat recuperated and experienced a solid year, with passenger travel demand strengthened and global military expenditure continued to rise.

The MENA region hadn't enjoyed quite the growth of the past five years but, despite the challenges of oil price uncertainties, as well as the political differences and conflict across the region, there were still signs of positive development.

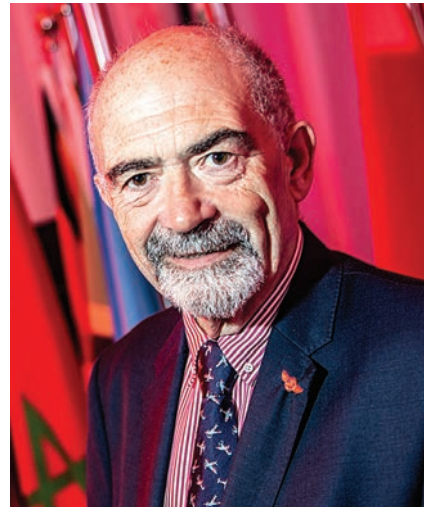
The industry is expected to continue its growth trajectory in 2019, led by increasing commercial aircraft production and strong defence spending.

In the Middle East, defence spending is expected to recover as oil prices stabilise at much higher levels compared to the 2015-17 period. The effect of this will become apparent at the February defence headline event – IDEX in Abu Dhabi.

This is always seen as a barometer for the health of the defence industry and there is a fair sense of optimism that greater involvement by the region's manufacturing sector will see greater participation beyond offsetting arrangements.

Six out of the top ten countries with the highest military expenditure as a percentage of gross domestic product (GDP) are in the Middle East: Saudi Arabia, Kuwait, Bahrain, Oman, Jordan and Lebanon.

Bahrain has already restructured its aerial defence force and, as you will read in our cover story, is making a strong case for cooperation.



Although the pace of growth in the two major countries in terms of expenditure – the UAE and Saudi Arabia – has slowed, their spending and strategic plans are significant, and analysts are predicting mid-single-digit growth annually over the next decade.

This positive outlook is also reflected in the commercial aerospace sector, where order backlog remains at an all-time high as demand for next-generation, fuel-efficient aircraft continues to surge with the rise in oil prices.

Over the 2018-37 period, passenger traffic in the Middle East is forecast to grow at 5.2%,

creating demand for 2,990 new aircraft valued at \$660 billion.

This means manufacturers will have to ramp up production to drive the growth which, itself, will add pressure to the supply chain.

This, too, is good news for the region. Already Abu Dhabi's Mubadala is demonstrating capabilities in the aerostructures business way above original expectations.

Morocco and Tunisia are already heavily invested in aerospace manufacturing and sectors such as MRO and aircraft interiors are expected to grow, as is training, as the industry expands its efforts to develop a workforce equipped to ensure the Middle East can shine in the sector on the ground, in the air and even in space.

So, as we enter this new year on a wave of optimism, let us hope for the wisdom and the circumstance to see our hopes become reality.

Safe landings,  
Alan Peaford, editor-in-chief

**COVER: RBAF commander, Major General Hamad bin Abdullah al Khalifah. PICTURE: ALAN WARNES**

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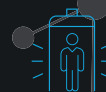
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## FOCUS ON . . .

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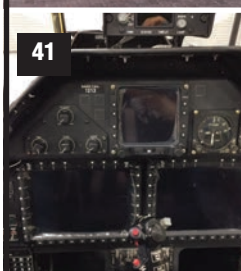
Several nations are modernising or looking to expand their rotorcraft fleets.

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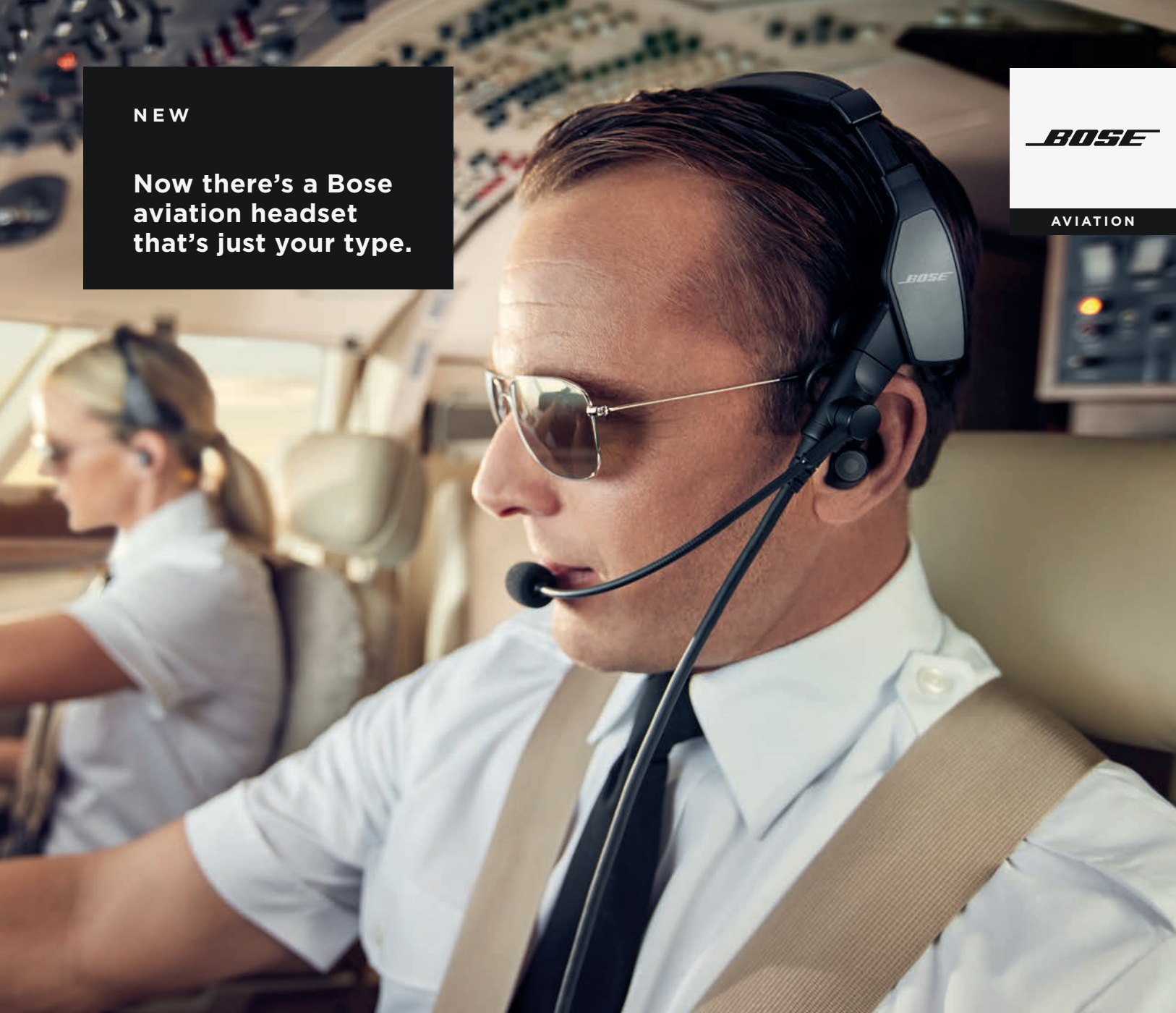
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### PROFLIGHT AVIATION HEADSET

In-ear configuration for pilots of moderately noisy aircraft, such as pressurised jets.





## Emirates' world's first integrated 'biometric path'

Emirates is gearing up to launch the world's first 'biometric path', which will offer its customers a smooth and truly seamless airport journey at the airline's hub in Dubai. Utilising the latest biometric technology – a mix of facial and iris recognition – Emirates passengers will soon be able to check in for their flight, complete immigration formalities, enter the Emirates Lounge, and board their flights, simply by strolling through the airport.

The latest biometric equipment has already been installed at Emirates Terminal 3, Dubai International Airport. This equipment can be found at select check-in counters, at the Emirates Lounge in Concourse B for premium passengers, and at select boarding gates. Areas where biometric equipment are installed will be clearly marked.

## Virgin lands historic spaceflight

History was made in December as Abu Dhabi-backed Virgin Galactic's SpaceShipTwo, VSS Unity, landed from her maiden spaceflight. It is the first time that a crewed vehicle, built for commercial, passenger service, has reached space. It is also the first human spaceflight to be launched from American soil since the final Space Shuttle mission in 2011.

A 60-second planned rocket motor burn propelled VSS Unity to almost three times the speed of sound and to a peak of 51.4 miles.

## Emirates' new Roman lounge

Emirates has opened its latest lounge at Rome's Leonardo da Vinci-Fiumicino Airport.

"The new lounge

represents an investment of more than \$4.5 million by Emirates and is an integral part of our focus to provide our premium and loyal customers with the highest levels of comfort and convenience, not just in the air, but also on the ground," said Mohammed Mattar, Emirates' divisional senior vice president, airport services.

## IATA predicts 8.2 billion air travellers

The International Air Transport Association (IATA) revealed that present trends in air transport suggest passenger numbers could double to 8.2 billion in 2037.

"Aviation is growing, and that is generating huge benefits for the world," said Alexandre de Juniac, IATA's director general and CEO.

"A doubling of air passengers in the next 20 years could support 100 million jobs globally. There

are two important things that stand out about this year's forecast. Firstly, we are seeing a geographical reshuffling of world air traffic to the east. And, secondly, we foresee a significant negative impact on the growth and benefits of aviation if tough and restrictive protectionist measures are implemented."

## New G500 for Qatar Airways

Gulfstream Aerospace recently made the first international deliveries of the clean-sheet, record-breaking Gulfstream G500.

Qatar Airways received two G500 aircraft at Gulfstream's Savannah headquarters. The aircraft will join the five Gulfstream G650ER aircraft already in service with Qatar Executive, the airline's executive charter business.

Qatar Airways Group chief executive, Akbar Al Baker, said: "We are truly

delighted to be the international launch customer for the all-new Gulfstream G500 jet. This state-of-the-art aircraft will set a new industry benchmark and will offer our passengers an unrivalled flying experience.

## Turkish and IndiGo in codeshare

Turkish Airlines and IndiGo have entered a codeshare and mutual cooperation agreement. This is the first codeshare agreement for IndiGo as part of its international expansion strategy. Through this cooperation, Turkish Airlines will be offering new destinations in India as marketing carrier on IndiGo-operated flights, while IndiGo customers will be able to reach many European destinations through Turkish Airlines' network.

## Meggitt aftermarket deal with OEM

Meggitt and OEMServices have signed a memorandum of understanding (MoU) to provide component aftermarket services for airlines operating in the Middle East, Africa, Asia and Russia/CIS.

OEMServices will provide distribution services for Meggitt in the named regions and a one-stop-shop for repair operations utilising dedicated global service centres and a 24/7 aircraft-on-ground (AOG) hotline, committed to responding to operator needs within the hour.

OEMServices' expertise in serving operators in these markets will ensure that Meggitt-approved solutions are immediately available, optimising repair turnaround times and minimising operational interruptions.

## Istanbul Airport officially opens

Istanbul Airport was officially opened on October 29 by Turkish President Recep Tayyip Erdogan, who said it would become an employment site for 225,000 people and make a single contribution of 4.9% to Turkey's gross national product.

"We have also received significant interest from other airlines on the possibilities of launching new routes and frequencies, especially because of the ease of access created by the dramatic increase in slots availability. Within 16 months we'll have a third runway, doubling the airside capacity over the existing airport," said Kadri Samsunlu, the airport CEO.

## Oman Air's new crew facility

Oman Air has officially opened a new state-of-the-art crew reporting centre at its hub in Muscat.

The purpose-built crew terminal is fitted with cutting-edge baggage-handling systems, electronic check-in kiosks and security and customs scanning equipment.

The centre eliminates the need to access the departure terminal at the airport.

The airline will provide user-friendly technology for its 691 pilots and approximately 1,757 cabin crew during the check-in and briefing processes prior to boarding their flights.

## Partnership to pioneer air navigation in the UAE



Signing on the dotted line: Norbert Haslacher, CEO Frequentis AG, and Ahmed Al Jallaf, the GCAA's assistant director general of ANSP.

Frequentis, a supplier of communication and information solutions, and the UAE's General Civil Aviation Authority (GCAA) have signed a memorandum of understanding (MoU) to support current and future developments in airspace management.

The agreement will establish a general working arrangement between the pair in order to strengthen GCAA's position as a leading organisation within the air traffic control (ATC) domain, while reinforcing Frequentis' role in providing systems that ensure the efficient and safe management of airspace.

Key topics for the growth of the partnership will address the enhancement of future flight planning, the interoperability of unmanned aerial vehicles (UAVs) and research to identify and develop air navigation service capabilities.



All smiles: Simon Roads of Honda Aircraft Company (left) with Adel Mardini of Jetex.

## Jetex clinches exclusive HondaJet dealer rights

Jetex is bringing the next-generation in advanced private jets to the Middle East after striking an agreement with Honda Aircraft Company to become the exclusive authorised dealer for the region.

The deal means Jetex is now the manufacturer's sole representative for the new HondaJet, offering sales and support across the Gulf and Middle East region.

"With Honda's brand strength and recognition in the Middle East, we have received tremendous interest in the HondaJet Elite. We are proud to appoint Jetex to provide our customers with a committed sales team in the region for the world's most advanced very light jet," said Honda Aircraft president and CEO, Michimasa Fujino.

## Royal Air Maroc to join Oneworld

Royal Air Maroc is to join Oneworld, a move expected to be implemented in mid-2020.

The carrier's regional subsidiary, Royal Air Maroc Express, will join as an affiliate member at the same time.

Royal Air Maroc CEO, Abdelhamid Addou, said: "This undoubtedly represents one of the most significant landmarks in our airline's 60-year history and on our journey to establish Royal Air Maroc as the leading airline of Africa."

## SWISS chooses Joramco

Joramco and Swiss International Air Lines (SWISS) have signed a five-year agreement by which Joramco will perform 'C' and heavy

maintenance visit (HMV) checks on the SWISS Airbus fleet of A320, A335 and A340 aircraft.

"Joramco, with its expanding capabilities, strives to provide its customers with flexible, high-quality services at competitive prices," said Jeff Wilkinson, CEO of Joramco.

## C-checks for GVs in Dubai

Jet Aviation has successfully performed two simultaneous 192-month C-checks on Gulfstream GV aircraft in Dubai.

Both checks were combined with a number of service bulletins. The company recently redelivered the aircraft to two separate customers.

Jet Aviation's maintenance centre in Dubai supports the full line of Gulfstream large-cabin business jets.



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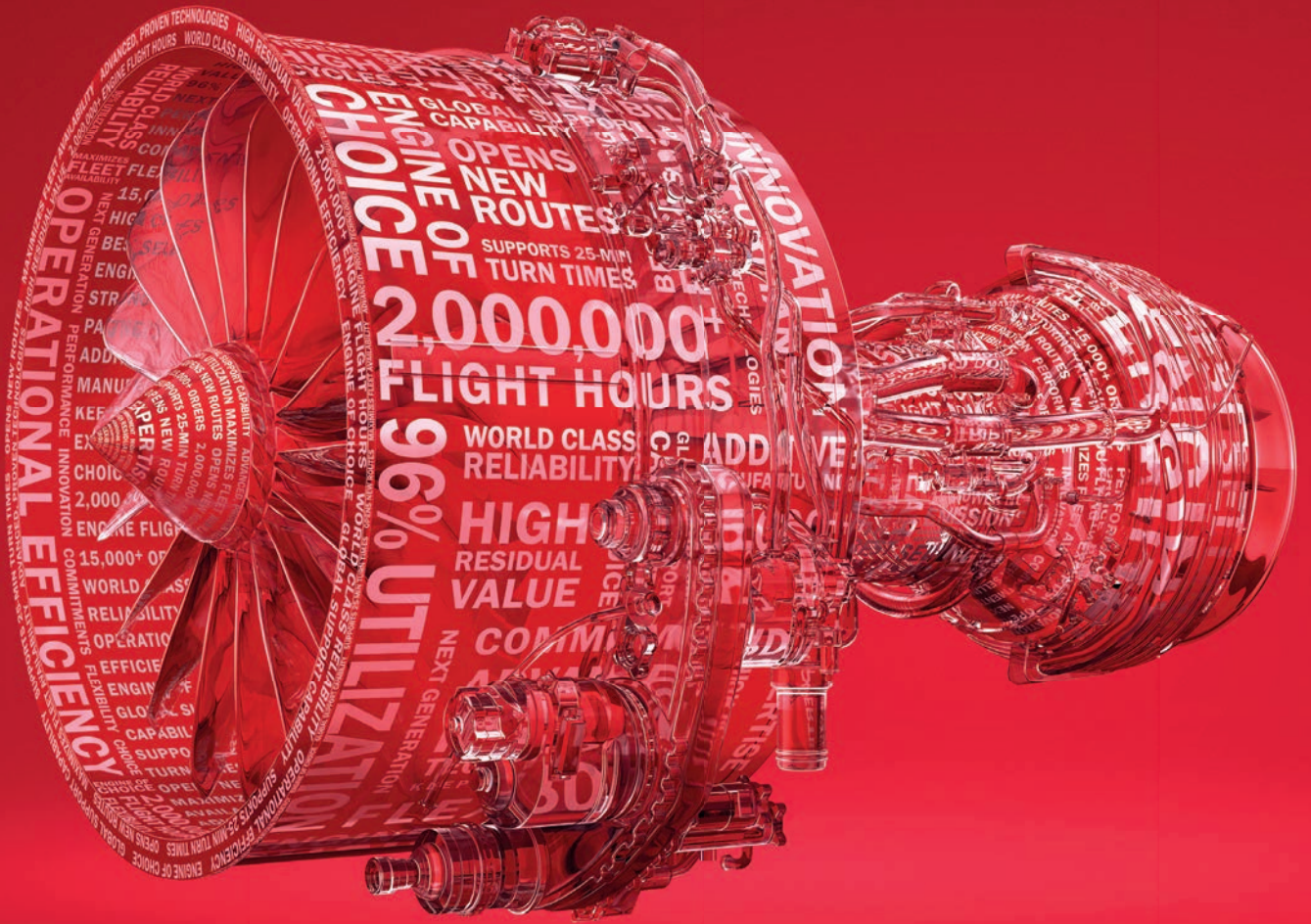
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## New agreement for offences on aircraft

Fahad Saeed Al Raqbani, the UAE's Ambassador to Canada, has signed the protocol for amending the agreement concerning offences and acts committed on board aircraft.

The protocol expands the grounds of jurisdiction by recognising, under certain conditions, the competence of the state of landing and the state operator to exercise jurisdiction over offences and acts on board aircraft.

The protocol extends legal recognition and certain protection to in-flight security officers and contains provisions for coordination among states to protect air transportation.

## Kuwait H225 deliveries begin

The Kuwaiti Ministry of Interior has announced the arrival of two Airbus H225 long-range helicopters from France. Newly trained Kuwaiti pilots flew them on their five-day delivery journey. The aircraft will serve with the Kuwait Police Rotary Wing, and are reportedly to be based at the Kuwait City Heliport, though the unit was previously based at Kuwait International Airport/Al Mubarak Air Base.

## Smart move at Hamad

Hamad International Airport (HIA) has successfully completed the first major phase of its 'smart airport' programme, which will enable the home carrier, Qatar Airways, to process more than 25% of its passengers using self-service check-in and bag-drop facilities.

Qatar Airways Group chief executive, Akbar Al Baker, said: "As Qatar Airways' home and hub,



The BBJ features striking paintwork on the fuselage, while the seating creates the perfect relaxation space.

## Vertis Aviation adds second BBJ to its fleet

Switzerland-based Vertis Aviation, the long-range charter specialist, has added a second Boeing Business Jet to its portfolio of large-jets available for international charter.

With a maximum range of 5,500 nautical miles and flying-times – augmented by seven PATS auxiliary fuel tanks – of up to 12 hours, the aircraft will be popular with clients seeking an executive airliner.

The aircraft's floating base better serves the growing number

of clients requiring long-range charters from the Middle East, as well as Europe and Russia.

Vertis partner, Jeffrey Emmenis, said: "We are experiencing a solid rise in demand for aircraft that can accommodate complex trips and we're arranging an increasing number of global circumnavigations. This type of aircraft perfectly fulfils all the requirements for these very special journeys, including Dubai to Tokyo."

Hamad International Airport is the airline's five-star gateway to the world. Initiatives like the smart airport programme put the passenger at the heart of the airport's strategy, helping make it one of the most technologically advanced and operationally efficient airports in the world."

## Alpha plans to EAT well

Etihad Aviation Training (EAT) and the largest multi-pilot training programme in MENA – Alpha Aviation Academy – have launched a partnership for the delivery of the core flying skills components of Alpha's pilot training programme.

EAT is a well-established approved training organisation (ATO) with one of the largest training facilities in the Middle East. Student pilots will spend three months in Al Ain,

being trained on the Cessna, before returning to Alpha in Sharjah to start the advanced flight simulator training phases.

## Trent newcomer powers Airbus

The Rolls-Royce Trent 7000, the latest member of the Trent family of engines, successfully powered the Airbus A330-800neo into the skies for its first test last November. The Trent 7000 is the exclusive engine for the A330neo and the seventh in a Trent family that has now accumulated more than 125 million engine flying hours.

Chris Davie, Rolls-Royce, programme director - Trent 7000, said: "The new engine is the latest chapter in a Trent success story and takes an outstanding aircraft to the next level of performance."

## Etihad watches the space

Etihad Airways is now introducing economy space, a new seating option across its wide-body fleet, to provide more choice to its customers on longer flights.

The airline has retrofitted its 10 Airbus A380s with economy space seats, which feature an increased seat pitch of up to 36 inches. The redesign increases the number of extra legroom seats in economy from 20 to 80 on this aircraft type.

## Flyadeal signs for 50 737 MAX jets

Flyadeal has committed to ordering 50 737 MAX aircraft, with options for 20 more, in a deal valued at up to \$5.9 billion at list price.

The deal is subject to both sides concluding final terms and conditions and a purchase agreement.

Director general of Saudi Arabian Airlines, Saleh bin Nasser Al-Jasser said: "The demand for air transport services in the domestic market of the Kingdom of Saudi Arabia has grown exponentially. A new brand, with a fresh identity focused on low-fares, Flyadeal has brought to the market a new choice – which has been received very positively."

## SalamAir goes for Swissport

SalamAir of Oman has signed a five-year contract with Swissport for hub handling at Muscat International Airport. The Swiss Aviation Services company, a global market leader of airport ground services and cargo handling, will provide the Omani carrier with a full range of services, from passenger services to ramp operations.

## Global 7500 earns FAA approval

Bombardier's flagship business jet, the Global 7500 aircraft, has received Federal Aviation Administration (FAA) certification.

"This milestone is the latest accomplishment for our award-winning Global 7500 business jet, which has been exceeding expectations on every level," said Michel Ouellette, senior vice president, Global 7500 and Global 8000 programme, Bombardier Business Aircraft. "The Global 7500 business jet has proven itself as the highest-performing aircraft in the industry and promises to revolutionise the market and significantly change the business aviation landscape."

## Flynas receives A320neo

Flynas received its first of 80 A320neo family aircraft in November. This follows an agreement, signed in January 2017, with deliveries scheduled to take place up to 2026.

Flynas is the first operator in Saudi Arabia to acquire the A320neo. It currently operates a fleet of 30 A320neos.

The A320neo, powered by CFM LEAP-1A engines, will support Flynas' expansion plans, while providing greater operational efficiency and passenger comfort.

## Search-and-rescue helicopter crash

Four people were killed in a helicopter crash which occurred during a search-and-rescue operation near Jebel Jais in the UAE at the end of December.

Three Emiratis and a fourth person died in the crash while performing their duties on board an Agusta 139 rescue



Delegates from Emirates and South African Airways at Emirates headquarters. From left: Joydeep Sareen, UAE country manager - sales, SAA; Anand Lakshminarayanan, SVP revenue optimisation, Emirates; Peter Davies, chief restructuring officer, SAA; Adnan Kazim, divisional senior vice president strategic planning, Emirates; Orhan Abbas, SVP - commercial operations, Emirates; TG Venugopal, SM codeshare cooperation, Emirates; Ben Leon, office of the CRO, SAA.

## Emirates and SAA expand codeshare

Emirates and South African Airways (SAA) are expanding their strategic cooperation with enhancements to their codeshare agreement, opening up new destinations for both carriers' customers.

Pending governmental approval, SAA and Emirates have signed an enhanced commercial partnership.

"We remain deeply committed to our decades-long relationship with SAA, and the forthcoming expansion of our codeshare agreement is an exciting development and a significant milestone in our history in South Africa," said Sir Tim Clark, president, Emirates Airline.

"We have seen great success with the codeshare agreement, having enabled greater connectivity to both SAA and Emirates customers, by offering more choice, flexibility and ease of connections to a wide range of cities via Dubai and across more points in southern Africa."

helicopter, which came down next to Jais Mountain in Ras Al Khaimah.

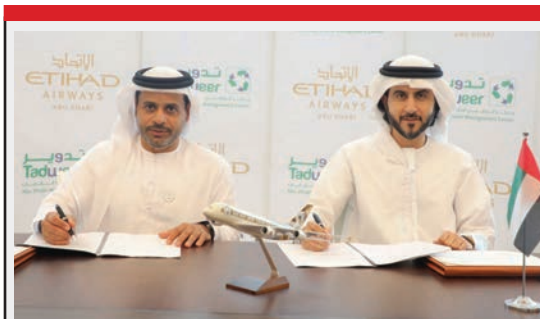
It is understood the helicopter struck a zipline on Jebel Jais.

## Dubai South goes large on logistics

GAC Dubai officially unveiled its new purpose-built contract logistics facility at Dubai South in November. The AED 100 million facility (\$27 million) is the largest in the company's history.

The 45,900 pallet, two-chamber temperature- and humidity-controlled facility is designed to handle a diverse range of product categories, including fast-moving consumer goods (FMCG), food & beverage, beauty products and dangerous goods (DG).

It also features a 2,400sqm dedicated value-added services (VAS) facility, featuring an extensive range of offerings to meet customers' needs.



## Etihad and Tadweer launch jet fuel project

Etihad Airways and Abu Dhabi Waste Management Center (Tadweer) are set to collaborate on a research project to explore how municipal waste can be converted into jet fuel.

One of the aims would be to use the final jet fuel on Etihad Airways' flights.

Mohammad Al Bulooki, chief operating officer at Etihad Aviation Group (pictured right signing the deal with Dr Salem Al Kaabi, acting general manager of Tadweer) said: "Waste-to-biofuel is a cutting-edge technology – one that Etihad Airways believes will have a profoundly positive impact on the aviation industry, while also providing waste management solutions and a cleaner environment."

Al Kaabi added: "The MoU aligns with our mandate to deliver highly innovative industrial and municipal waste management solutions, as well as our commitment to the national agenda of the UAE Vision 2021 and Abu Dhabi waste masterplan 2040 that aims to divert 75% of municipal solid waste away from landfills."

■ Etihad special report, page 90.

## Reduction of turnaround delays

Emirates passengers travelling from, or transiting through, Dubai International Airport (DXB) can expect fewer instances of delays associated with aircraft turnaround, thanks to a new innovative application built in-house by the carrier.

Hub monitor is being used by Emirates' operational staff in Dubai to share and monitor real time information on the various activities that are carried out to prepare an aircraft for departure. Through its monitoring and proactive alerting system, the application helps avoid delays and improve on-time performance, ultimately leading to a better passenger experience.

## Oman Dreamliner

Oman Air took delivery of its new Boeing 787-9 Dreamliner in December.

With the addition of this latest aircraft, Oman Air now operates nine Boeing 787 Dreamliners. This aircraft will be utilised on Oman Air's European and Far-Eastern sectors.

## RJ's 60-second self-check-in

Royal Jordanian (RJ) passengers can now self-check-in at Queen Alia International Airport (QAIA) using the common use self-service (CUSS) kiosks available in the departures terminal.

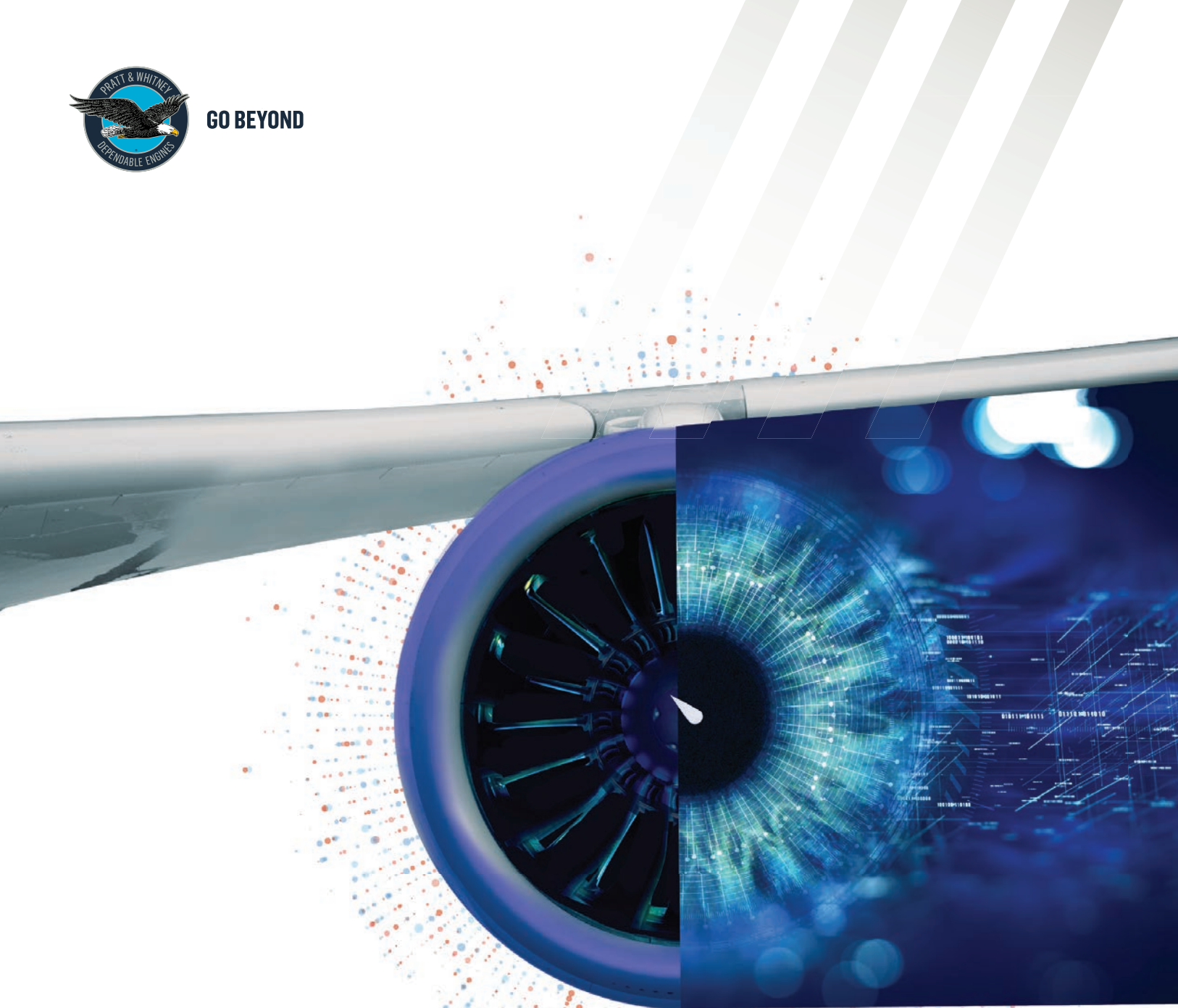
Passengers' boarding passes and luggage tags can now be issued without queuing at the check-in counters.

Passengers flying on RJ and departing from QAIA can self-check-in for all routes with the exception of flights to North America and London, due to security procedures.





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## DAE gets new credit facility

Dubai Aerospace Enterprise (DAE) has signed a new four-year unsecured revolving credit facility arranged by Emirates NBD as sole mandated lead arranger and bookrunner.

The initial commitment of \$535 million is from a group of eight regional banks. The agreement allows the facility to be increased to up to \$600 million at any time after the initial closing. The facility will support the future financing needs of the business.

## Rolls-Royce takes care of MEA

Lebanese carrier Middle East Airlines – Air Liban (MEA) has decided to purchase four new and two option Airbus A350-900neos, powered by Rolls-Royce Trent 7000 engines, as part of its wide-body fleet renewal. The aircraft are due for delivery in 2021.

MEA chairman and director general, Mohamad El-Hout, said: “Rolls-Royce TotalCare is expected to offer optimisation to our maintenance costs through long-term engine maintenance services. This deal symbolises the close bonds and relationship between the UK and Lebanon.”



## Gulf Air Bahraini pilots graduate

A new batch of pilots took to the skies in November with Gulf Air as they completed ground and base training courses.

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

This is part of the cooperation between Gulf Air and Tamkeen – a public-government

agency founded in 2006 to provide assistance and training to private-sector businesses and individuals.

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

## ME states to share security info

Egypt, Jordan, Oman, Saudi Arabia, Sudan and the UAE have signed a letter of intent (LoI) to share sensitive aviation security material.

The move follows the presentation of a working paper entitled ‘sharing of aviation security information between states’ at the second high-level conference on aviation security.

The working paper that inspired the LoI discusses the importance of the strengthening cooperation between states regarding the sharing of relevant information in order to enhance the effectiveness

and efficiency of risk-based aviation security measures.

## Jordan gets the call

The International Air Transport Association (IATA) has called on the Government of Jordan to continue to focus on aviation as a strategic enabler of the country’s economic growth and development.

Aviation already supports close to \$2.2 billion in economic activity and 70,000 jobs in Jordan, including the catalytic benefits of tourism enabled by air transport.

“Jordan’s leaders have always understood the importance of having a sustainable aviation sector.

They have prioritised policies that have encouraged the development of air connectivity that supports travel and tourism,” said Alexandre de Juniac, IATA’s director general and CEO.

## Egypt MRO

Russian Helicopters Holding Company is completing the creation of a maintenance, repair and overhaul (MRO) centre for Mi-8/17 helicopters based at the facilities of Helwan Factory for Developed Industries (HFDI) in Helwan (Egypt).

It plans to certify the MRO centre in Egypt in 2019.

## Rolls-Royce’s electric dream

Rolls-Royce is to build the world’s fastest all-electric aircraft. The zero-emissions aircraft is expected to make a run for the record books with a target speed of more than 300mph (480kph), and a range of more than 200miles.

It will have the most powerful battery ever flown with three lightweight e-motors generating 750kW and 1,000 horsepower – roughly the equivalent of a F1 race car.

The first fully electric aircraft, with a wingspan of 24ft, is scheduled to take the skies in 2020 after 24 months of development.

## That’s the ticket, says IATA

The International Air Transport Association (IATA) has completed the first ‘IATA Pay’ ticket purchase transaction in a live test environment.

IATA Pay is an initiative to develop a new payment option for consumers when purchasing a ticket directly from an airline website.

The method offers an extremely high level of security to both user and recipient and can be instantaneous.

IATA’s role is to develop an industry solution enabling airlines to make this payment option available on their websites.

## Royal Air Maroc receives 737 MAX

Boeing delivered the first 737 MAX for Royal Air Maroc in December. The carrier plans to use the fuel-efficient, longer-range version of the popular 737 jet to expand and modernise its fleet. Morocco’s flag carrier, which also recently welcomed its first 787-9 Dreamliner, will take delivery of three more 737 MAX 8s and three more 787-9s over the next few months.

“These new 737 MAX aircraft expand our medium-haul portfolio, which forms the backbone of Royal Air Maroc’s fleet. Our choice of this aircraft is in line with our strategy of continuously expanding and modernising our fleet and strengthening operations,” said Abdelhamid Addou, CEO and chairman of Royal Air Maroc.



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 **BOEING**

*Syrian Arab Airlines chief executive, Talal Abdulkarim, talks to **Martin Rivers** about the flag-carrier's intolerable challenges, and how Russia could help reverse its fortunes.*

**S**yrrian Arab Airlines (SyrianAir) provoked a curious mixture of applause and raised eyebrows at the annual meeting of the Arab Air Carriers Organisation (AACO) in Cairo in November, when chief executive, Talal Abdulkarim, urged the industry group to hold its next get-together in Damascus.

The Syrian capital would not have been the first venue to spring to mind when the AACO began making plans for its 2019 meeting. In all honesty, it was probably bottom of the list.

Syria has been torn apart by eight years of brutal civil war that began with an Arab Spring uprising but quickly morphed into a multi-faceted battle between regional governments, world powers and a spectrum of rebel groups – most notorious among them the fanatical Islamists of Daesh, who at one point controlled roughly half the country.

With estimates for the war's death toll running as high as half-a-million, the violence has been characterised by the very worst human rights abuses on all sides. Troops loyal to Syrian President, Bashar al-Assad, are among those accused of committing atrocities against civilians.

In this climate it was virtually impossible for the AACO to accept SyrianAir's invitation, not least because of western sanctions prohibiting companies from developing business ties in the country. Kuwait was later announced as the 2019 host.

Continued  
on Page 20

“The sanctions are unjust, illegal and one-sided.”  
TALAL  
ABDULKARIM

# SYRIAN

# SOLDIERING ON

CONTINUED FROM PAGE 19

But Abdulkarim's impassioned speech will not be forgotten quickly by AACO delegates.

His invitation underscored the Syrian Government's firm belief that the worst of the troubles are now behind them. The northern city of Idlib – held by a group with suspected ties to Al Qaeda – is the last remaining rebel stronghold in the country. Daesh has lost almost all of its territory thanks to a two-pronged assault by Syrian and Kurdish forces, resulting in a sharp fall in mass-casualty terror attacks.

Though the AACO does not yet feel ready to hold its flagship event in Damascus, the capital is seeing an increase in international conferences and diplomatic visits.

"This is not a marketing campaign for Syria," Abdulkarim said through a translator. "The security situation in Damascus is safe. The only part where tension is present is towards the north [of Syria], and as a result of the Turkish presence there."

Estimating that the government has regained control of 90% of the country, he said efforts by "takfiri forces" to "destroy Syrian society" have failed unequivocally.

"And with absolute confidence I can say that Syrian airspace is now considered the safest in the world, due to the tight security control."

### Cessation of hostilities

Unfortunately for Abdulkarim, even a complete cessation of hostilities would not be enough to end SyrianAir's isolation on the international stage. The flag-carrier has had its activities impeded by US sanctions for almost two decades – a consequence of the poor bilateral relationship between Damascus and Washington.

The release of confidential US diplomatic cables by Wikileaks in 2010 shed much light on America's policy towards the airline.

One diplomat wrote that America considers SyrianAir to be "the regime asset most vulnerable to unilateral US sanctions, and where the effect of sanctions is most obvious to the Syrian public". Another spoke about US "efforts to pressure the SARG [the Syrian Arab Republic Government] through withholding safety-related licenses" for its flag-carrier.

Western sanctions against Syria's civil aviation sector have blocked the airline from buying new aircraft, while hindering its ability to keep existing ones airworthy. As in Iran, this approach has the unpalatable consequence of endangering the safety of flight for passengers.

That is why *Arabian Aerospace* opposes sanctions against civilian airlines anywhere on the planet.

Despite the humanitarian impact of its embargo, America tightened restrictions against SyrianAir in 2013, when it accused the airline of transporting military cargo on behalf of Iran's Islamic Revolutionary Guard Corps (IRGC). The move came one year after the European Union stepped up its own pressure on SyrianAir by banning it from all EU airports.

The government owns a pair of Tupolev Tu-134s, at least one of which (registration YK-AYB) is used as a diplomatic jet for the head-of-state and other officials. This one is pictured on final approach at Vnukovo International Airport. PICTURE: PICASA.



"The hurdles are securing spare parts, buying new aircraft to expand and renew the fleet, and securing ground equipment for the airports," Abdulkarim explained.

"In addition to that, there are financial penalties, such as the suspension of the accounts of the organisation and the closure of all overseas bank accounts, as well as the suspension of our international insurance subscription. All of this has resulted in a loss of funds that belong to the organisation."

The immediate impact of sanctions is starkest when looking at SyrianAir's depleted fleet.

The flag-carrier today has just seven passenger aircraft on its books – six A320s purchased new from Airbus in the late 1990s, and one 18-year-old A340 that was sourced in 2017 with the help of brokers operating in the black market.

Two of the A320s are currently held in storage, Abdulkarim said, blaming an Israeli air strike on Damascus Airport three or four years ago.

In 2010, SyrianAir also managed to obtain a pair of almost new ATR 72-500 turboprops. But both aircraft are now held in storage, presumably due to the difficulty of sourcing spare parts for maintenance.

Successive attempts to sign a renewal contract with Airbus – reportedly for up to 50 aircraft – were blocked by Washington around the same time.

The challenges only heighten Abdulkarim's sense of pride about his company's safety record.

"Since its establishment in 1947 until now... Syrian Arab Airlines has never had any accidents related to technical errors," he beamed.

"Good training, preparing our technicians prior to 2011, having lots of spare parts available, [conducting] daily safety inspections for the aircraft and regular scheduled maintenance – this

is how the organisation was able to keep the Airbus flying."

Asked about SyrianAir's current route network, he admitted that the fleet is "not big enough to cover all of the requirements of air travel in Syria".

More than a dozen destinations are served by its five functioning aircraft, including Abu Dhabi, Algiers, Amman, Baghdad, Bahrain, Cairo, Doha, Dubai, Khartoum, Kuwait, Moscow, Najaf and Sharjah. That compares with a 30-point network before the airline was banned from Europe.

### No hurdles, problems or restrictions

Flight frequencies are low, but the chief executive insisted there are no "hurdles, problems or restrictions" bearing down on the scheduled network.

"Unfortunately, the media portrayed the situation as if the government has lost full control over Syria," he complained. "In fact, from the beginning of the crisis until the end, Damascus Airport kept running on an unaffected schedule that was never disrupted."

Abdulkarim also rejected US accusations that his fleet is used for military purposes.

"We don't have cargo aircraft," he said. "SyrianAir's fleet is made of medium-size passenger airliners that have a capacity which does not accommodate more than the baggage of the passengers. The sanctions are unjust, illegal and one-sided."

Sceptics would point out that three in-service Ilyushin Il-76 freighters have been painted in SyrianAir's livery, and the type is promoted on the airline's website as providing "commercial cargo services".

In 2015, state-run news agency, SANA,



Three government-owned Ilyushin Il-76 freighters have been painted in SyrianAir's livery.

PICTURE: ALEKSANDR MARKIN.

identified SyrianAir as the operator of at least some of the Il-76s, stating that they are used “for transporting public institutions’ cargo”.

The same freighters have been tracked by western intelligence agencies flying across Syria and into Iran for presumed military missions – blurring the boundaries of SyrianAir’s support role for its government owner.

However, the official stance is that the Il-76s are operated by the Syrian Air Force and do not fall under the business activities of the flag-carrier.

Other Russian-made aircraft can also occasionally be spotted in SyrianAir’s colours.

The government owns a pair of Tupolev Tu-134s, at least one of which (registration YK-AYB) is used as a diplomatic jet for the head-of-state and other officials. Despite being three-and-a-half decades old, both airframes still appear to be in service: YK-AYB was photographed landing in the Belarusian capital, Minsk, in September.

SyrianAir also previously operated Tu-154s – again dating from the mid-1980s – and the company signed (but did not fulfil) a tentative order for three Tu-204s in 2011, just as the Airbus talks were unravelling.

Exceptionally strong diplomatic and security relations between Damascus and Moscow would seem to make Russian-built aircraft the obvious solution for bypassing western sanctions. Yet officials at both SyrianAir and the country’s civil aviation authority have declined repeated invitations to re-fleet with Russian aircraft.

Safety is believed to be the main stumbling block.

SyrianAir’s virtually unblemished safety record is down not just to the airline’s maintenance staff

– who Abdulkarim describes as “globally renowned for being highly skilled” – but also to a longstanding bias for western metal. Current-generation Russian alternatives are, in the opinion of most industry experts, less technologically advanced and more prone to accidents.

However, the capabilities gap between western and Russian aircraft manufacturers appears to be narrowing – and SyrianAir stands to be a major beneficiary.

“Our friends in Russia have a new product called the MC-21, which is comparable to and outclasses similar models from Airbus and Boeing,” Abdulkarim said, in reference to Irkut’s new narrow-body design, which is being marketed as a rival to the A320neo and 737 MAX.

#### Operating cost advantage

If Russian Government claims are to be believed, the MC-21 will offer a 12-15% operating cost advantage over contemporary alternatives. European Aviation Safety Agency (EASA) pilots have begun test flights on the type, which is due to enter commercial service in 2020.

Abdulkarim freely admits that his preference would be placing direct orders with Airbus. “It makes sense to avoid the extra cost of re-training the team to work on a new model,” he explained. “But the main priority is to continue operating and, in order to do that, I need to find alternatives in case the Europeans decide to continue with the sanctions.”

SyrianAir is, therefore, talking to Irkut about an order for “at least 15 to 20 aircraft”, with deliveries expected between 2022 and 2025. That would return the fleet to its original size in

the early 2000s, when Boeing 727s and 747SPs were also operated by the airline.

Crucially, Irkut is working to replace the MC-21’s US-made Pratt & Whitney PW1000G engines with locally produced Aviadvigatel PD-14 turbofans.

The switch reflects Moscow’s growing desire to untangle its domestic industries from western supply chains – a dependency that leaves strategic parts of the Russian economy exposed to sanctions. Though it will be some time before MC-21 production lines are fully autonomous, Abdulkarim believes the threshold needed to defang sanctions has already been passed.

“The model is 80% Russian,” he noted. “And we have words from the company’s management that they were able to get approval from the board members to begin selling the product.”

Asked for its perspective on a possible deal between Irkut and SyrianAir, the US Treasury fired a warning shot to Russia: “Anyone that provides material support to, or knowingly engages in significant transactions with, SyrianAir may themselves be sanctioned by the United States.”

Even putting aside the threat of sanctions, Syria faces immense challenges on the path to normalisation.

#### Mindless bloodletting

Years of conflict have left many people, particularly westerners, unable to associate the country with anything other than mindless bloodletting.

But, just as Beirut rehabilitated its image after Lebanon’s long and brutal civil war, Damascus will, inevitably, one day be seen as just another capital city. Visiting friends and relatives (VFR) traffic will almost certainly be the driving force behind this recovery, fostering links with the outside world long before tourists and business travellers return.

Abdulkarim recalled how dozens of foreign airlines flew to Syria before the war, including major European carriers like Air France and Alitalia. The UAE alone had 55 weekly flights to the country.

Today, in sharp contrast, Syrian skies are dominated by just the flag-carrier and Cham Wings, a privately owned domestic rival. The only foreign airlines serving the country are Iranian and Iraqi.

That represents a tiny fraction of the air transport network that Syria’s 19 million citizens will need if they are to begin re-building their homeland.

No matter how reluctant western powers may be to engage with President Assad, commercial flying in the country is destined to grow exponentially from its current, depressed level.

“There is total security and stability,” Abdulkarim concluded. “There is no reason for airlines to keep their operations suspended at Damascus Airport.”

■ Interview translated by Mohammed Emad.

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**Abdul Wahab Teffaha:**  
 “Although crises have never been alien to our region since time immemorial, they have never reached the levels we are witnessing nowadays.”

# We must not lose our free spirit...

*Fuel prices, the need for infrastructure to keep pace with airline growth, and the dangers of protectionism, were among the topics at the annual meeting of the Arab Air Carriers Organization (AACO) in Cairo. Alan Dron reports.*

**M**ore than 30 of the region’s airlines, both large and small, got together in the Egyptian capital in November to meet fellow C-suite executives and discuss the state of the industry.

As AACO secretary-general, Abdul Wahab Teffaha noted, returning to the city where the organisation was established more than five decades ago, and where EgyptAir was launched in 1932 as the first Arab airline, represented not only a return to its birthplace, but also a milestone to reflect on how far the Arab air transport sector has come – and where it hopes to go in the future.

The past year has seen the sharp rise in fuel prices put a severe dent in the profit figures of even successful Arab carriers; Emirates, for example, reported that its half-year profit for 2018-19 had slumped to \$62 million compared to \$452 million for the same period a year ago.

However, the most pressing concern expressed in Teffaha’s ‘state of the industry’ speech was the growing threat of the rolling back of the liberalised economic environment that has brought many benefits to airlines and their passengers over recent decades.

The reappearance of tariffs and calls for protectionism, together with increasing costs of investment due to rising interest rates, posed real challenges to an industry that relies for its growth

on sturdy and stable economic development and openness, he said.

The global airline industry had grown in tandem with governments adopting liberal policies that eased or removed restrictions on traffic rights and the movement of people and goods, as well as playing down the concept of national flag-carriers and replacing it with brands. This had opened the way for competition and the transformation of air transport from a sovereign activity into an economic one.

For Arab airlines, these liberal policies had allowed giant global airlines and hub airports to appear in the region. “More importantly... these policies enabled the customer to take command and to have the absolute freedom of choice,” said Teffaha.

#### Acceptance and satisfaction

“Removing protectionism meant that the service provider, be that an airline or an airport or any provider for other services, has to do its best to gain the customer’s acceptance and satisfaction, through the best services and prices. This also compelled the service provider to manage its costs in the best way and to become creative to achieve maximum customer loyalty.

“How would things be if we go back to protectionism? The straight answer is the way it used to be... prior to 1978.

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“In those times, airlines used to agree amongst themselves on passenger fares and cargo rates. They also used to agree on the services provided to the passenger: the seat pitch, maximum levels of free food and beverage, maximum weight or number of free bags in accordance with the class of service, and how to construct fares in case the traveller is going to more than one destination.

“There were also undercover enforcement officers who used to test airlines’ adherence to these agreements, where heavy financial fines were imposed on any airline that deviated from those agreements and tried to compete with the others on prices or services.”

Teffaha noted that the global aviation industry was experiencing mixed fortunes.

On the one hand, global passenger numbers now exceeded 4 billion, with Arab airports handling around 370 million – almost equivalent to the entire population of the region. International passenger numbers worldwide grew by 7.9% in 2017, and by a further 5.6% in the first eight months of this year compared for the same period last year.

**Even larger rise**

The Arab region saw an even larger rise in international passengers in 2017 – up 8.2% – although the rise in the first eight months of 2018 was slightly lower than the global average at 4.8%. Tourist arrivals globally grew 6.8% last year and by 7.2% in the Arab region.

This equated to air transport accounting for 7.8% of the Arab world’s gross domestic product (GDP), more than twice the figure of 3.6% globally.

However, growth in the Arab air transport industry was slowing compared to the last decade: “Although crises have never been alien to our region since time immemorial, they have never reached the levels we are witnessing nowadays. This has, of course, had an impact on the economic growth in the Arab world and, consequently, the growth of air transport.

“The Arab air transport market grew by 7.7%



**Governments must replace political fragmentation with collaborative cross-border decision-making. And this has to happen soon.**

ALEXANDRE DE JUNIAC

in 2017 and 4.7% in the first eight months of 2018, as opposed to an annual average of 10% between 2006 and 2016.

“Revenue passenger kilometres (RPKs) grew by 6.8% in 2017 and 4.8% in the first eight months of 2018, versus 14% between 2006 and 2016.”

However, the biggest adverse impact had been seen on international air transport within the Arab world. This shrank in 2017 by 6.8% and by 4.9% in the first eight months of this year.

AACO members had still been able to achieve a growth in load factor by adding less capacity than the growth in demand. This improved member airlines’ operating results, which increased by 12% over 2016.

Working in these difficult circumstances, AACO has concentrated its efforts over the past year on three major areas:

- On the aeropolitical level, it achieved several successes including agreeing with the Arab Civil Aviation Organization the revision of the 1979 Tunis Convention relating to tax exemption for air transport activities. It also continued to call on more Arab countries to ratify the Montreal Protocol of 2014 about unruly passengers and worked with member airlines preparing for the 2019 implementation of International Civil Aviation Organization (ICAO) carbon offsetting and reduction scheme for international aviation (CORSA) emissions agreement.
- It assisted member airlines in many areas of their operations, including rationalising their costs in certain areas, within strict adherence to competition and anti-trust laws.
- It raised awareness of the issues that the industry is dealing with through website, social media, and its electronic weekly, monthly and quarterly bulletins

Speaking to the annual meeting, Alexandre de Juniac, International Air Transport Association (IATA) director-general and CEO, noted that aviation was critical to the MENA region, supporting 2.4 million jobs and \$130 billion in economic activity across the Arab world. That accounted for 3.3% of the region’s employment and 4.4% of its GDP.

“And this footprint is growing,” noted de Juniac. “Over the next 20 years we expect passenger numbers to rise by 4.3% annually. In 2037 some 630 million air journeys will touch this region – 360 million more than this year. As aviation’s leaders, we must work together and with governments to realise this potential and the economic and social development that it will catalyse.

“It is no secret that this region faces some very difficult security challenges. Last year’s personal electronic devices ban crisis has resulted in stronger links between industry and governments focused on keeping aviation secure. But there is always room for greater co-operation, which we continuously urge governments to do.”

Continued on Page 26

**Plenty to talk about: The 51st AACO AGM gets under way.**



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Ask the experts:  
The opening  
AACO session  
in Cairo.

#### CONTINUED FROM PAGE 24

He urged more Arab governments to recognise IATA's operational safety audit (IOSA) in their safety oversight, given the huge contribution it made to airline safety: airlines that passed the audit process were three times less likely to have an accident.

Egypt had led the way in doing this and Bahrain was the latest MENA state to incorporate IOSA in its regulations, he said.

On the environmental front, he noted that the near-term target to limit emissions was to achieve carbon neutral growth from 2020.

He reminded AACO members that every carrier had to start reporting its emissions for the CORSIA scheme from January 1 2019. "In parallel, we want more governments to sign up to the programme from the voluntary period beginning in 2020. Already some 75 are committed. This accounts for about 76% of global aviation activity."

As of last November, Qatar, Saudi Arabia and the UAE were the only MENA governments to have done so. While congratulating them, he urged other governments in the region to follow suit.

#### Foresight in developing airports

Turning to the region's infrastructure, he applauded governments for their foresight in developing airports. "While many parts of the world struggle to build infrastructure, the last decade has seen major investments in Abu Dhabi, Bahrain, Dubai, Egypt, Jordan, Kuwait, Oman, Qatar, Saudi Arabia and elsewhere around the region."

However, he had a word of caution: "To meet their responsibility to provide effective infrastructure, we see many governments looking to the private sector. And that continues to make us nervous. Airlines have been disappointed many times in the past with privatisations that have failed to live up to their promised benefits."

An airport's main value to national development was in the connectivity it provided, not the short-term financial benefits governments might gain from selling it off.

"So, as Saudi Arabia and others across the region consider airport privatisation, our message is clear and simple: talk to all stakeholders – especially the airlines – to ensure that you gain the best long-term economic and social benefits.

"I will be totally frank in saying that we have not seen a privatisation anywhere in the world fully deliver on all its promises. And there is no need for governments in the region to repeat the mistakes that have been made in other parts of the world."

And, despite the many fine new airports in the region, air traffic control (ATC) provision continued to be a worry, especially in the Gulf. "Capacity has not kept pace with the growth in demand, which is leading to significant delays."

What he described as "diplomatic difficulties in the GCC" – a clear reference to the dispute between Qatar on the one hand and Saudi Arabia, Bahrain, the UAE and Egypt on the other – had made the problem worse by affecting flightpaths.

"The average delay per flight attributed to ATC issues in the region is 29 minutes. And we could see that doubling by 2025 unless we make urgent progress. The costs of that would be enormous – \$7.22 billion in ATC delay costs to passengers due to lost productivity time; \$9.12 billion in ATC delay cost to airlines."

There had been many reports and studies into the problem, together with technical advances in ATC such as improved airspace design, flexible use of airspace and the implementation of performance-based navigation. But the problem literally grows worse each day as traffic increases.

"There is an enormous amount of traffic in a limited geographic area. And the only solution is

to manage the area as a whole. Governments must replace political fragmentation with collaborative cross-border decision-making. And this has to happen soon."

The effective implementation of the Middle East contingency coordination group (CCT) to manage tension points in the Syrian crisis demonstrated that states could work effectively together in the ATC field.

IATA's final area for concern was costs. Since 2016 airlines had faced an extra \$1.6 billion in industry costs in the MENA region, most of it from increased passenger facility costs in the Gulf.

#### Growth across the economy

"In coordination with AACO, the message that we are sending to governments is that the value of aviation to a country is not in the taxes it collects. It is in the growth that it enables across the economy. Airlines are like the proverbial goose that lays golden eggs. And if governments choke the goose with taxes and charges, the golden eggs will stop," said de Juniac.

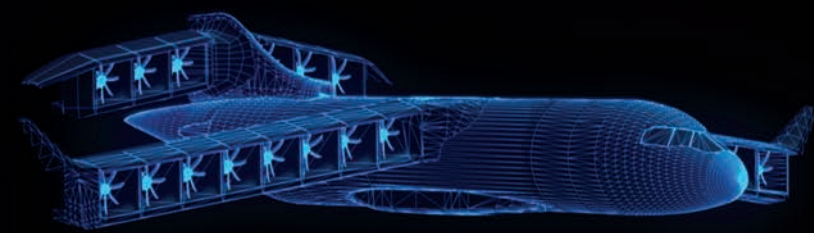
Finally, he urged AACO members to do more to encourage women to enter the sector.

"Finding a solution is all the more critical because we are facing a skills shortage. In the peak northern summer season, Emirates had to trim frequencies because it did not have enough pilots. Finding a solution for that will require a comprehensive set of actions over a sustained period. And one of them – which goes beyond the pilot shortage – is to enable more women to find careers in aviation.

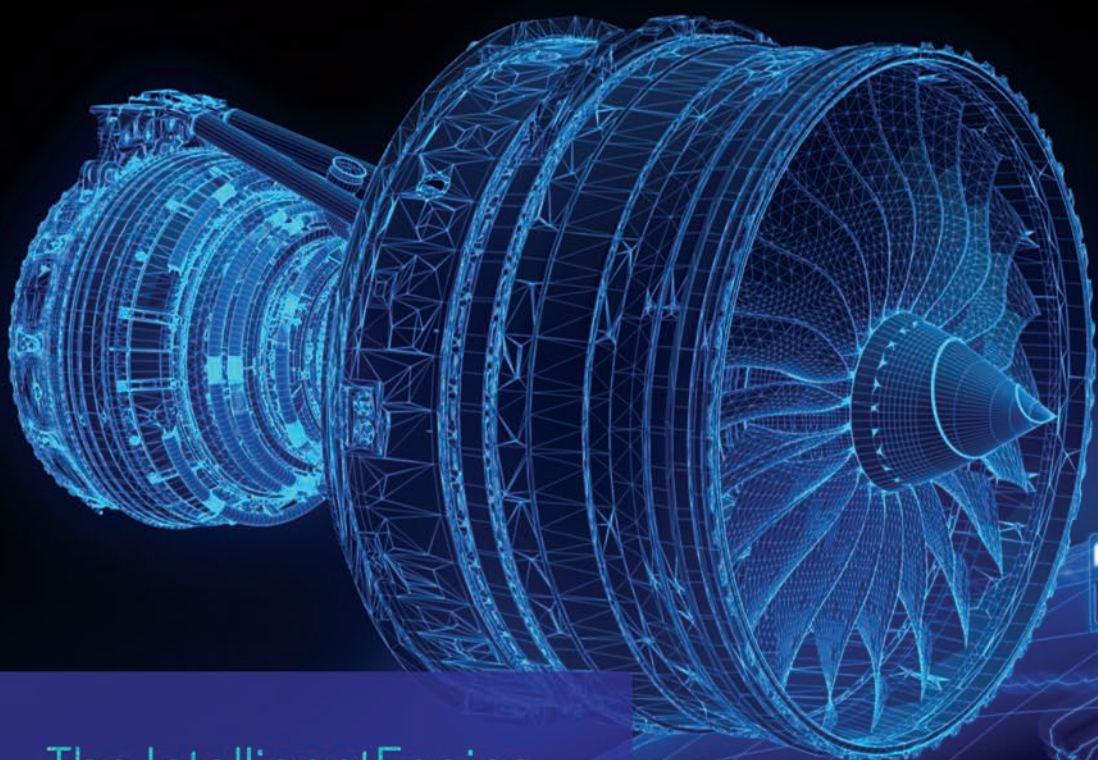
"We are partnering with Korn Ferry, Airports Council International, Aerospace Industries Association, and the International Aviation Women's Association in a study that aims to identify best practices in breaking the glass ceiling for women in aviation.

"We will publish the results in the first quarter of 2019."

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The airline operates a single Embraer ERJ-145 regional jet – seen here on approach to Las Palmas in the Canary Islands.

## Why Mauritania wants to strike a Paris match



*Mauritania Airlines is rapidly expanding its route network, but one of the major prizes still remains tantalisingly out of reach.*

**Alan Dron reports.**

**T**he apron at Nouakchott-Oumtounsy International Airport is growing steadily more busy as Mauritania Airlines ramps up the number of destinations it serves in west and central Africa.

Mauritania's national carrier was set up in 2010 after two previous airlines carrying the country's flag had collapsed in the previous decade.

In the past year, Brazzaville, Dakar, Cotonou, Freetown and Libreville are among the destinations that have started to appear on the destination boards at the recently completed Nouakchott-Oumtounsy.

More African cities are destined to join the network in the next few years, the airline's director-general, Mohammed Radhy Bennahi, said, but one location to which his airline would like to operate – Paris Charles De Gaulle – “is still under study and negotiations”.

The Paris route was previously served, but suspended in 2015 for commercial reasons. With Mauritania being a Francophone nation, it is a natural one for the airline to wish to restore.

Part of the problem behind the delay is that Bennahi is aware that the Mauritanian capital does not, by itself, generate sufficient traffic to make a Paris flight viable. For that reason, he envisages using Nouakchott as a hub, gathering passengers there from elsewhere on the company's route network, before setting off on a connecting flight to the French capital.

Also on the route ‘wish list’ is Jeddah, for Moslem passengers heading to the Saudi Arabian

city on Haj and Umrah pilgrimages.

Bennahi envisages the Jeddah route being a scheduled, but seasonal, service. As with Paris, he believes that Nouakchott could serve as a concentration point for passengers from other west African originating points.

To handle the growing route network, the airline is going through modest additions to its fleet. The company is largely a Boeing 737 operator; until recently, it flew two 737-500s, plus single examples of the -700 and -800. A single Embraer ERJ-145 regional jet completed the inventory.

### **New aircraft expected**

Over the past year, however, the two 737-500s have been retired and more new aircraft are expected imminently. “We’ve already ordered two Embraer E175s that will be joining the fleet by the end of March 2019,” said Bennahi.

The Embraers will mainly operate on domestic and short-haul international routes, such as Las Palmas in the Canary Islands.

Domestically, the airline operates to Nouadhibou and Zouérate; other domestic destinations such as Kiffa and Néma are being considered for services.

The most significant addition to the fleet came in December 2017 with the arrival of a Boeing 737 MAX 8 – the first of the latest generation of the Boeing twinjet to be delivered to Africa and a matter of some pride for the airline. It operates with a two-class configuration, 16 business-class and 144 economy-class seats. The company is in

Mauritania Airlines' director-general, Mohammed Radhy Bennahi, sees the new Nouakchott-Oumtounsi International Airport acting as a west African mini-hub for longer-ranged flights.

## IRAQI AIRWAYS FORCED TO PLAY A WAITING GAME

*Iraqi Airways is expanding its fleet and aims to grow its route network, but is awaiting indications from the country's newly installed government as to its future direction. Alan Dron reports.*

Iraq's national carrier, keen to expand, is marking time as it waits for a clear indication of the government's plans for its future direction.

It would like to start services both to the United States and Bangladesh, two destinations where it sees big demand for its services.

It is also mulling the future shape of its long-haul fleet, while steadily increasing and modernising its short-haul component.

Speaking at the Arab Air Carriers Organization annual meeting in Cairo in November, Mrs Sana Al-Khayyat, the carrier's assistant director general for commercial affairs, said that it aimed to renew its long-haul fleet as soon as possible.

This currently consists of two Boeing 747-400s, two 767-200s and single examples of the Boeing 777-200LR and Airbus A330-200.

"We're going to retire the 747, 767 and 777 within the next year, but it depends on circumstances," she said. "We're just waiting to see what the new government will do, how they plan to deal with Iraqi Airways."

The airline previously indicated that it would prefer to acquire more 777s, but Al Khayyat said that the company was now looking towards the Airbus A330neo. As mentioned above, the airline has a single A330-200 in its inventory at present. The single 777 is used partly for Haj and Umrah traffic.

□□□□

On the short-haul front, Iraqi Airways has two Airbus A320s and a single A321, but is rapidly building up its fleet of Boeing 737-800s. It has 14 in service at present, from a total order of 30.

Rounding out the short-haul fleet are six Bombardier CRJ900 regional jets, which fly a combination of domestic routes and short-haul international services to destinations such as Ankara, Antalya and Cairo. "The domestic market is very strong – and profitable."

The CRJs are due to be joined by another Canadian design. At the Dubai International Airshow in 2013, the company signed up for five Bombardier CSeries jets – since renamed the Airbus A220 after the European manufacturer acquired the design from Bombardier – but, according to Al-Khayyat, the company is assessing how useful they would be.

"We've not received them yet. They are supposed to be delivered by 2020 [but] we want to see how useful they are for Iraqi Airways." Once again, she said, it depended on the government's plans to develop the airline.

According to Saj Ahmad, the UK-based chief analyst of StrategicAero Research, who takes a particular interest in Middle East carriers, there may be some doubt over the A220s. Whereas Iraqi Airways' order for 30 737-800s was a government-to-government arrangement and, thus, secure, the order



Sana Al-Khayyat: "The domestic market is very strong – and profitable."

for the A220 with Bombardier had been struck by the airline itself, rather than the government, and was, thus, "a little bit at the fringes".

Not only did Iraqi Airways not have many low-density routes on which the A220 could be used, he said, it had built up considerable expertise on maintaining its Boeing 737-800s due to the presence of a Boeing engineering team that had been almost semi-resident in Iraq as the aircraft were introduced. Taking on another type, in the form of the A220, "might just cause more trouble than it's worth".

Whatever aircraft are eventually acquired, however, Al-Khayyat said they would likely be purchased, rather than leased; the company prefers to have its assets on its books.

It has plans to expand its network but is also keen to establish codeshares with other carriers, she said.

For some years, Iraqi Airways has been barred from flying into European Union airspace because of safety concerns raised by the European Aviation Safety Agency (EASA). At present, it uses its own aircraft to fly into Europe, but operating under the air operator's certificate (AOC) of Turkey's Atlas Global Airlines.

"We're working very hard on that," said Al-Khayyat. "We asked [EASA] not to come to do the necessary checks on us until we are ready."

Iraqi Airways' director-general, Miran Farid, has previously expressed the hope that this would be accomplished by the end of 2018, but Al-Khayyat said she hoped this would happen within the next six months.

According to Ahmad, part of the problem is that so many of the company's fleet are so new that they have not yet been required to go through the 'heavy' C-checks and EASA has, therefore, not been able to assess the company's skills in conducting those overhauls.

talks with Boeing over the acquisition of a second MAX 8.

The Gulf carriers and Turkish, which are all making hefty inroads into the African market, are not direct competitors, but regional rivals include Air Ivoire, Royal Air Maroc and the Ethiopian Airlines-backed Asky Airlines.

Despite this, Mauritania's passenger numbers and load factors are increasing, said Bennahi. Its best-performing route is not an obvious one, namely Nouakchott – Tunis. This, explained the director-general, was due to medical tourism bound for the Tunisian capital.

Profitability continued to be elusive, "but we're almost at break-even", said Bennahi. If it was not for the substantial increase in fuel prices over the past 18 months, profitability might already have been achieved. The cost of fuel is likely to remain one of the company's greatest challenges in 2019.

Another challenge is the remoteness of Mauritania, which also makes maintenance problematical: "It's not so easy to bring in spares in an aircraft on ground (AOG) case," said Bennahi.

However, the company is proud of the fact that, in 2018, it once again passed the International Air Transport Association operational safety audit (IOSA). Those companies that have IOSA certification have a markedly better safety record than those that do not.

Profits may not yet have been achieved but continuing to operate in one of the world's most remote regions, with a tiny domestic passenger base, is no small achievement in itself. ■

Jordan Aviation runs a combination of scheduled flights, charters and leasing of its aircraft to other carriers.



## JATE battles to stay on target

*As a country, Jordan has never had it easy. Sandwiched between larger or more powerful nations in a highly unstable region, with few natural resources, it has had to rely on the ingenuity and skills of its people to survive. Alan Dron highlights one excellent aviation example.*

**O**ver the years, Jordan's airlines have to fight off both the strength of the huge Gulf carriers and the rapidly growing low-cost carriers that are making their presence increasingly felt in the region.

For an airline, therefore, to have made a profit in every year bar one since its formation, is no mean feat.

Jordan Aviation (JATE) was founded in 1998 as a privately owned airline headquartered in Amman, by Captain Mohammed Al-Khashman. The company obtained its air operator's certificate (AOC) in October 2000 and began operations the following month.

Still privately owned today, it is run by co-owner, Captain Al Khashman's son, Captain Zuhair Al Khashman.

The airline runs a combination of scheduled flights, charters and leasing of its aircraft to other carriers. A significant part of its work over the years has been flying United Nations peacekeeping troops to trouble spots around the world, a service for which the company has received several UN awards.

It also has the necessary approvals to act as a cargo carrier, but this is not a field in which it operates at present.

### Maintenance operation

It has a maintenance operation – JAV Technic – based at Amman's Queen Alia International Airport that is approved by 17 countries, handles maintenance for carriers throughout the region, and has European Aviation Safety Agency (EASA) certification.

JAV Technic aims to increase its aircraft repair approvals by introducing new capabilities in handling Airbus and Boeing single-aisle types, as well as those from Embraer.

The company, which specialises in airframe repair, along with services for wheels and brakes and certain composites service, currently covers the Airbus A320, A330, Boeing 737 and 767.

The aim is to have expanded from these types by early 2019 to include A320s operating with both IAE V2500 and CFM56-5B engines, along with Boeing 737NG and Embraer aircraft.

JATE survives partly because it has a completely different route network and mode of operation from that of Royal Jordanian.

"Our business model is different," said Zuhair Al Khashman. "We work in a different way. We are a traditional airline with a low-cost concept. We offer all the services [of a legacy airline] such as baggage and catering, but at a lower price than legacy carriers."

The company faces both opportunities and challenges in the near term, said Khashman. A major opportunity is likely to arise when neighbouring Syria starts to open up again as the government nears the end-game in the long-running civil war.

Challenges come in the form of subsidies for rival carriers, he said. These go to both national carriers and other legacy airlines where governments seek to keep state-owned companies afloat. "While we, as a private sector company, don't get any."

Rising fuel prices are another hurdle to be faced, but these have affected JATE less than some companies: "They didn't have an impact on our operation that much."

The fleet today consists of a mix of Airbus and Boeing types – two Airbus A320s, plus a single A330-200 from the European manufacturer, accompanied by five Boeing 737 Classics (three -300s, one -400 and a -500), plus two 767-200s and a single 777-300.

Between 2001 and 2003, Jordan Aviation concentrated its activities on charter contracts with UN peacekeeping troops and now it is their favoured vendor. The UN acknowledged JATE's efforts by granting it several awards and recognition letters.

During 2005-2007 JATE operated programmed charter flights from King Hussein International Airport to destinations in the region.

In 2006, the company started dry-leasing its aircraft to other Arab and foreign airlines, especially during peak periods. The same year it completed the International Air Transport Association (IATA) operational safety audit (IOSA) and a re-audit in 2008, becoming one of the youngest airlines to complete this audit with no findings. ■





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# Pichler flies the flag against the high threat

Royal Jordanian Airlines boss, Stefan Pichler, has prepared well for an influx of low-cost competition, as **Martin Rivers** reports

**R**yanair's decision to launch 14 routes to Jordan last year could easily have been a disaster for Royal Jordanian Airlines, the country's flag-carrier.

Only two other MENA nations – Israel and Morocco – have experienced a large-scale influx of low-cost airlines from Europe. The flag-carriers of both countries struggled financially when their markets opened up to no-frills competition.

Yet, despite facing the same headwinds, Royal Jordanian delivered an 87% rise in net profits in the first nine months of last year, accelerating the turnaround launched by new chief executive Stefan Pichler.

"I have run low-cost airlines for more than 10 years and I have run legacy airlines for more than 15 years, so that's all rubbish," Pichler said when asked about the changing landscape, harking back to his days at Jazeera Airways, Fiji Airways, Air Berlin and Thomas Cook. "The reality of the airline business model is it suits the market in which you operate. That's it. Put it in whatever box you like."

While he is not a fan of the "low-cost" label, Pichler is steadfastly committed to its guiding principles. One of his first acts as chief executive was removing free hot meals from short-haul flights. He also introduced hand-luggage-only fares – a novelty in a region where generous baggage allowances are the norm.

Further changes are expected as the airline adjusts to heightened competition from abroad.

"By April [2019] we are going to have increased the density on-board of our aircraft in economy class... and we will have a reduced business class by one row," Pichler affirmed. "So we are increasing the on-board earning capacity of our short-haul and medium-haul fleet."

Royal Jordanian is also boosting its dependence on connecting traffic through Amman, which now accounts for about one-third of the business.

Outlining the network strategy, Pichler said he favours a gradual process of "enhanced connectivity" over headline-grabbing expansion. Three destinations were launched last year –

Copenhagen in Denmark, and Erbil and Sulaymaniyah in Iraq – while this summer will see the long-awaited addition of Washington DC.

Royal Jordanian currently flies from Amman to 20 points in the Middle East and north Africa, 17 in Europe, four in North America, and three in the Far East.

The airline is reducing its exposure to the Persian Gulf because of capacity dumping by rivals that "are not necessarily focused on the bottom line".

## Syrian market

However, Pichler believes the once-lucrative Syrian market, just across Jordan's northern border, could soon recover: "We hope Syria opens up again. For us it's two things. Right now, we fly to Beirut but we are not allowed to overfly Syria, so it makes our route much longer. And the other thing is flying back to Syria."

He noted that Royal Jordanian used to serve three "beautiful destinations" in Syria – Damascus, Aleppo and Deir ez-Zor – and said the airline would resume operations to its neighbour immediately, if given the green light by regulators.

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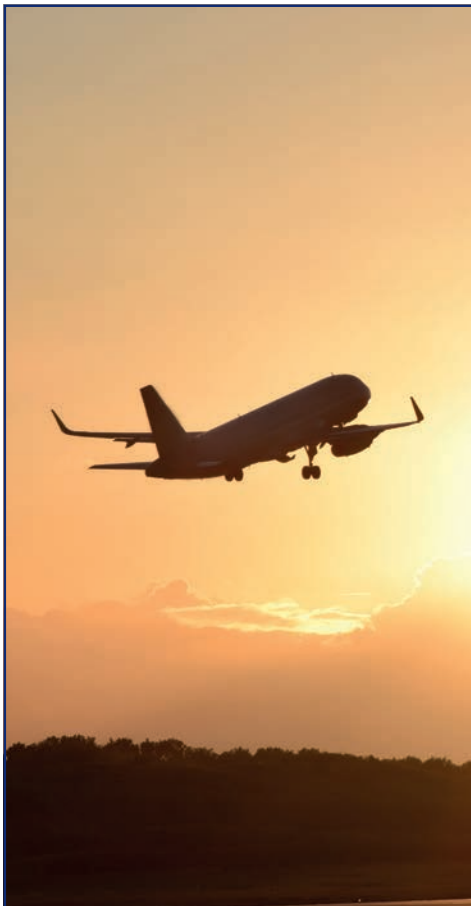
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## of low-cost...

While the flag-carrier strengthens its Amman hub, there is evidence of strategic pullbacks elsewhere.

Pichler has dissolved Royal Wings, a charter-cum-low-cost subsidiary that mainly operated leisure flights from Aqaba in the south of Jordan. He has also ditched plans to base one of Royal Jordanian's aircraft in the city – effectively leaving the market to be carved up by Ryanair, EasyJet and Norwegian Air Shuttle.

The Aqaba Special Economic Zone Authority is now seeking to acquire Royal Wings' operating licence with a view to launching its own airline, Fly Aqaba.

Turning to the fleet, Pichler said a decision will be taken in the first quarter of 2019 about new aircraft orders.

The chief executive has already committed to replacing Royal Jordanian's 19 narrow-bodies with 23 units by the middle of the next decade. "We try to get the best offer, full stop," he said of on-going talks with Boeing, Embraer and Airbus. "The best offer for me is very simple: NPV – net present value."

No wide-body orders are planned as the airline's seven Boeing Dreamliners are all less than five years old. ■



“We are increasing the on-board earning capacity of our short-haul and medium-haul fleet.”

STEFAN PICHLER

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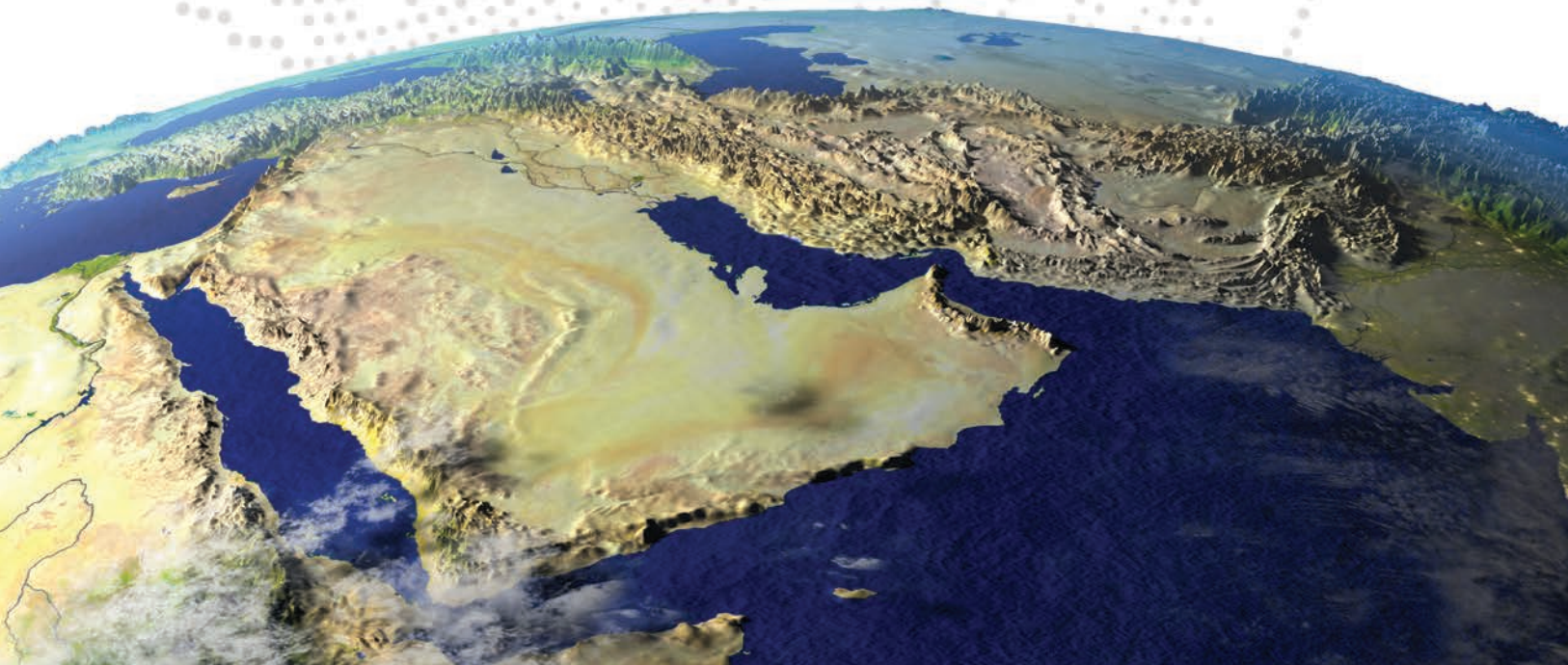
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The 2017 edition attracted 1,235 companies from 57 countries.

Organised by the Abu Dhabi National Exhibitions Company (ADNEC) in collaboration with the UAE Ministry of Defence and the country's armed forces, IDEX showcases the latest defence developments.

Running alongside the Naval Defence Exhibition (NAVDEX), it will feature technology trends, artificial intelligence, and will focus on the vital role of these technologies in advancing the defence sector and its related industries.

Themed 'Defence for Security and Safety', the international defence conference will also highlight the UAE's leading initiatives in achieving digital transformation in line with the country's artificial intelligence strategy. It will centre on four inter-related focus areas – economics, security and stability, offset, and innovation and artificial intelligence.

#### Tens of thousands

The exhibition, celebrating 25 years since its inception in 1993, is expected to attract tens of thousands of local, regional and international delegates, officials and visitors. Last year, the event drew more than 105,000 visitors.

"The 2017 edition attracted 1,235 companies from 57 countries and 2019 should see six new countries, taking the total to 1250 companies from 63 different countries," said Saeed Al Mansoori, IDEX executive director.

Leading local companies such as Tawazun, Emirates Defence Industries Companies (EDIC), Abu Dhabi Ship Building (ADSB), International Golden Group (IGG), Etimad Holding, Al Hamra Group and Calidus will make their presence felt, in addition to global companies such as Gami/Sami from KSA, Airbus, Boeing, Leonardo Spa, Norinco, Rafale, Rheinmetall, Safran, and Thales.

"The Middle East continues to be a

*The International Defence Exhibition and Conference (IDEX) will celebrate its silver jubilee at the Abu Dhabi National Exhibition Centre from February 17-21. Grant Turnbull and Marcelle Nethersole discuss the issues facing the region's military forces and look forward to what visitors to the event can expect.*

# SILVER SERVICE

significant market for defence manufacturers and emerging suppliers all over the world," said Al Mansoori. "In this context, events such as IDEX play a crucial role in accentuating the defence capabilities of the region, while facilitating strategic partnerships and offering global defence companies the opportunity to explore new markets and consolidate their presence in the region."

He added: "For Abu Dhabi, IDEX and NAVDEX is important as the emirate seeks to grow and diversify its economy and open up key non-oil industries, as envisaged in the Abu Dhabi Vision 2030."

ADNEC has also entered into partnerships with leading international companies to showcase the latest defence technologies related to enhancing global peace and security.

"We were delighted to sign strategic agreements in December with a number of specialised national defence companies," said Al Mansoori. "The agreement also

endorses EDIC as the strategic partner for IDEX and NAVDEX 2019, Tawazun Holding as the principle partner for IDEX 2019 and SEHA Ambulatory Healthcare Services as the official healthcare services provider for IDEX and NAVDEX 2019."

Tareq Abdul Raheem Al Hosani, chairman of the Emirates Defense Companies Council (EDCC) and chief executive officer of Tawazun Economic Council, said: "The rapid growth achieved by our national defence industry is a manifestation of the huge potential held by the UAE in various sectors. Our partnership with IDEX 2019 presents a perfect model of strategic collaboration between two important sectors, the exhibition and defence, to showcase the UAE's unique competencies and capabilities in this vital sector."

#### Ambitious strategy

Al Mansoori said: "We have received tremendous support from our partners, and at ADNEC, we are implementing an ambitious strategy to support specialised exhibitions and conferences that serve key economic sectors identified by Abu Dhabi economic vision and plan Abu Dhabi 2030, including the defence industry."

He added: "Overall, IDEX has served as an ideal platform to foster partnerships and long-term relationships between governmental institutions, defence companies and armed forces." ■



*The Middle East region continues to be one of the most vibrant markets for parapublic helicopters.*

# FLEETS EYE UP THE MULTI-ROLE MARKET

**S**everal governments in the region are recapitalising their fleets in this sector or standing up new public service organisations that will give broader coverage in areas such as law enforcement (LE), search and rescue (SAR) and other general transportation and government support duties.

The big players in the rotorcraft market – including Bell, Airbus Helicopters and Leonardo Helicopters – continue to make inroads in the Middle East region with all chalking up healthy sales over the last few years, despite a notable downturn in the oil and gas market.

A spokesperson for Airbus Helicopters said its 20-year market forecast for the region's civil and parapublic sector sees the region growing 103% in the 2016-2036 timeframe. "By 2036, deliveries to the region should reach a total of 2,492 helicopters, representing 11% of the world demand," said the spokesperson.

Recent successes for Airbus Helicopters includes contracts with Kuwait's Ministry of Interior (MoI), which is expanding the number of helicopters in its fleet to support several departments. Two new AS365 N3+ Dauphins, ordered from Airbus Helicopters in 2015, were delivered at the end of 2017, supplementing two older AS365 N5s already operated by the Kuwait MoI.

## Ease of use

Kuwaiti crews on the new N3+ variant, which features an advanced 4-axis autopilot and flight management system, have noted its ease of use compared with the legacy N3. The twin-engine helicopters have enough room for eight passengers, along with a host of specialist equipment, including a new winch system, searchlight, loudspeakers and a Wescam sensor turret. This equipment is particularly useful for SAR operations.



Capacity is also being expanded with the introduction of two new 9t H225 helicopters, one used for VIP duties and the other equipped for SAR/LE missions. The expanded fleet will ensure that helicopters now have dedicated roles rather than rerolling aircraft every mission, though the loss of one AS365 N5 in 2018 to a hangar fire will affect that somewhat.

The Airbus Helicopters spokesperson said it also saw "a lot of interest" in its newest helicopter, the H160, in the region.

A total of 10 pre-serial H160 production aircraft are planned, with the first aircraft beginning assembly last year and continuing through 2019 to coincide with qualification. The new 5.6t helicopter, which effectively supersedes the AS365 Dauphin, is being pitched across a broad range of sectors from emergency medical services (EMS) to public service roles, as well as VIP transport.

It is understood that the UAE's Joint Aviation Command (JAC) is interested in the H160, particularly as a VIP aircraft.

Another new helicopter programme that could be poised for potential sales success in the region is the Leonardo Helicopters AW609, which, if all goes to plan, will make history as the first tilt-rotor aircraft to enter commercial service.

The aircraft is expected to gain qualification in late 2019, although the long development programme has had



**Left: Airbus Helicopters' new H160 is already getting attention in the Middle East region, with the OEM recently showing off its EMS potential.**

PICTURE: AIRBUS HELICOPTERS

**Right: Kuwait's Ministry of Interior recently received two brand new AS365N3+ helicopters, boosting the government's capacity in several areas, including search and rescue.**

PICTURE: CHARLES RODERICK.

setbacks, including the fatal crash of a prototype in 2015.

In the same year, it was announced by the original equipment manufacturer (OEM) that the UAE JAC had selected the AW609 for SAR missions, indicating an initial requirement for three aircraft (with three additional options). However, as this article went to press, a firm order has yet to materialise and a previously stated delivery date of 2019 looks unlikely, owing to programme delays.

Could the UAE use the pomp and ceremony of the IDEX 2019 exhibition in Abu Dhabi to finally seal the AW609 deal?

## New generation

While the market awaits the AW609, Leonardo Helicopters continues to find success with its existing fleet of helicopters. Around 400 of the company's "new generation" aircraft have been ordered in the region, with around a third of those dedicated to parapublic roles.

A spokesman said the AW139 and AW109 had been "highly successful" across the region for law enforcement, homeland security, patrol and EMS/SAR.

Both the UAE and Qatar Emiri Air Force (QEAF) operate the AW139, which supports a number of parapublic missions.

Qatar received three additional AW139s



**Left: The AW139 has been highly successful across the region for law enforcement, homeland security, patrols and EMS/SAR.**

**Below: The Bell 429 has achieved sales in Kuwait, where it is operated as a HEMS platform for the Ministry of Health, as well as in Oman, but its role there is less clear.**

PICTURE: BELL.



in 2013 and, although these aircraft are flown by Qatari Air Force pilots, the helicopters are actually dedicated EMS platforms and part of Hamad Medical Corporation's (HMC) air ambulance service, known as LifeFlight.

The helicopters' liveries are also different from their drab grey air force counterparts, instead sporting a fetching green and yellow ambulance scheme.

The LifeFlight Service began as a six-month pilot project in 2007 and its subsequent success led to the addition of the three AW139s. It is able to perform 24-hour EMS missions across Qatar – including to remote regions with difficult access by road – and responds to around 2,000 emergencies a year, according to Dr Robert Owen, chief executive officer of HMC's ambulance service.

### Highest priority

"When speed is the highest priority, or when patients need emergency care in the more remote areas of Qatar, the LifeFlight Service is called into action," said Owen.

The 6.4t (with a kit available to increase to 7t) AW139 has capacity for two patients, along with two medical personnel and life-saving equipment to stabilise a patient for transition into hospital care. Two Qatari Air Force pilots are on board who are able to utilise a 4-axis digital automatic flight control system

(DAFCS), which, if necessary, has SAR modes and in-built SAR patterns for the flight management computer.

Bell is also synonymous with parapublic helicopters in the region, with several governments operating the OEM's aircraft for a variety of agency missions. "Bell aircraft performing military and parapublic missions are, frankly, ubiquitous throughout the region," said Doug Wolfe, Bell global military business development director for MENA.

Bell did not disclose figures for how many of its helicopters are currently in parapublic roles in the region.

Kuwait's Ministry of Health (MoH) operates two Bell 429 light-twin helicopters, contracted through the Al-Safwa Security and Defense Systems Company. Kuwait's MoH, which previously operated the Bell 430 was the first customer in the Middle East for an EMS-configured example of the 429, which can hold two litters as well as having enough cabin space for two medical attendants and two crew.

The Royal Omani Air Force (ROAF) is another known user of the Bell 429 in the region, but how many it has acquired is not officially known. The few photos that are in open circulation appear to show the ROAF 429 is used for VIP transport and fitted with a winch, likely for SAR missions.

Bell will be hoping that its new fly-by-wire helicopter, the 525 Relentless, will also be able to make a mark on the region's parapublic sector. Like the aforementioned H160 and AW609, the new super-medium is now also in the final stages of development and is looking to complete its certification this year. This programme has not been without its own troubles, with it also suffering a fatal crash of a test aircraft in 2016.

### Rapid response

Despite those initial problems, Bell is positioning the 525 for missions such as SAR, EMS and VIP transport. "With a highly reconfigurable main cabin, 162kt (300km/h) speed for rapid response and excellent side and over-the-nose crew visibility, the Bell 525 Relentless delivers precision, safety and consistency across all parapublic helicopter missions," according to Bell's company literature.

With many governments in the region expanding their helicopter-based SAR, EMS and LE assets, the need for multi-role helicopters that can provide support across these parapublic mission sets in a safe and cost-efficient manner will only increase.

New helicopters coming on to the market will also provide new options and challenge existing footholds, promising an interesting few years ahead in the region. ■

*The Middle East continues to be a fruitful market for military helicopter suppliers – whether US, European or Russian – as several nations either modernise or look to expand their rotorcraft fleets.*



## THOROUGHLY MODERN MILITARY...

**C**ountries across the region are investing billions of dollars in new military helicopter acquisitions, from heavy-lift platforms that can carry out troop transport and casualty evacuation missions, to specialist platforms such as scout helicopters and attack helicopters that are able to support ground forces with an array of rockets, missiles and cannons.

There is, equally, a push to acquire naval helicopters, especially as maritime modernisation expands in countries such as Saudi Arabia.

Conflict and ongoing operations in the region are key drivers behind this modernisation, with many militaries ensuring their helicopter fleets are up to date to meet future threats on land and at sea, whether they be state or non-state in origin.

In March 2018, it was announced that Qatar had signed a contract for 28 NH90 helicopters. Of the 28, a total of 16 twin-engine helicopters will be in tactical transport (TTH) configuration, with Airbus Helicopters in Marignane, France, responsible for final assembly and delivery of those variants.

The remaining 12 will be in naval (NFH) configuration and assembled and delivered by Leonardo from its Venice-Tessera facility in northern Italy.

The NH90 has also been acquired by Oman, and was recently

utilised in the much-publicised Saif Sareea 3 exercise with the UK at the end of 2018.

European manufacturer, Airbus Helicopters, has achieved additional successes, including a Kuwaiti contract for 30 H225M Caracal multirole utility helicopters with associated support and services packages worth around \$1.14 billion.

Kuwait has been an important partner for Airbus Helicopters over the last few decades, with the country operating AS332 Super Puma, SA330 Puma, and Gazelle helicopters. The first deliveries of the H225M are expected next year, according to Airbus.

“Some of our largest contracts in recent years have come from the Africa and Middle East region,” said an Airbus Helicopters spokesperson. “We continue to see opportunities for the H225M and for NH90 across the region and we see a lot of interest in our newer products, such as the H160.”

Military helicopters from US manufacturers – namely Sikorsky, Bell and Boeing – continue to be popular, especially as sales are often supported by US funding under foreign military sales (FMS) deals. In October 2018, the US Defense Security Cooperation Agency (DSCA) announced that the State Department had cleared the way for Iraq to acquire five new Bell 407GX attack helicopters.

**The UH-60 has a long-running history in the region and the latest UH-60M variant has been delivered to several countries, including an armed version to the UAE.**

PICTURE:  
LOCKHEED MARTIN.

Continued  
on Page 41



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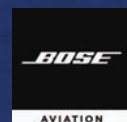
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“The addition of five Bell 407GX helicopters will help compensate for the combat loss of seven IA407 helicopters in recent years and increase the Iraqi Security Forces’ combat effectiveness against ISIS and other terrorist elements in Iraq,” said the DSCA announcement.

The UAE also operates 30 armed 407 multirole helicopters (MRH) modified by NorthStar Aviation.

Bell and NorthStar previously teamed to develop a twin-engine 429MRH variant, which was demonstrated at IDEX 2017 alongside a real 407MRH belonging to the UAE Joint Aviation Command. A source familiar with the project, however, noted that the 429MRH had now been effectively shelved owing to lack of customer interest.

In April 2018, the DSCA also announced the possible FMS of 12 AH-1Z Zulu attack helicopters to Bahrain for an estimated cost of \$911.4 million. “Our military products are only acquired by sovereign nations through the US FMS programme,” said Doug Wolfe, Bell’s global military business development director for the MENA region.

“The Zulu’s lower acquisition costs and best-in-class lifecycle and expeditionary attributes make it the perfect choice for a modern national defence,” he added.

### Legacy fleet

As well as new aircraft, Bahrain is also upgrading its legacy fleet. In 2018, photos appeared online showing one of the Royal Bahraini Air Force’s newly-upgraded AH-1 Cobras. A contract was signed with Turkish Aerospace Industries and Aselsan in 2015 for a range of upgrades, including a new ASELFLIR-300T electro-optical/infrared (EO/IR) turret and a glass cockpit, as well as other system upgrades.

According to the London-based International Institute for Strategic Studies’ (IISS) Military Balance, Bahrain currently has 34 AH-1 Cobras in its inventory, made up of E, F and P variants. These are located at Riffa Air Base.

Jordan is another AH-1 Cobra operator, with enough helicopters for two squadrons. Up to 12 of those Cobras have gone, or are going through, comprehensive upgrades in the US with Science and Engineering Services (SES) and Northrop Grumman responsible for extending their out-of-service date by another 20 years.

Northrop Grumman is overseeing a complete avionics upgrade, which the company said provides a “cost-effective solution” and an alternative to purchasing brand new aircraft. “In the



future, we anticipate increased demand and opportunities for rotorcraft in the Middle East, primarily driven by aging fleets and the need to equip rotorcraft with advanced, multi-mission capabilities,” said Ed Griebel, director, land & avionics C4ISR division, Northrop Grumman.

This marked the first time an AH-1F/S operator has digitally upgraded its aircraft since the aircraft were built in the 80s. This was enabled by Northrop Grumman’s integrated mission equipment package (iMEP), which includes a commercially available FlightPro Gen III mission computer, a full suite of liquid-crystal display (LCD) multifunction displays, an embedded software digital map and navigation controls. An external change is the incorporation of the Wescam MX-15Di EO/IR turret to improve reconnaissance and targeting capability.

### Upgraded AH-1F

Northrop Grumman announced in June 2018 that the first upgraded AH-1F had now been shipped to Jordan and would undertake weapons testing and final acceptance by the Royal Jordanian Air Force (RJAF).

Jordan also received 12 new UH-60M Black Hawks throughout 2017 to strengthen the country’s quick reaction force.

Bahrain was the first MENA customer for the latest ‘Mike’ variant of the Sikorsky/Lockheed Martin UH-60 Black

**Top: The Royal Air Force of Oman operated its NH90 helicopters during the recent Saif Sareea 3 exercise with the UK; the helicopter was also recently ordered by Qatar.**

PICTURE: UK MOD.

**Above: The Royal Jordanian Air Force is upgrading a portion of its AH-1 Cobra fleet to extend the aircraft service life by another 20 years, including the addition of a new digital cockpit.**

PICTURE: NORTHROP GRUMMAN/SES.

Hawk, with first deliveries taking place in 2009. The UAE is another customer for the M variant, and several of these aircraft are now going through customisation to carry a range of air-to-ground weapons on outboard pylons.

It was revealed in 2018 that Lockheed Martin had completed qualification trials of the UH-60M weaponisation kit, which is being led by Sikorsky’s Polish company, PZL Mielec.

The most successful attack helicopter in the region continues to be the Boeing AH-64 Apache, with more than 100 examples in four countries, including Saudi Arabia, the UAE, Kuwait and Egypt.

Saudi Arabia and the UAE have deployed Apaches as part of coalition operations in Yemen, with several airframe losses reported.

In December 2016, it was announced that the DSCA had approved the sale of 37 AH-64E Apaches (28 remanufactured + 9 new build) to the UAE. The deal is worth \$3.5 billion, although a definitive contract has yet to be announced. Qatar is also preparing to receive its first AH-64E Apaches by next year, as part of a deal for 24 examples signed in 2016.

### Chinook makes its mark

Boeing’s CH-47F Chinook also continues to make its mark in the region, most recently with Saudi Arabia. In May, it was announced that US Army Contracting Command had placed a \$25.7 million order with Boeing for eight CH-47Fs that will be destined for the Royal Saudi Land Forces Aviation Command.

These will supplement a sizeable UH-60 Black Hawk fleet, including 17 new M variants that were contracted as part of an FMS deal in 2018. These aircraft will be operated by both the National Guard and Royal Saudi Land Forces Airborne Special Security Forces.

In September, the Royal Saudi Naval Forces also received the first of 10 MH-60Rs, which are being acquired as part of a 2015 FMS deal worth \$1.6 billion. Five of those aircraft will be stationed at US Naval Station Mayport, Florida, for at least three more years as Saudi crews are trained.

Russian industry still poses a challenge to rotorcraft sales and has made inroads.

In 2018, the RJAF displayed its first Mil Mi-26T2 heavy-lift helicopter. It will receive a total of four to add additional capacity in areas such as troop transport.

Egypt has also acquired the Ka-52 Alligator and Iraq has taken on several Mi-28 Havoc attack helicopters.

Nevertheless, as recent orders have shown, western helicopters continue to dominate the region. ■



*As the region sees its airspace become increasingly dangerous, demand is increasing for integrated aircraft protection systems.*

**M**ilitary aircraft in the Middle East region face a myriad of ground-based surface-to-air (SAM) threats – everything from shoulder-fired heat-seeking missiles to complex radar-guided systems.

The proliferation of these air defence assets throughout the region is driving demand for integrated aircraft protection suites that are able to meet a range of emerging state and non-state threats.

While much focus is placed on the advanced aircraft that are being sought by air forces in the region, it is often the lesser discussed sub-systems that are key, especially when it comes to survivability in contested environments. These sub-systems, such as missile ‘warners’, decoys and jammers, enable aircraft to defend themselves and survive in contested airspaces.

Indeed, like other parts of the world, the region is seeing its airspace become increasingly dangerous as new air defence systems are acquired and brought online.

The civil wars in Syria and Yemen have shone light on how aircraft are at risk in the region, with several shoot-downs in both conflicts.

#### Accidentally shot down

In September 2018, a Russian Il-20M ‘Coot’ surveillance aircraft was accidentally shot down by a Syrian S-200 battery, leading to more advanced S-300 systems being brought in by Russia.

Even outside of conflict zones, Russian air defence systems are garnering interest from several Middle East nations.

In 2018, both Saudi Arabia and Qatar expressed a desire to purchase Russia’s highly-advanced S-400 Triumph air defence system. According to data from Rosoboronexport, the detection range of an S-400 is upwards of 600km, with the ability to track more than 300 targets at once, and engage at distances out to 250km.

It is no surprise, then, that aircraft being supplied into the region are fitted out with an array of self-protection measures to meet this threat.

Kuwait’s new F/A-18E/F aircraft will come equipped with the AN/ALE-55 fibre-optic towed decoy from BAE Systems, enabling offboard radio frequency (RF) jamming of incoming missiles, as well as Raytheon-developed radar warning receivers to alert crews when they are being tracked, and, importantly, being targeted.

Kuwait’s new Typhoon aircraft will also benefit from the Praetorian defensive

# THE SUITE SHOP



**The Middle East region is seeing a proliferation of advanced air defence systems, including both western and Russian systems, and has witnessed several shoot-downs in recent years.**

PICTURE: DOD.

aids sub-system (DASS) developed by the Leonardo-led EuroDASS consortium, which is standard to all Eurofighter aircraft. “Praetorian is a highly integrated system; it encompasses an active missile warning system, [electronic support measures] detection... and on-board jamming capability and off-board jamming with a towed radar decoy,” explained Jon McCullagh, head of strategic campaigns, electronic warfare, Leonardo Airborne and Space Systems.

“All that is integrated into the entire aircraft in terms of the human machine interface,” he continued. “When the Typhoon senses an imminent threat, the pilot gets a warning noise and an arrow in the head-up display (HUD) saying roll the aircraft in this direction, pull on the stick, and while that is happening the Typhoon will do what it needs to do in terms of activating on-board countermeasures.

“It’s a quantum leap in technology.”

McCullagh singled out the proliferation of large strategic SAM

systems in the Middle East region as one of the key concerns for air forces. “They can effectively deny a large volume of airspace, out to hundreds of kilometres. And they utilise more advanced radar systems than we’ve seen before. They are optimised for different targets within the large volume of airspace they are protecting, which brings different challenges for the DASS.”

Leonardo also recently unveiled its BriteEye offering, which integrates the company’s SEER radar warning receiver with a number of countermeasures, including the BriteCloud off-board decoy, to give fast jets an advanced, integrated protection suite against radio frequency (RF)-guided missiles.

#### Incoming missile

BriteCloud – now in service on UK Royal Air Force Tornado aircraft – can be fired out of traditional ‘55’ and ‘218’ dispensing systems. However, instead of chaff, it emits an RF signal to draw away an incoming missile.

In the future, BriteCloud is expected to be compatible with the RAF Typhoon’s new smart dispensing system, developed by Saab, which will relay data to the countermeasure before launch.

“We’ve already had interest from a lot of Middle Eastern countries that are looking to upgrade the defensive capabilities of their current aircraft,” said McCullagh. “We are in negotiation with a number of nations about how we will introduce it [BriteCloud] into service with them over the next few years.”

McCullagh said the company could



**A Qatar Emiri Air Force C-17 fires flares during an exercise in 2018, providing a screen against possible attacks from MANPADS.**

PICTURE: DOD.

partner with other domestic electronic or aviation component manufacturers to create an indigenous protective jamming solution.

Leonardo has also teamed with Terma to offer its compact jamming system (CJS) for the Danish company's electronic combat integrated pylons system (ECIPS). The ECIPS/CJS incorporates a powerful RF jammer and is being marketed as an "upgrade path" for existing F-16 aircraft. It sits within the current flight envelope of the in-service ECIPS+, so no modifications are required as part of a mid-life upgrade. It is also compatible with BriteCloud.

Terma also supplies its modular aircraft survivability equipment (MASE) pods into the Middle East region. These are specifically developed for addressing the man-portable air defence systems (MANPADS) threat, which still persists in the region owing to their proliferation among non-state actors and their relative low-cost compared with strategic SAMs.

The 25kg pod incorporates directed infrared countermeasures (DIRCM), flare dispensers and missile warning sensors, to give 360 degree protection against MANPADS.

The UAE is one known customer of the MASE pods, with one source noting that it had at least 24 pairs to outfit its fleet of Iomax Archangel turboprop aircraft, used for counterinsurgency operations.

One downside of a podded solution is that it takes up two wing pylons, which is valuable real estate for carrying guided missiles and other weapons.

DIRCM continues to grow in popularity, especially as this type of

defensive system reduces in size, weight and power requirements to enable integration on a wider variety of platforms. Traditionally, this type of countermeasure was only available for larger assets, including troop transports and VIP aircraft, although it is now trickling down to smaller manned and unmanned aircraft including vulnerable "low and slow" platforms, such as helicopters.

This type of system can supplement traditional flares and works by tracking an incoming threat (detected by UV/IR missile warning sensors) and then jamming the infrared/heat-seeking missile by directing a laser into its guidance system.

**Operationally deployed**

Only a few companies have mature and operationally deployed DIRCM solutions, one being Leonardo with its Miysis product that was unveiled at the IDEX exhibition in 2013.

"We cannot lose sight of the fact that infrared MANPADS continue to be a considerable threat to both commercial and military aircraft around the world," said Tony Innes, head of DIRCM campaigns at Leonardo Airborne and Space Systems. "Instability in countries such as Syria, Iraq and Libya make it incredibly difficult to account for these MANPADS," he added.

Innes said that, along with the Royal Canadian Air Force (which has equipped its CP-140 Aurora maritime patrol aircraft with Miysis), there is also a Middle Eastern customer for the defensive system, although the country

and platform type is confidential.

For the CP-140 programme, Miysis integrates with Hensoldt missile warning sensors.

Leonardo has also carried out trials with support of the UK Government to integrate its DIRCM solution with Thales' new Elix-IR warning system, a sovereign UK capability that provides a missile approach warning and hostile fire indication to crew as part of a defensive aids system.

Italian company Elettronica and Spanish manufacturer Indra also sell DIRCM systems, with both companies announcing a partnership in 2018 to develop a Quantum Cascade laser-based DIRCM, dubbed EuroDIRQM.

This gives Middle East customers a far wider range of options to choose from to protect their aerial assets against MANPADS, and, importantly, they are International Traffic in Arms Regulations (ITAR)-free, making them far easier to acquire compared with competitor systems originating from US manufacturers.

Whether it is lightweight MANPADS technology that hone in on heat signatures of low-flying aircraft, or higher-end strategic systems with advanced digital radar guidance to hit far-off targets, aerial platforms across the region need to be prepared to defend themselves against future surface-to-air threats.

New defensive systems are giving crews greater protection in increasingly contested airspaces, but the cat-and-mouse game between advanced SAMs and aircraft continues.



**Directed infrared countermeasures can defeat MANPADS with systems such as Leonardo's Miysis already achieving sales in the Middle East.**

PICTURE: LEONARDO.



*Air forces around the region are boosting their intelligence, surveillance and reconnaissance (ISR) assets to gain the information edge over adversaries.*

# ALL TO PLAY FOR IN THE GAME OF HIGH SPY

**A** plethora of manned sensor platforms – whether imagery intelligence (IMINT) or signals intelligence (SIGINT) – plus unmanned platforms are now coming on line to ensure intelligence needs are being met.

Data collected from airborne ISR assets, either visual or electromagnetic signals, plays a vital role in all phases of military operations, whether planning, execution or after-action analysis. This information can be crucial to ensure that targets of interest are monitored and the desired effect on that target is being, or has been, achieved.

The importance of airborne intelligence collectors has been demonstrated over the last several years in the fight against Islamic State, with the international coalition deploying a number of ISR assets over Iraq and Syria.

This has included the MQ-9 Reaper, a medium-altitude long-endurance (MALE) unmanned air vehicle (UAV), utilised extensively for multi-hour surveillance orbits and strike missions.

## Electronic order of battle

Other intelligence assets have included US and UK RC-135 Rivet Joint aircraft, monitoring radio frequency (RF) signals and building up an electronic order of battle for Syrian, Russian and IS forces.

Fast jet assets flying over Iraq and Syria are also equipped with targeting pods, giving crews long-range imaging and laser designation capability to ensure precision-guided munitions (PGMs) find their target.

Countries in the region that are currently modernising their fast jet fleets are also ensuring that the new aircraft have appropriate air-to-ground ISR functionalities, especially to conduct strike missions swiftly against fleeting targets as well as with greater accuracy to reduce collateral damage through the use of PGMs.

Lockheed Martin's Sniper advanced targeting pod (ATP) continues to be popular in the Middle East. In September 2018, Lockheed Martin announced that the Royal Bahraini Air Force (RBAF)



would acquire an additional 19 Sniper ATPs to equip its F16 Block 70s under a foreign military sales (FMS) deal.

In 2018 it was also announced that the Qatari Emiri Air Force (QEAF) would equip its new Rafale fleet with the Sniper ATP, as well as Kuwait for its new Eurofighter Typhoon and F/A-18C/D fighter aircraft.

The Sniper ATP gives high-definition infrared and daylight imagery, along with passive detection, tracking and ranging of targets. It also includes a datalink functionality to transmit full-motion video and metadata to other platforms, ground units or a command centre, and if required, laser illumination of targets as well as laser-lead guidance for precision delivery of PGMs on static and moving targets.

While the number of high-end fighter aircraft with associated ISR capability increases, air forces in the region continue to operate lower-end surveillance assets – generally smaller turboprop aircraft – that often have integrated strike capabilities.

Two aircraft of note here are the Cessna 208B Grand Caravan, as well as the Air Tractor AT-802 (and derivatives), both of which have seen widespread use as joint ISR/strike platforms in the region owing to their suitability for counter-insurgency operations.

The Royal Jordanian Air Force (RJAF), for instance, uses both the 208B Grand Caravan and AT-802 for ISR missions.

**General Atomics has been a pioneer of unmanned combat ISR platforms but restrictive US export policies has seen the company struggle to make international sales.**

PICTURE: GA-ASI.

The latter platform was acquired by the RJAF from the UAE and is operated by the Prince Hussein II ISR Wing based at King Abdullah Air Base.

The aircraft have gone through upgrades by Florida-based Iomax to modernise the AT-802's armament control system (ACS), effectively replicating the fit on Iomax's newer Archangel Block 1B border patrol aircraft. This means that the aircraft will be able to carry a heavier weapons load out, as well as integrating a new Wescam MX-15 electro-optic/infrared (EO/IR) sensor for improved ISR and PGM targeting capability.

## Guided weapons

The UAE, meanwhile, operates 24 Archangel aircraft – these based on the Thrush 710P airframe rather than the AT-802, although both are similar in appearance. They integrate a number of guided weapons and are also fitted with an EO/IR turret.

A company source disclosed that a favoured tactic for UAE pilots is to fly high-altitude sorties to recon targets at night, where it is “virtually invisible” to those on the ground.

The Iraqi Air Force has similarly used its fleet of 208B Grand Caravans for ISR missions, especially during the battle to retake Mosul, and has in recent years upgraded the platform with newer high-definition EO/IR sensors.



A number of countries in the region are also boosting their ISR capabilities with the introduction of dedicated multi-intelligence – or multi-int – collection platforms.

The UAE Air Force will receive three new airborne early warning and control (AEW&C) aircraft from Saab. Known as GlobalEye, the Bombardier Global 6000-based aircraft will be delivered to the UAE fitted with an Erieye extended range (ER) active electronically scanned array (AESA) radar, along with a secondary maritime radar and electronic intelligence (ELINT) collection capabilities and an EO/IR turret.

This sensor fit will ensure that the aircraft can perform a number of missions, from maritime surveillance to controlling the aerial battlespace with its powerful radar.

A far more secretive UAE programme is known as Project Dolphin, which is seeing two Bombardier Global 6000 aircraft being converted in the UK for SIGINT missions.

One aircraft has already been painted in a UAE Air Force livery, while a second was in testing as this article went to press. Marshall Aerospace is acting as lead integrator for the programme, although a spokesperson for the company would not comment on the project owing to its highly secretive nature.

Once the Project Dolphin aircraft are in service they will be one of the most

advanced SIGINT aircraft in the region, with only Saudi Arabia operating a similar high-end airborne capability in the form of the 707-based RE-3A, which, itself, has recently been upgraded to closely resemble an RC-135 Rivet Joint.

Unsurprisingly, the Beechcraft King Air 350 also continues to be a popular option for regional air force ISR needs. In early 2018, the US State Department approved a potential foreign military sale (FMS) to Kuwait for four King Air 350ERs fitted with MX-15 sensors, as well as the Leonardo Seaspray 7500E; the latter suggesting that the aircraft will be used in some maritime surveillance capacity.

#### Additional opportunities

Jan Boyes, head of ISR and air mobility campaigns at Leonardo Airborne and Space Systems said he saw additional opportunities with aircraft such as the King Air 350, including the integration of advanced ELINT/ electronic surveillance measure (ESM) capabilities, such as the company's SAGE product.

This would give countries an ELINT collector that was comparable to a strategic asset, but on a smaller tactical platform. "You would struggle to find another piece of ELINT equipment that is comparable for [SAGE's] size weight and power, and capability," said Boyes.

Possessing ELINT collectors is seen as particularly important for understanding the electronic environment and



**The Cessna 208B Grand Caravan continues to be a popular ISR and strike platform, with several nations, including Iraq, using the aircraft for counter-insurgency operations.**

PICTURE: NORTHROP GRUMMAN.

developing countermeasures for the complex radar/missile systems that are being deployed in the region, especially the likes of the Russian S-400. "Countries are looking to build a sovereign capability to gather intelligence across the electromagnetic spectrum," explained Boyes.

Leonardo's SAGE technology could also be integrated on to unmanned vehicles – including platforms such as the MQ-9 Predator/Reaper or Schiebel Camcopter – which are proliferating across the region to meet ISR demands.

"We have invested heavily in the Middle East market in the last decade and are on a path to increase that investment even more," said Jim Thomson, regional vice president of international strategic development for General Atomics Aeronautical Systems, Inc (GA-ASI). "We have [also] seen a dramatic increase in interest in GA-ASI remotely piloted aircraft since the release of the new US UAV export policy."

#### New rules for exporting

The US announced new rules for exporting UAVs in April 2018, which could reverse a recent trend that has seen Chinese-manufactured drones proliferate across the region. Thomson said he was "very encouraged" by the new export rules and that GA-ASI would "be able to more freely compete in the Middle East market".

Stymied by US export rules, many Middle East countries have turned to the China Aerospace Science and Technology Corporation (CASC) CH-4B for their ISR needs.

This is now in widespread use across the region, notably in Egypt, Iraq, Saudi Arabia and the UAE.

This success has principally come from China's willingness to supply armed UAVs, giving Middle Eastern air forces a much-needed persistent ISR and strike capability for counterinsurgency operations. ■

**The RC-135 Rivet Joint has provided the US and UK with a valuable asset to soak up electronic intelligence data on Islamic State forces, as well as Syrian and Russian assets.**

PICTURE: UK MOD.

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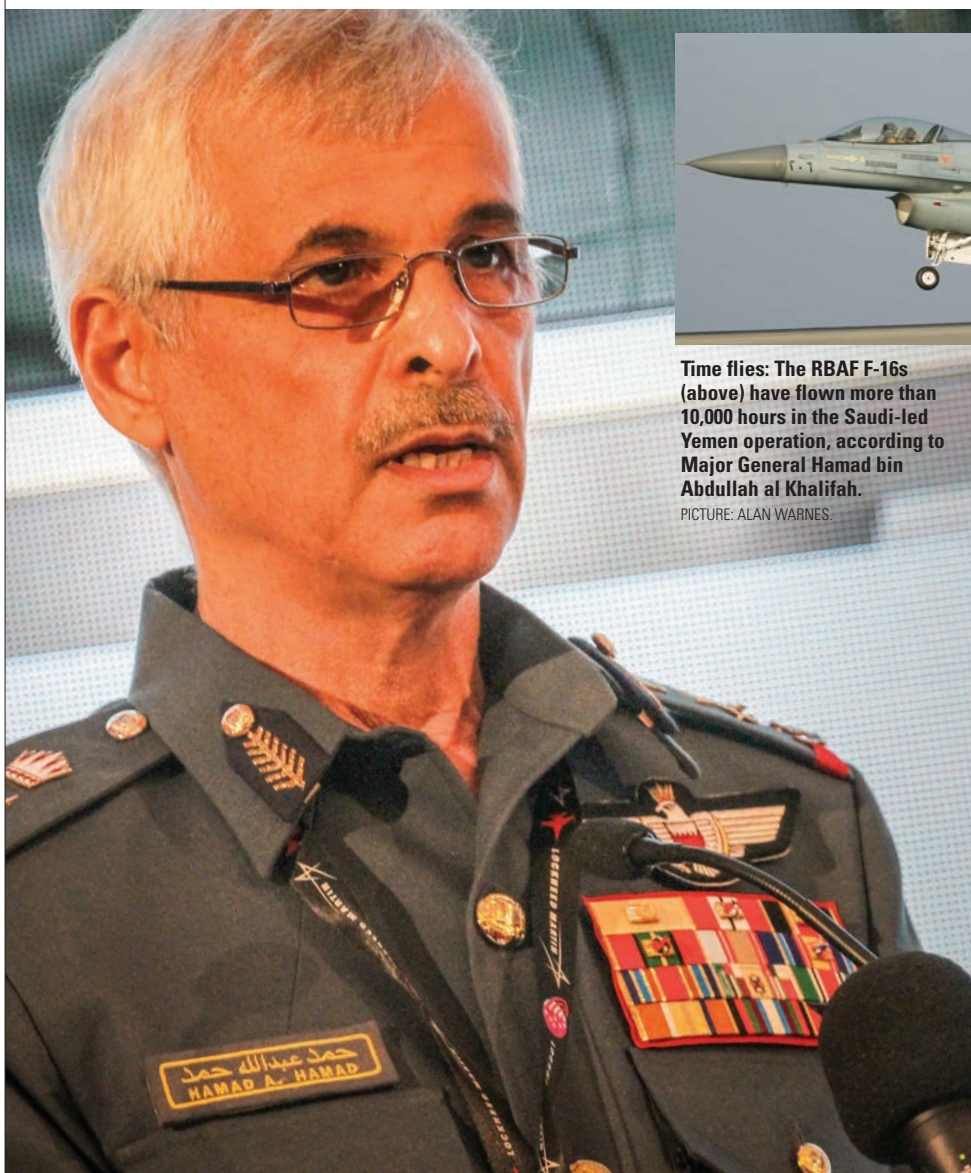
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Royal Bahraini Air Force commander, Major General Hamad bin Abdullah al Khalifah, discusses his country's major defence and security issues with Alan Warnes.

# Battle-weary Bahrain looks to upgrade forces



**Time flies:** The RBAF F-16s (above) have flown more than 10,000 hours in the Saudi-led Yemen operation, according to Major General Hamad bin Abdullah al Khalifah.

PICTURE: ALAN WARNES.

**B**ahrain has been supporting the Saudi-led coalition against the Houthis militia in Yemen since the bombing campaign started in March 2015. During the recent Bahrain International Air Show (BIAS), the Royal Bahraini Air Force (RBAF) commander, Major General Hamad bin Abdullah al Khalifah, revealed that, over the past three-and-a-half years, the RBAF F-16s had flown more than 10,000 hours and in excess of 3,500 sorties.

"We are providing close air support along Saudi Arabia's southern border with Yemen," he explained.

The mission, according to the commander, has meant the aircraft fly daily, ensuring unauthorised traffic is not crossing the border.

"We are only using F-16s, [believed to be four] because other allied countries are providing the helicopters and transport," he said.

It hasn't all gone to plan though. One of the RBAF's F-16Cs was lost due to a malfunction on December 30, 2015. Fortunately, the pilot ejected and was recovered safely.

The Major General said all the allies were involved in training exercises to hone their capabilities and work together as one force. "It has seen a lot of improvements in the way we work together and we have advanced a lot in many fields [since the mission started], but

Continued  
on Page 48

Upgrades are continuing to the Bahrain Air Force's existing fleet of AH-1F helicopters.



#### CONTINUED FROM PAGE 47

need to do more in space, cyber, missile defence and our own defences,” he added.

Right now, the RBAF is concentrating its modernisation efforts on the front-line aircraft. Last July, the Bahraini Government signed a \$2.785 billion deal with its US counterpart for 16 brand new Block 70 F-16C/Ds and their support. The Major General, who has been the air force commander for more than a decade, is looking forward to their arrival in 2022. “These new F-16s will add to our current capability and will be integrated with the assets of other allied air forces,” he said.

The new jets will house the Northrop Grumman APG-83 scaleable agile beam radar (SABR) active electronically scanned array (AESA) radar; a new modular mission computer (MMC); a large centre pedestal display with improved programmable display generators; a high-speed databus; embedded GPS/INS navigation systems; and Link 16.

The aircraft will also have a lifetime of 12,000 hours rather than the standard 8,000 as per previous models.

There is provision for a wide range of weapons, according to the US Defense Security Cooperation Agency (DSCA) notification released in September 2017. These include the Raytheon AIM-9X Sidewinder air-to-air missiles (AAMs); Raytheon AIM-120C advanced medium-range air-to-air missiles (AMRAAMs); Raytheon AGM-154 joint stand-off weapons (JSOWs); Boeing AGM-84 Harpoon anti-ship missiles; Raytheon AGM-88 high-speed anti-radiation missiles (HARMs); Boeing GBU-38 joint direct attack munition (JDAM) GPS-guided bombs and GBU-54 laser JDAMs; Boeing GBU-39 small diameter bombs; GBU-24 Paveway III and GBU-50 enhanced Paveway II laser-guided bombs; and BLU-109/111/117 hard target and penetrator bombs.

More detail on the deal for 12 single-seat

F-16Cs and four F-16Ds, announced in July, was forthcoming at the air show.

Lockheed Martin’s Rick Groesch, director regional VP Middle East business development, who is set to retire after 23 years with the company, said: “They will be handed over to the US Air Force in the last quarter of 2021 with the first jets delivered to Bahrain in the first quarter of 2022.”

On deliveries, Groesch added: “The first will be an F-16D, followed by an F-16C, and this pattern will continue until the four F-16Ds are delivered. Then it will be all the remaining F-16Cs.”

#### Plan to upgrade

Lockheed Martin was hoping that the RBAF would go ahead with a plan to upgrade its existing 20 F-16C/Ds to a similar standard, known as the F-16V. But, at a reputed cost of \$1.1 billion, the RBAF commander was not looking to upgrade them just yet. “Our priorities lie with the 16 new Block 70s. Our current fleet has been modernised to a very high standard and is extremely capable, until the Block 70s arrive. What happens after that we don’t yet know,” he said.

Some of the reason he has opted to drop the F-16 upgrade deal is because the budget has been spent on acquiring 12 AH-1Z Cobra Viper attack helicopters. The \$912 million deal was announced at the air show.

The commander said deliveries would start in late 2022 and be completed in 2023. “Our Cobra fleet will be significantly improved to continue our share in the growth and security of the Gulf region,” he added.

Bahrain is the second AH-1Z export customer, after the Pakistan Army. The latter was going to receive 12 AH-1Zs through the US Government’s foreign military sales (FMS). However, a breakdown in relations between the US and Pakistan, based on US claims that Pakistan is not

doing enough in the war on terrorism, stopped the helicopters being delivered earlier this year.

That deal now looks dead and there is some speculation that the Pakistan Army examples could be delivered to Bahrain. However neither Bell, nor DSCA director, Lt General Charles Hooper, were willing to speculate.

These new helicopters will supplement Bahrain’s existing fleet of AH-1s, which will by then be made up of 18 AH-1Fs and around six TAH-1P Cobra trainers.

Turkish Aerospace is upgrading the 18 AH-1Fs as part of a \$25 million deal agreed in June 2015, which draws upon avionics systems already operational on Turkey’s T129 advanced attack and reconnaissance (ATAK) helicopter.

Integration of the ASELFLIR 400 turret into the attack helicopter’s nose is one major improvement, as well as an enhanced weapons delivery set-up and a night-vision goggles (NVG)-compatible cockpit.

It was expected that one of the three upgraded AH-1Fs already worked on might have been at the show but nothing was there and neither the RBAF nor Turkish Aerospace were keen to talk about the deal.

Relations between Turkey and Saudi Arabia are not good currently, so the Ankara-based company would not comment, although it did have Cobra Upgrade literature at its stand.

The RBAF commander would only tell the author: “They should all be delivered by the end of 2020” and that the deal covered a ‘good number’ of helicopters.

Turkish Aerospace won the contract in June 2015 and the first upgraded AH-1F made its first flight from the company’s Ankara facility in September 2017. Turkish weapons manufacturer, Roketsan, confirmed at the show that its 2.75-inch CIRIT laser-guided missiles would be integrated. ■



## RBAF trains its attention on pilots

RBAF commander, Major General Hamad bin Abdullah al Khalifah, now has to face up to the challenge of ensuring there are enough aircrews trained to fly when the new F-16s and AH-1Zs arrive. "We have already started that and there are pilots now training in the US for the F-16s," he confirmed.

According to one source, there is already a Hawk pilot and one F-5 pilot in the US.

One problem the commander faces is that the Slingsby T-67 Fireflys, used for primary flying training, are currently grounded.

Student pilots are going to Egypt (Air Force Academy to fly Grob G 115EGs and Hongdu K-8s); Saudi Arabia (King Faisal Air Academy flying PC-9s and PC-21s); and United Arab Emirates (PC-7s and PC-21s at the Sheikh Khalifa bin Zayad Air College).

### Returning from Egypt

The pilots returning from Egypt will go directly to F-5s but if they have flown in Saudi and the UAE they start flying the Hawk Mk129s and then F-5s.

It seems an odd way of doing things and, perhaps, buying a new primary trainer could be an option. But, according to another source, with only 20 pilots being trained a year there is no point in funding such a solution.

The commander confirmed the 12 F-5E/Fs, delivered more than 20 years ago, would be sticking around for a while.

"The F-5s are being used as a multi-role platform; one of the roles is to provide lead-in-fighter-training (LIFT) to the F-16s because they are supersonic, while they still continue to work in the air-to-ground mission."



The first of two ex-RAF C-130Js acquired by the RBAF arrived on the eve of the show which, according to the commander: "Will be an excellent addition to the air force because it was the only shortfall we had. They will give us a great capability for exercises and, yes, Yemen operations, too."

The first aircrews and technicians were trained in the UK, but it is believed that another new eight-man crew is working up with the Spanish Air Force.

On the threat from Iran, he said: "It is historic, they have been threatening us for a long time, not only as a country but also through militias. The GCC is doing much better to counter that threat and we are pleased the international coalition now understands the problem." ■

**Top:** His Royal Highness Sheikh Abdullah bin Hamad bin Isa Al Khalifa, who had earlier opened the Bahrain International Air Show, visited the Lockheed Martin stand to view the F-16 Block 70 cockpit trainer. He is pictured talking to Lockheed Martin director regional VP Middle East business development, Rick Groesch and General (Ret) Gary North, vice president customer relations.

**Above:** Major General Hamad al Khalifa with DSCA Director Lt General Charles Hooper (left) and Mitch Snyder, president and CEO, Bell, following the AH-1Z announcement at BIAS.

PICTURES: ALAN WARNES.



One of two Calidus B-250 prototypes currently under development at Al Ain, Abu Dhabi. PICTURES: ALAN WARNES

# Why the Calidus truly

*The UAE's Calidus B-250 is bidding to become the next new generation light attack aircraft of choice. Alan Warnes reports.*

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

At the recent Bahrain International Air Show, one Royal Bahraini Air Force (RBAF) pilot, said, after stepping out of the cockpit simulator: "It is amazing." When asked why, he said: "Because it's set up like a fighter's cockpit."

Saif Alkaabi, a former UAE Air Force and Air Defence (UAEAF&AD) Mirage 2000-9 pilot, and now the vice president of marketing at Calidus, smiled: "It's true. Our aircraft is mission-ready. It has not been built as a trainer then converted into a new mission like so many of our rivals. We have built it as a light attack aircraft."

Calidus acquired Brazilian company, Novaer, to build the B-250 project in 2015. The aircraft was unveiled to the public at the Dubai Air Show in November 2017.

At first glance, the B-250 looks similar to the Super Tucano, which is not surprising given both aircraft were designed by Novaer's Joseph Kovacs. But, before the B-250's designer started his work, he was told by Calidus that the aircraft had to be faster – with an air speed up to 300mph flying straight and level – pull between -3/+7G and have the most advanced technologies on board. It should also have a maximum endurance of 12 hours.

Powered by a 1600shp Pratt & Whitney PT6A-

68 engine with a four-blade Hartzell propeller, the aircraft got its speed and more. According to Alkaabi, it can actually reach 380mph during manoeuvres.

Being pressurised to fly up to 30,000ft means it can get to a high enough altitude to avoid most enemy air defences and man-portable air defences (MANPADS).

The cockpit houses two Martin Baker Mk 16 ejection seats, so the pilot's safety is assured, and a Rockwell Collins civilian Pro Line Fusion avionics system provides a nice look.

#### Feedback from operations

Alkaabi spoke of the importance of the UAEAF&AD in the project: "We are learning from the feedback coming from its operations [in Yemen] and channelling it into the aircraft."

"It relies heavily on a good man-to-machine (MMI) interface in the Mirage 2000-9 and F-16 Block 60, as well as good cooperation with other air forces. So the feedback we have received from the UAE's Yemen ops and its air warfare centre is invaluable."

Alkaabi added: "At the moment, current light attack aircraft are only used when the operator has gained air superiority. However, the B-250 will be able to operate during the air superiority phase. We designed the aircraft so the aircrew, working in a g-suit in a pressurised cabin, can work for long periods over the battlefield."

The B-250 can remain up to eight hours on station.

Alkaabi went on to say: "Another priority is winning the asymmetric war. Defeating militias and terrorists, who are willing to use civilians as shields, is a top priority in the aircraft's evolution."

"We want to introduce smart inexpensive weapons on to the B-250. There is no point in dropping a \$100,000 dollar weapon on a \$5,000 vehicle because you would be killing yourself economically. And we don't want any collateral damage. So we are trying to find good solutions for the aircraft."

Undoubtedly, the aircraft's biggest advantage is that it is made from carbon fibre, which means it weighs around 1,000kg less and this can be converted into more avionics, more fuel and armaments.

Its armament load-out is impressive. For example, with four 250lb GBU-58 Paveway II laser-guided bombs, two AIM-9 Sidewinders and a drop tank, the B-250 has a range of 350 miles (560kms), according to Calidus.

Production of the aircraft is expected to take place at Al Ain, home to the new national aerospace park.

Calidus wants to integrate UAE weapons manufactured by the likes of Barij Dynamics (formerly Tawazun Dynamics) and Emirates Systems and Support Services (ESSS).

The latter is a partnership formed in 2014 between the UAE and South Korea's LiGNex 1. An ESSS spokesman said: "The Koreans can help us to integrate weapons, qualify them and change seekers in them."



Left: At DAS 17, Calidus displayed a B-250 with the AI Barij P3 (inside) PGM and the ESSS LOGIR rocket-launcher. Right: The B-250's cockpit display, as seen here in the simulator at Bahrain International Air Show in early November, is very impressive.

# is the light fantastic

At IDEX 2017, ESSS was exhibiting the likes of the Emirates guided bomb – a Mk80 series unguided bomb with a wing/guidance kit, which turns it into a cruise missile using inertial/GPS navigation.

The system has a wireless interface connecting the bomb's fire control unit to the pilot's knee-pad unit or mission-planning unit. The big advantage is the wireless communications ensure there is no need for any special modification to the aircraft platform.

This LiGNex1 wing kit is already in service with the Republic of Korea Air Force F-15s and F-16s.

Another weapon the partners are working on is the LOGIR imaging infrared precision rocket, which was seen mounted under the wing of one of the B-250s at the 2017 Dubai Air Show (DAS 17).

## Strap-on-bomb kit systems

Providing ESSS with some opposition is Al Barij Dynamics – a partnership forged in 2012 between South Africa's Denel Dynamics and Tawazun Dynamics, as Al Barij was formerly called. It manufactures the Al-Tariq family of strap-on bomb kit systems, used on Mk81, and Mk82 bombs. They provide the user with all-weather, day or night operational capabilities, utilising GPS/INS guidance.

The system allows for increased targeting accuracy by using a semi-active laser (SAL) seeker or an imaging infrared (IIR) with complete automatic target recognition (ATR) capability.

At DAS 17, Al Barij showcased its latest product, the P3 precision-guided munition, which also uses the WiFi system.

A low-cost, precision-guided kit designed to improve the range and accuracy of the standard Mk81 and Mk82s, it consists of either an inertial navigation system (INS)/global navigation satellite system (GNSS) guidance option or an INS/GNSS SAL seeker version.

P3 has been integrated on a number of platforms and serial production has already begun in the company's Abu Dhabi facility.

The weapons won't just be dedicated to the UAE. According to Calidus, they will also include Chinese, European, Russian and US systems to ensure all markets will be catered for.

So far, though, the B-250 is not believed to have dropped any weapons. This might be because the aircraft has a civilian Rockwell Collins Pro-Line Fusion avionics system, which was never developed to work with a stores management system and a military mission computer.

To get around this, Calidus could be integrating a second system to work in parallel. But the question is why is Calidus bothering with Rockwell Collins if such a solution has to be found?

The company has a close working relationship with Rockwell Collins, which has designed the new Firestorm targeting system and will allow the B-250 to move into the digital-close air support (CAS) era.

In the standard package, the system consists of a laser range finder, tactical PC, StrikeHawk video downlink receiver, joint terminal attack controller (JTAC) mobile networked joint fires digital targeting software, associated ancillaries, power management system and hand-held azimuth augmentation unit.

Firestorm has proven to be interoperable with the JSF but will only be offered to 'certain clients' said Alkaabi. And the reason for that is simple – it will be bound by ITAR regulations.

But, if this aircraft is to be successful, it has to be ITAR-free, so it can be sold anywhere in the world. Unfortunately, the close relationship with Rockwell Collins will prohibit this.

The moment a US avionics company modifies its software to accommodate the integration of weapons, the B-250 will fall under the ITAR regulations.

Both the A-29 Super Tucano and Beechcraft T-6B light attack aircraft have already fallen under the ITAR jurisdiction.

## Repeat the errors

Surely the purpose of designing aircraft like the B-250 outside of the USA, means it shouldn't repeat the errors of its competition.

At DAS 17, a L3 Wescam MX-15D EO/IR turret was also fixed on the aircraft. With its advanced video tracker integrated to cater for its close air support, ISR and counter-insurgency needs, it is a great tool. However it, too, falls under the ITAR regulation.

GCC countries are continuing to try and break away from the chains of reliance on the US, which ties them down in ITAR regulations. They know there are enough solutions out there for Calidus to explore to replace the US systems.

Alkaabi said: "We have many countries interested, who are comparing the flexibility and capabilities of the design with other platforms, all at an operating cost of up to \$1,200 per hour. And we can provide the customers with what they want." ■

## ANKA-S IS THE CAT'S WHISKERS

Turkey's Anka-S unmanned aerial vehicle (UAV) is now operational with the Turkish Air Force in a revised form, according to a Twitter announcement by Ismail Demir, director of the Turkish Defence Industries Directorate (SSB).

The new sub-variant is fitted with the indigenous Aselsan common aperture targeting system (CATS) electro-optical/infrared (EO/IR) reconnaissance, surveillance and targeting system.

This is in place of the US-made FLIR Systems Star SAFIRE 380 HLD EO/IR sensor turret initially fitted to the type.

The Anka name (originally a phoenix-like mythological creature) is applied to the family of UAVs developed by Turkish Aerospace Industries (TAI) for the Turkish Armed Forces.

□□□□□

The TAI Anka prototype made its maiden flight on December 30 2010 and the type completed acceptance testing with the Turkish Air Force on January 20 2013.

The Turkish Air Force ordered 10 Anka block B UAVs in 2013.

This is an improved version of the original Anka block A, fitted with an Aselsan synthetic aperture radar/ground moving-target indicator payload in addition to the platform's usual under-nose EO/IR sensor.

The Anka-S is the serial production version and it is equipped with a ViaSat VR-18C Highpower SATCOM antenna and a national flight-control computer.

The Turkish Undersecretariat for Defence Industry (SSM) ordered 10 Anka-S UAVs and 12 ground-control stations on October 25 2013, to be delivered from



An Anka-S fitted with the indigenous Aselsan CATS system. Below: Turkey's Anka-S UAV is now in service with an indigenous targeting system, and has been cleared to use the MAM-L glide bomb.



The shroud over the under-nose sensor turret makes it impossible to tell whether this Anka-S has been fitted with Aselsan's CATS system.

March 2017 in batches of two, four and four aircraft, with deliveries to be completed by 2019.

The Anka-S completed its first live fire tests on August 17 2018. The weapon selected for the initial integration programme was Roketsan's MAM-L smart micro munition, a glide-bomb derivative of the laser-guided long-range anti-tank missile system (L-UMTAS).

It was always intended that the first two aircraft would be equipped with the Star SAFIRE 380-HDL FLIR payload as an interim fit, pending availability of the Aselsan CATS system.

The Anka-S, like the block A and block B aircraft, is powered by a Thielert Centurion 2.0S engine, although Turkish Engine Industries (TEI) is developing an indigenous national engine for the aircraft, capable of operating on diesel or JP-8 jet fuel. ■

## EGYPT INDUCTS ARMED CHINESE DRONES

The Egyptian Ministry of Defence has confirmed that it has taken the Chinese-built Chengdu Wing Loong unmanned air vehicle (UAV) into air force service, writes Jon Lake.

The aircraft was featured in a video broadcast on Egypt's 45th Air Force Day on October 14, which was published on the ministry's official social media pages.

The production included footage of a Wing Loong taking off from a desert air base, armed with what appeared to be a pair of Lán Jiàn-7 (Blue Arrow 7 or BA-7) laser-guided missiles on two of its four underwing hard-points.

The aircraft was shown attacking and destroying a ground target.

The video's voiceover boasted: "The Egyptian military has been boosted with the latest global armament systems, including the multirole Rafale aircraft, F-16 fighter jets, Boeing AH-64 Apache helicopters and China's Wing Loong armed aircraft."

The Wing Loong (also known as the Pterodactyl I or the Yílong-1) is similar in appearance to the US Reaper UAV with a V-tail, but has more in common with the original RQ-1 Predator. The Wing Loong is powered by a similar 100-hp ROTAX 914 piston engine, and can carry a 200-kg payload, including 50-kg Blue Arrow-7 laser-guided missiles or LS-6 guided bombs, or YZ-102A or YZ-212 bombs.

An Egyptian Air Force Wing Loong UAV, armed with a pair of 50kg Blue Arrow 7 semi-active laser-guided air-to-surface missiles.



In 2016, China's Xinhua news agency reported that Egypt had requested the integration of a Model YJ-203 Ku-Band synthetic aperture and moving target indicator radar on its Wing Loong UAVs. This was required to allow the detection of improvised explosive devices (IEDs) and roadside mines, and to detect and track moving vehicles.

Wing Loong UAVs have already seen combat service with Egypt's Task Force 777, operating against 'Wilayat Sinai', the local arm of so-called Islamic State (IS).

Wing Loongs were used to search for smuggling tunnels used by IS between Gaza and Sinai and, in March 2017, the Egyptian Air Force used them to launch a number of airstrikes against militants in north Sinai, in the cities of El Arish, Rafah, and Sheikh Zuweid.

In November 2018, it was announced that Egypt would purchase 32 new Wing Loong 1D UAVs. The 1D variant has increased wingspan – up from 14 metres to 17.8 metres – with a higher maximum take-off weight, and with payload doubled to 400kg. ■

ALPHA

BRAVO

COLLINS

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DELTA

ECHO

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The second Project Dolphin Global 6000 SIGINT aircraft departs Robin Hood Airport (UK) for the UAE.



## PROJECT DOLPHIN GLOBAL 6000 MAKES A SPLASH IN THE UAE

One of the two Bombardier Global 6000 aircraft modified for the UAE Air Force and Air Defence by Marshall of Cambridge under the so-called 'Project Dolphin' has now been delivered to the UAE, writes *Jon Lake*.

The aircraft (serial number 1325), was the second of the pair to be converted, emerging from the hangars at Cambridge's Teversham Airport in the UK for the first time on May 18 last year.

The first aircraft had been seen outside more than a year before and had begun test flying on June 21 2017. It was initially testing the handling of the heavily modified airframe, and clearing the modified external configuration.

But, while the first aircraft (1326) remained unpainted, the second was soon painted in full UAE Air Force markings and, on August 30, flew to Robin

Hood Airport (the former RAF Finningley) before departing for the UAE the following day.

Though the aircraft are fitted with a ventral canoe fairing similar to that on the RAF's Global Express-based Sentinel radar reconnaissance/surveillance platform, they are understood to have been converted for signals intelligence (SIGINT) duties by Marshall Aerospace and Spec Ops Technology – a US, Netherlands and UAE-based company that specialises in airborne intelligence, surveillance and reconnaissance (ISR) platforms.



The two aircraft were originally registered to a Swiss-based company – Asia Global Technology (AGT) International – which was previously responsible for

the UAE's Falcon Eye surveillance system and for the Abu Dhabi safe city project. They were originally delivered to Teversham in late 2012.

Some reports suggest that long delays resulted from the failure of the originally specified communications intelligence (COMINT) suite, said to have been supplied by Advanced Integrated Systems.

It has been further reported that the UK's QinetiQ was called in to help with the integration of a replacement mission system, the AS-5 airborne communications electronic surveillance system, which forms the 'spine' of the mission system.

It is not known whether the aircraft also have an electronic intelligence (ELINT) role, but the ventral canoe would be ideal for housing direction-finding 'spinner' antennas for accurate geolocation of signals. ■

## QATARI DEFENCE MINISTER 'CUTS STEEL' ON QAAF TYPHOON

Qatar's Deputy Prime Minister and Minister of State for Defence Affairs, HE Dr Khalid bin Mohammad Al Attiyah, has formally inaugurated the production of the 24 Eurofighter Typhoon and nine BAE Systems Hawk aircraft being produced for Qatar.

The first aircraft is expected to be delivered to the Qatari Emiri Air Force (QEAF) in 2022.

It will be the first aircraft from the UK's Warton production line equipped with the new Captor-E active electronically scanned array (AESA) radar.



The start of production was officially marked by a steel-cutting ceremony in Warton on October 18.

The ceremony was attended by the minister and his UK opposite number, Defence Secretary Gavin Williamson, and by a number of senior officers from the Qatar Armed forces, including Air Force Brigadier General Hamad bin Jassim Al Marri, the Qatari military attaché in the UK, and Brigadier General Jassem Mohammad Al Mannai, the director of the Al Dhariyat project, under which Qatar is developing the QEAF capabilities, not least through the acquisition of a fleet of modern fighter aircraft.



His Excellency Dr Khalid bin Mohammad Al Attiyah (right) and Gavin Williamson discuss the future of the two countries' defence relationship ahead of the steel-cutting ceremony.

PICTURE: CROWN COPYRIGHT.

Al Attiyah was also briefed on preparations for a technical college that will be established in Qatar, and which will have a prominent role in training Qatari Armed Forces personnel.

Al Attiyah and Williamson had previously signed the contract to supply 24 Typhoon and nine Hawk aircraft to Qatar on December 10 2017. This 'became effective' with the first payment, which was made on September 18 last year.

Before this, in July 2018, the Amir of Qatar, and

Commander-in-Chief of the Qatari Armed Forces, Sheikh Tamim bin Hamad Al-Thani, presented the squadron standard at the stand-up of No12 Squadron.

This will be a joint Royal Air Force and QEAF Typhoon unit that will allow Qatar's air and ground crew to gain experience on the aircraft before the first Qatari Typhoons are delivered.

The joint squadron is also expected to deploy to Qatar to protect Qatari airspace during the 2022 World Cup. ■

## GUARDIAN MOVE FOR EMIRATI APACHE FORCE

The UAE is to procure nine new-build Boeing AH-64E Apache Guardians, and will upgrade eight of its existing AH-64D aircraft to the same standard, together with related equipment, training, and support, writes *Jon Lake*.

The \$242 million contract has an estimated completion date of February 28, 2023.

Full-rate production on the AH-64E Guardian variant began in 2012. It features an upgraded Longbow fire control radar, more powerful engines, advanced avionics and enhanced night-vision capabilities.

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The UAE's Special Operations Command currently operates 28 AH-64D Apaches – converted from the 30 AH-64A helicopters purchased in 1991 and 1994 in an upgrade programme that began in 2008.

The UAE has a long-standing requirement for more Apaches, and to upgrade its aircraft to the latest AH-64E standard – originally known as the AH-64D Block III.

In 2010, the UAE Government requested a possible sale of 30 AH-64D Block III Apache helicopters and for an upgrade of its 30 existing AH-64D Block II lot 10 Apaches, which were to be remanufactured to AH-64D Block III configuration, giving a total fleet of 60 aircraft.

But it scaled back its requirement and, in December 2016, the US State Department approved a proposed sale of just nine new-build AH-64E



The latest contract will see about half of the UAE's Apache force consisting of the new AH-64E Guardian standard.

helicopters, with 28 AH-64Ds to be re-manufactured to the same standard to give a fleet of 37 aircraft.

The latest US Defense Security Cooperation Agency (DSCA) approval sees the nine new-build aircraft augmented by just eight AH-64D conversions.

It is not known whether the UAE plans to upgrade its remaining 20 Apaches to the same standard at a later date, or whether the procurement of 30 Northstar

Aviation 407 MRH Lightning multi-role helicopters, and of large numbers of UH-60L and UH-60M Black Hawks, has reduced the requirement for Apaches.

It would seem unlikely that the remaining 20 AH-64Ds can remain in service for an extended period without some kind of upgrade, as obsolescence and diminishing manufacturing resources will start to make some systems increasingly difficult to support. ■

## US 'Little Birds' flying to Lebanon

Lebanon is to receive a new \$120 million US military aid package, writes *Jon Lake*.

It includes six MD530G scout and light-attack helicopters, six Scan Eagle unmanned aerial vehicles (UAVs), and associated communications equipment intended to allow ground troops to call in air strikes.

The US Army placed the order for the six MD 530Gs for Lebanon on October 1 2018, though the delivery forms part of a wider US Army effort to equip allied air arms with up to 150 'Little Bird'-series rotorcraft.

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This larger order underpinned a \$1.4 billion five-year indefinite delivery/indefinite quantity (ID/IQ) contract that was awarded in September 2017. That deal also covers the supply of at least 36 MD530Fs to Afghanistan and six MD530Fs to Kenya.

The MD530F Light Scout Attack Helicopter and the MD530G Cayuse Warrior are similar derivatives of the Vietnam War-era Hughes Model 369, delivered to the US Army as the OH-6 Cayuse Light Observation Helicopter, and popularly known as the Loach and as the 'Killer Egg' in armed form.



The MD530G offers six weapons hardpoints – the wingtip-mounted launch tubes not being fitted to this aircraft, which carries a mix of rocket pods and guns. ■

A succession of company owners developed improved civil and military models, culminating in the A/MH-6 'Little Bird' used by US special forces.

Boeing retained the rights to the 'Little Bird' for the US forces and some high-end allies, while Lynn Tilton's company, MD Helicopters Inc (MDHI), began the development of Scout Attack Helicopter variants of the MD530F and MD530G in 2011, having taken over the civil MD500/520/530 series in 2005.

The MD530G differs from the MD530F in having a new glass cockpit configuration with digital multi-function displays and an L3 Wescam MX-10D sensor turret as standard.

The MX-10D includes visual and infrared full-motion video cameras, and a laser designator, giving the MD530G the ability to employ precision-guided munitions, including the laser-guided BAE Systems advanced precision kill weapon system II (APKWS II), which will be supplied with the Lebanese MD530Gs.

The two variants originally differed in the number of weapons hardpoints offered, but both the MD530F and the MD530G now tend to be offered with the Dillion Aero six-position mission-configurable aircraft system (MCAS) weapons 'plank'. ■

# Iraq takes more armed Bell 407GT helicopters

Iraq is to buy five armed Bell 407GT helicopters to offset the combat losses of seven of its armed Bell IA-407s in recent years, writes Jon Lake.

The Bell 407GT is the designation given to the armed version of the Bell 407GX.

In a notification of the sale to Congress in October 2018, the US Defense Security Co-operation Agency (DSCA) wrote: "The addition of five Bell 407GX helicopters will help compensate for the combat loss of seven IA-407 helicopters in recent years, and increase the Iraqi Security Forces' combat

effectiveness against the Islamic State and other terrorist elements in Iraq."

The Iraqi Army Aviation Command received three unarmed T-407s for training in 2010, and then received eight batches of three armed IA-407s from August 2012 to April 2013.

Three further aircraft (the prototypes) were initially retained in the USA. These took the total to 27 IA-407s, and 30 Bell 407s in total.

In a lower-profile procurement initiated in February 2015, 16 Bell 407GX helicopters were delivered to BBM

Inc of Reno, Nevada, to be operated in Iraq for a variety of missions from casualty evacuation to reconnaissance. Some reports suggest that these unarmed aircraft are operated by the 200th and 500th rotary training squadrons at Al Taqaddum/Habbaniyah.

The latest Iraqi Bell 407 procurement was announced by the DSCA on October 4.

The new helicopters will have a range of weapons, sensors and systems integrated via a Tek Fusion Global Inc (TFGI) Pathfinder mission management system (MMS) and an Ares weapons management system (WMS).

They will be fitted with a six-station Dillon Aero mission-configurable aircraft system (MCAS) weapons 'plank'.

Weapons systems included comprise FN Herstal M240 7.62mm and M3P 12.7mm machine guns; General Electric GAU-19 12.7mm Gatling guns; and M260 70mm rocket launchers configured to fire the BAE Systems advanced precision kill weapon system (APKWS), a laser-guided conversion of the Hydra 70mm rocket that has been used by the Iraqi Air Force and the army since December 2016.

The new aircraft are to be equipped with night vision goggle (NVG)-compatible lighting, ballistic seat and cockpit armour, an MX-15Di electro-optic/infrared (EO/IR) sensor turret, RF-7850A secure communications radios, AN/ALE-47 countermeasure dispensing systems, AN/AAR-60 MILDS automatic plume detectors, and IR-suppressing exhaust systems. ■

Iraq's new Bell 407GTs will be to a similar standard as the 27 IA-407s that were delivered from 2012.



## FULL STOP OR FULL STEAM AHEAD?

Wildly contradictory reports surround the status of Algeria's ambitious plans to build large numbers of AgustaWestland AW109s, AW139s and AW101s in a new factory at Ain Arnat in Setif province, currently home to the 9 Regiment d'Hélicoptères d'Entraînement.

Some reports suggest that production is due to begin imminently, while others say that the Leonardo defence group's plans have come close to stalling in Algeria, and that hope is running out for local production.

Leonardo, itself, remains tight-lipped about all aspects of its business in Algeria.

"I'm afraid that we can neither comment on the joint venture (JV) status nor of the Algerian helicopter fleet," a spokesman said, though earlier this year, Leonardo's new commercial director, Lorenzo Mariani, confirmed that the JV was ongoing. "In Africa we are present in Algeria, where we are creating a JV," he said.

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Leonardo has delivered around 88 helicopters to Algeria over the past decade, plus eight W-3 Sokols from its Polish AgustaWestland Swidnik (previously PZL Swidnik) subsidiary.

It is estimated that these 88 helicopters have included two VVIP-configured AW101 Mk 642s, 15 AW109LUHs, 11 search-and-rescue (SAR)-configured AW139s and 10 AW119 Mk II Koala training helicopters.

The navy has received six AW101 Mk 610 SAR



An AgustaWestland artist's impression of the AW101 surveillance and intervention variant offered to Algeria for local production.

helicopters, four AW139s, four Super Lynx Mk 130s and six Super Lynx Mk 140s. The gendarmerie has received 14 AW109LUHs, and the Unite Aérienne de la Sureté Nationale (UASN – police air wing) 10 more, while the Protection Civile received six AW139s.

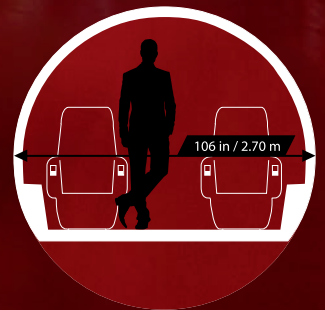
The first phase of a programme to acquire additional helicopters was supposed to cover the supply of 15 AW109 LUH helicopters to the Gendarmerie Nationale, and 10 to the UASN, with five AW139s being delivered to the Protection Civile. ■

It is not clear as to whether these were supposed to be additional to the 20 AW109s that were actually delivered to the police and gendarmerie.

The second phase was supposed to include the delivery of 10-15 AW101s for the Gendarmerie Nationale and the third to see 27-32 AW101s and 15 AW109 LUH helicopters being assembled locally with further local assembly of the AW109LUH (and perhaps of the AW139) to meet UASN and Protection Civile requirements. ■



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**T**he MENA region's major business aviation event of the year – the MEBAA Show – took place in Dubai in December.

The impact of the past two years' economic challenges in the Gulf, along with the regional uncertainty, meant it was expected to be a subdued show.

Although the quantity may have been down, the quality remained high with exhibitors

reporting positive meetings and a well-attended conference addressed the main issues affecting the region's business aviation issues.

On the static park, some of the biggest business jets in the world were on display – reflecting the fact that the Middle East has more than half of the world's market in this sector.

From the Boeing 787 Dream Jet, to a personal A340 lavishly fitted by its owner – one of the

world's richest men – the possibilities were clear. The other manufacturers were also showing their biggest and best – but there was still room for the smallest of personal jets and for the growing VIP helicopter market to be represented.

*Alan Peaford, Marcelle Nethersole, Steve Nichols and Dave Calderwood report from Dubai World Central on the highlights of the event.*

# Show rich in quality



## On the road to Morocco

**M**EBAA's plans to grow its north Africa show – MEBAA Maroc – have been boosted by the latest figures from the WingX Business Aviation Monitor.

The research company said that business aviation flights to Africa are trending up by 8%.

Due to its strategic location between Europe, the Middle East, and the rest of Africa, Morocco is seeing an increasing amount of movements, which also include flights servicing the South American market.

### Business airport

A new business airport will open in the country within the next few years, which will complement the new fixed-base operations (FBOs) by Jetex and Swissport Executive Aviation opening this year.

MEBAA's event in Marrakech will take place on September 25-26 this year at the Manara Airbase, part of Marrakech's international airport.

Ali Alnaqbi, founding and executive chairman of MEBAA, said: "As the region sees growth driven by both market forces and government support, we are pleased to have the government acknowledge the importance of MEBAA Show Morocco to the industry."



The MENA region as a whole is seeing a turnaround in fortune and, according to MEBAA, the number of business aircraft movements is predicted to reach 175,000 by 2020, while the number of registered aircraft is expected to increase to 1,200.

"This sharp increase is attributable to the region's thriving economies, notably Morocco, and an expanding wealthy elite using business aircraft in increasing numbers," Alnaqbi said.

The Marrakech event will also host the MEBAA Conference Morocco, featuring key business leaders and roundtable discussions to promote debate and share industry knowledge.

**“As the region sees growth driven by both market forces and government support, we are pleased to have the government acknowledge the importance of MEBAA Show Morocco to the industry.”**

**ALI ALNAQBI**

## MEBAA IN BRIEF

### Gulfstream speed record

Gulfstream smashed the world speed record for flying between New York, USA and the MEBAA show in Dubai. Its ultra-long-range G650ER took just 11 hours 2 minutes – beating the previous record by one hour and 48 minutes. That's an average speed of Mach 0.90 for the 6,142nm flight.

### Falcon flies with Honeywell

UAE-based Falcon Aviation Services signed a contract with Honeywell Aerospace to become a member of the latter's global channel partner network.

The deal covers the sale, installation and service of Honeywell avionics for Middle East-based helicopter operators. This will offer a more localised repair and installation provision for Honeywell equipment at Falcon Aviation Services' Abu Dhabi-based facilities.

### GainJet ponders new Challenger

Charter operator GainJet is considering adding a third Challenger 604 to its dedicated medevac fleet.

The Greek VIP and long-range charter specialist would base the aircraft in Africa, adding to those it already has in the Middle East and Europe.

# DIAMOND SHINES AS PILOT TRAINING PROVES KEY

The issue of pilot shortages was a key talking point at both the show and the MEBAA Conference, with a greater focus on training in both the exhibition hall and out on the static park.

An order for 60 new aircraft plus support package – believed to be worth more than \$30 million – was announced at the show.

Austria-based Diamond Aircraft received the order for DA42-VI and single-engine DA40 NGs from the new pilot training centre set up by the Saudi National Company of Aviation (SNCA) and training specialists CAE.

Delivery of the first 12 aircraft will start in February 2019, with the rest spread over five years.

The DA40 NG and the DA42-VI are the latest versions of Diamond's piston aircraft fleet, equipped with composite airframes, jet-fuel Austro engines and Garmin G1000 NXi avionics.

### Meeting the demands

"The commitment of another reputable big flight school to our aircraft and flight training solution proves we are meeting the demands of flight training organisations worldwide," said Amila Spiegel, sales & marketing director of Diamond Aircraft.

"We are the only manufacturer who offers a full range of modern, safe, efficient and reliable single and twin-engine aircraft, along with proprietary jet-fuel piston engines and professional high-fidelity Diamond Simulation flight training devices."

Anthony Miller, SNCA-CAE director, said: "This purchase agreement is one of the largest in the history of aviation academies in Saudi Arabia and, perhaps, the Middle East region. It also marks a new era of aviation training in the kingdom, which is well aligned with the kingdom's 2030 vision."

Saudi Arabia, specifically, and the



Celebrating: Amila Spiegel and SNCA-CAE director Anthony Miller.



Left: Captain Bardar Khaldi: "In Saudi Arabia alone, we believe we have a need for 8,000 pilots and 11,000 technicians over the next five years."

Middle East in general, is facing a significant shortfall in airline pilots. The academy aims to provide the Saudi and Gulf region with qualified pilots, who meet the specific requirements for airlines in the region.

Saudi anticipates a dramatic pilot demand for pilots in the next five years for airline and business aviation growth and another of the MEBAA exhibitors is planning to fill the gap.

Tayaran – Saudi's National Aviation Academy – made its debut at the MEBAA

## TAKING THE ACADEMIC APPROACH

The University of South Wales (USW), a higher education institution in the UK and the UAE, and Falcon Aviation are to establish a strategic partnership to facilitate an integrated university-industry approach to the training and development of aircraft maintenance engineers.

USW has opened its new KHDA/EASA/GCAA-approved campus at Dubai South, offering a range of aviation engineering programmes.

As part of the integrated approach, USW students will receive the required on-the-job training from Falcon's qualified personnel, and gain experience in the workplace alongside their academic studies, in order to become competent professionals and licenced aircraft maintenance engineers.

show, just months after its official launch.

"We all know about the major problem facing aviation," said the academy's general director, Captain Bardar Khaldi. "There are massive fleet orders for airlines and operators and, at the same time, a high attrition rate as more and more experienced pilots retire.

"In Saudi Arabia alone, we believe we have a need for 8,000 pilots and 11,000 technicians over the next five years."

Recognising that current training provision left a huge shortfall in meeting those demands, the stakeholders developed plans to create an academy by the industry for the industry under the chairmanship of Prince Sultan bin Salman, the Muslim world's first astronaut, a former fighter pilot with commercial helicopter and jet ratings.

With the commitment of the industry, the new academy has bases in King Abdullah Economic City, 100km north of Jeddah, and at the former Saudi royal flight airport at Thumamah Airport near Riyadh.

"We will be looking to bring through 450 pilots and 1,000 technicians a year – both male and female," he said. "But that is still only 20% of the number we need."



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**MEBAA  
IN BRIEF**

**Jet meets the standard**

Jet Aviation's FBOs in Dubai and Saudi Arabia are among a total of 20 that have received the international standard for business aircraft handling (IS-BAH) stage 2 safety registration.

**Ajwa deal for Saudi hangar**

First time MEBAA exhibitor, Riyadh-based Ajwa, announced an agreement with PrivatAir in Saudi Arabia for the building of 32,000sqm of hangar space.

Ajwa offers lean and environmentally controlled aircraft hangars that are fully sealed to protect aircraft from some of the harshest conditions in the world, according to CEO, Abdulmajid Obaid.

**Click clicks with new platform**

Click Aviation Network is expanding its trip support services and showing the power of its Omega online platform.

The Dubai-based global network of aviation partners, offering an integrated range of pre-trip, in-flight, on-ground and post-trip services, also offers aircraft ground-handling, ground support, international trip support, aircraft charter, fuel, catering, route analysis and much more.

*BOEING DELIVERS THE BIG NEWS FROM THE SHOW*

The Middle East's dominance of the corporate airliner and ultra large business jet market was reinforced by Boeing's decision to announce its new BBJ 777X model at MEBAA.

Boeing will offer two models, the BBJ 777-8 – described as the longest-range business jet ever – and BBJ 777-9.

The BBJ 777-8, with its 11,645nm (21,570km) range, features a spacious 3,256sqft (302.5sqm) cabin, while the BBJ 777-9 provides an even larger cabin measuring 3,689sqft (342.7sqm) but offers a slightly lower range of 11,000nm (20,370km).

Greg Laxton, head of Boeing Business Jets, said the BBJ 777X is capable of flying more than halfway around the world without stopping. "It can connect virtually any two cities in the world, flying faster than any business jet ever built," he said.

"Our most exclusive customers want to travel with the best space and comfort and fly directly to their destination. The new BBJ 777X will be able to do this like no other aircraft before it, redefining long-range VIP travel."

Captain Alex Fecteau, BBJ director of marketing, said: "The BBJ 777X features a new 72 metre composite wing and the world's tallest cabin at 2.4 metres. It will also feature the new GE9X engines, offering 5% lower fuel consumption than competing engines.

"Its patented Boeing 'smoother ride' technology features 'smart sensors' and is designed to reduce motion sickness by dampening the effects of turbulence. The BBJ 777X is the largest twin-engine in the world and will offer heads-of-state and VIPs lots of benefits."

Boeing Business Jets said the BBJ 777X is ideal for customers in the region. The Middle East is its largest market, currently accounting for 29% of all BBJ sales. It said 52% of all BBJ wide-body orders are from the Middle East and there are a total of 26 wide-body BBJs in service, including 747-8, 767, 777 and 787 variants.



Greg Laxton (left) and Captain Alex Fecteau show off the new model.

**Debut with a dash of style for ACH**

Airbus Corporate Helicopters (ACH) made its MEBAA Show debut following its decision to develop a new division, which focuses exclusively on the corporate and private aviation sector.

ACH was keen to push its specially outfitted light twin Airbus ACH145 to the region's VIP operators.

"This is an aircraft that has power as well as comfort, performance and style," said ACH's Nitin Sareen.

Designed to deliver performance throughout the flight envelope, the H145 demonstrates capability and flexibility, especially in high and hot operating conditions.

ACH demonstrated how, in its corporate or VIP role, the aircraft can be comfortable, too. It displayed a full-size mock-up of a cabin, specially designed by Mercedes Benz.



Hareb Thani Al Dhaheri, CEO, EDIC Horizon International Flight Academy (left) with Patrick Moulay, SVP commercial business, Bell.

*BELL'S DOUBLE CELEBRATION*

Bell and EDIC Horizon International Flight Academy celebrated the delivery of two new Bell 429s helicopters during a ceremony held at the show. Based at Al Ain International Airport Zone, EDIC Horizon International Flight Academy provides flight training to future pilots with its exclusively Bell fleet, comprising Bell 206s and Bell 407s, and now the 429.

The company will use its new Bell 429s for airline transport pilot (ATP), instrument, multi-engine and specialised mission training, said Horizon CEO, Hareb Thani Al Dhaheri.

Patrick Moulay, SVP commercial business, Bell, said: "This celebration is a key milestone for us as it demonstrates the traction the Bell 429 has gained in the Middle East. There are now 332 Bell 429 aircraft in operation around the world, exceeding 330,000 hours of operation on the global fleet."



The Mercedes Benz interior in the ACH145.



Gone phishing: Taylor Banks shows off the hacker's skills.

## Spelling out the 'hacker' threat

Satcom Direct (SD) was terrifying jet owners and operators as it outlined just how important it is to safeguard in-flight connectivity systems from internet hackers.

The company hosted presentations by an ethical hacker, performing 'live' hacks on its stand, and warning that if companies don't take care with cyber security on their aircraft it could cost them dear.

Taylor Banks, a 'white hat' hacker with SD, showed just how easy it is to capture sensitive identity information from passengers who are not adequately protected from "phishing" exploits.

Using real-world scenarios, the digital security professional demonstrated how he can simply and easily fake websites and URLs that can then capture people's log-in and other information – without them even realising.

Banks said that, given people often use the same ID and password for multiple sites, including personal banking, subsequent personal or corporate hacking was an accident waiting to happen.

SD said its threat-monitoring service for business aviation is seeing an increasing number of hacking and "phishing" attacks that it is able to stop.

Michael Skou Christensen, VP international, SD, said: "Our security operations centre is blocking millions of threats each month. Many are targeted directly at the business aircraft we manage."

## MEBAA IN BRIEF

### Falcon on the move

Falcon Aviation will be switching its business aviation MRO activities to its new base at Dubai World Central. It had previously been operating at Abu Dhabi's Al Bateen Executive Airport.

The Abu Dhabi facility will become a regional turboprop MRO base supporting the Bombardier Q400.

### Inflite looks after Kuwait Legacy

Inflite The Jet Centre has been awarded a contract by National Legacy of Kuwait to apply navigational modifications by Honeywell Aerospace to its Legacy 600 aircraft. The Legacy 600 project was being handled at Inflite's facility at London Stansted Airport, Embraer's authorised service centre in the UK.

### Gogo goes big

Gogo Business Aviation was showcasing its 2Ku high-speed broadband service for VIP airliners, which was introduced last year, plus its forthcoming Iridium Certus L-Band offering, which will provide broadband services for smaller-cabin aircraft.

Gogo says around half-a-dozen additional VIP aircraft have been completed with 2Ku.

## A NEW VISION FOR SAUDI PRIVATE AVIATION

The Cirrus Vision Jet made its Middle East show debut and Stefano Cestarelli, regional sales director for the Middle East and Italy, believes the newly certificated aircraft could prove popular – particularly in Saudi Arabia. Saudi is less restrictive than other Gulf states and there is a growing base of private pilots in the kingdom.

With 27 civil airports spread across Saudi, plus support for the country's civil aviation authority (GACA), the kingdom is seeing ever-greater enthusiasm for aviation.

"I was able to take the jet to an airfield near Mecca on the way to the show as there was a fly-in.

There was a lot of interest from the Saudi pilots," Cestarelli said. "The airfield is getting a new runway and will be developed for private aviation. It is an indication of the interest in aviation."

The Vision Jet is the world's first certificated personal jet, having gained its approvals two years ago. It has been designed explicitly for private ownership.

It is a single-engine but is rammed with technology to aid safety and ease pilot workload.

"It really is easy to move from an aircraft like the Cirrus SR-22 to the jet," said Cestarelli. It cruises at 300kts and has a maximum ceiling of 28,000 feet.

Stefano Cestarelli: "There was a lot of interest from the Saudi pilots."



Citadel Completions wowed show-goers with its stunning Airbus ACJ340.

## The height of luxury...

It is unusual to get unrestricted access to one of the large privately owned VIP corporate airliners. However, when the owner also has a completions company, it makes good sense to demonstrate just what is possible. Louisiana-based Citadel Completions is owned by Las Vegas entrepreneur and businessman, Sheldon G Adelson, the founder, chairman and CEO of the Las Vegas Sands Corporation, which owns the Marina Bay Sands in Singapore, and is the parent company behind the Venetian Resort Hotel Casino and the Sands Expo and Convention Center, both in Las Vegas.

He set up Citadel after having completion work undertaken on his own aircraft. He realised that, with the right approach, he could set up an enterprise that could handle the work faster and better than any competitor providing full-scale interior completions for luxury and commercial aircraft, such as Boeing 737, 747, 767 and 777 jets, along with Airbus A330 and A340s.

Adelson's own privately owned VIP Airbus ACJ340-500 was on the static park and impressed visitors.

Citadel says its mission is to customise narrow and wide-body aircraft to the highest standards, faster than anyone else. MD Joe Bonita said it has an engineering-centric approach that prevents delays while producing the very best results.

*United Technologies Corp (UTC) completed its acquisition of Rockwell Collins late last year. The two companies combined to form Collins Aerospace Systems.*

**Steve Nichols** reports.

## COLLINS PLAYS THE NAME GAME



**Very special: VIP passengers can now get Stage on-demand content on their tablets.**

**G**oodbye Rockwell Collins – hello Collins Aerospace Systems – that’s the message from the aviation giant after its acquisition was completed by United Technologies Corporation (UTC).

The announcement by UTC on November 26 said the acquisition was one of the largest in aerospace history, with Collins Aerospace Systems now having a global presence of 70,000 employees across 300 sites and \$23 billion in annual sales.

In fact, the completion was so close to the MEBA show in Dubai, that its stand there was branded as Rockwell Collins, but with a Collins Aerospace banner.

Didier Perrin, director sales and marketing, Europe, Middle East and Africa, for Collins Aerospace, said: “MEBA is an important show for us, both from a cockpit avionics and cabin perspective. We are an important player in the region for both large cabin and VVIP business aircraft and supply solutions for many different platforms.”

### Keen to showcase

Perrin said the company was keen to showcase its Pro Line Fusion integrated cockpit after it was recently awarded supplemental type certification (STC) for the Bombardier Challenger 604 in a joint effort between Rockwell Collins, Nextant Aerospace and Bombardier.

The upgrade replaces factory-installed cathode ray tube (CRT) displays with three 14.1-inch widescreen displays with advanced graphics. It says its touch-interactive maps, with real-time on-board weather radar overlays and special-use airspace, all add to a significant gain in situational awareness.

“It provides a baseline of equipment for operating the Challenger 604 in modern global airspace with automatic dependent surveillance-broadcast (ADS-B), optional future air navigation systems (FANS) compliance, satellite-based augmentation system (SBAS) capability, global navigation satellite system (GNSS), localiser performance with vertical guidance (LPV) approaches, radius-to-fix (RF) legs, synthetic vision and much more,” said Perrin.

“As such, it opened up a significant market for us in the Middle East,” he added, saying Pro Line Fusion is now available on 21 different platforms.

Collins also expects Pro Line Fusion to be certified for the Cessna Citation CJ1+ and CJ2+ light business jets in 2019.

And, speaking of ADS-B, Perrin said he was keen to encourage owners to move forward with ensuring their aircraft are compliant with the upcoming mandates that will see ADS-B Out required on certain aircraft types in US airspace by December 31, 2019 and June 6, 2020 in Europe.

“We are urging operators to move quickly to ensure they are compliant, especially as the UAE will mandate ADS-B Out by January 1, 2020 too,” Perrin said.

### Integrated cockpit

Collins also showcased an upgrade to its Pro Line 21 integrated cockpit, taking it to 21+. This brings ADS-B and FANS capabilities and has already been installed on a Bombardier Challenger 605 in the region.

Moving back from the cockpit, Collins Aerospace is also promoting its Venue cabin management solution. This now features high-definition displays, moving maps, news, games, movies, music, videoconferencing and much more.

“Venue has been a successful product for us in the large VIP market, with more than 1,100 installations completed,” Perrin said. “We have outfitted 10 VIP aircraft in the Middle East in the last 18 months alone.”

Collins’ ARINCDirect arm is also able to supply Venue with an in-flight connectivity capability from nose to tail using Inmarsat’s Jet ConneX ultra-fast Ka-band satellite solution and/or Tailwind Direct Broadcast Satellite (DBS) television system.

Entertainment is also available via its Stage subscription solution, which streams licensed Hollywood movies and TV episodes, news, sports, and weather feeds and personal content to passengers’ mobile devices.

“Stage means private and corporate jet VIPs have access to a wide range of entertainment options,” said Perrin. “The system can deliver more than 50 simultaneous streams per wireless access point (WAP), so each VIP can enjoy their own preferred media.”

The company also signed a contract with Orbit Showtime Network (OSN) in November 2017 to provide 3,000 hours of high-definition (HD) premium Arabic content, including dramas, comedies and lifestyle programming.

“This is a great opportunity for our customers in the Middle East to get the content they want, right at their fingertips,” Perrin concluded. ■

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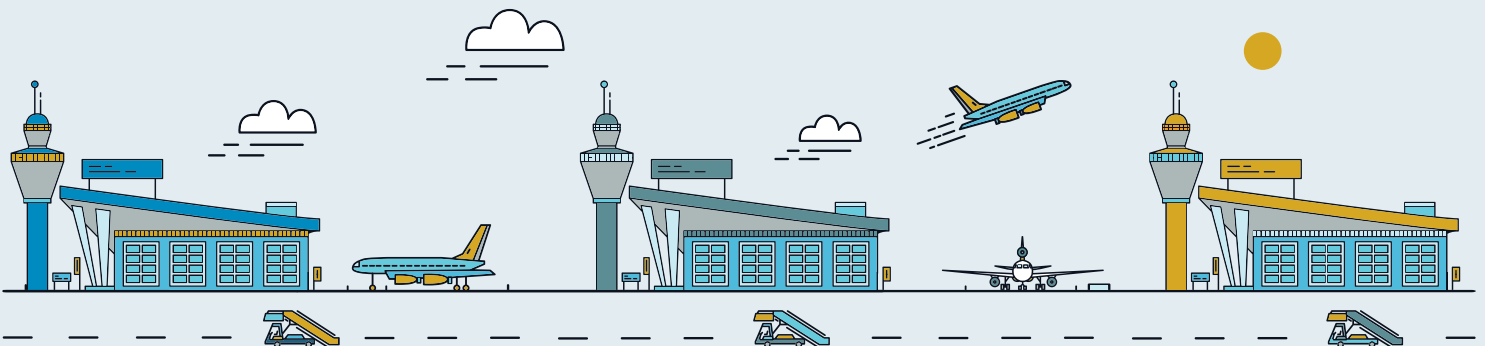


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*Qatar has reportedly donated a VVIP-configured Boeing 747-8 to Turkey. Jon Lake finds out more.*

## Qatar emir donates BBJ 747-8I to Turkey

**T**urkey's state-run broadcaster, TRT, reported that the aircraft had been gifted to President Recep Tayyip Erdogan by Qatar's Emir, Sheikh Tamim bin Hamad Al Thani, as a symbol of the latter's "special love for Erdogan".

Sceptical opposition MPs doubted this account and tabled a parliamentary question asking Vice-President Fuat Oktay to disclose whether the aircraft had been purchased by the state. They were concerned that the president might be using taxpayers' money to buy himself a VIP aircraft, even as the country was struggling to avert a major financial crisis.

Erdogan responded by insisting that the sheikh had donated the aircraft to the Turkish state after hearing that his country was

interested in buying it. He claimed Sheikh Tamim Al Thani had said: "I won't take money from Turkey. I give this as a present to Turkey."

The aircraft could have formed part of a wider \$15 billion Qatari package of economic projects, investments and deposits aimed at supporting Turkey's economy and currency.

### Increasingly close

Relations between the two nations have become increasingly close in recent years. In 2015, Turkey and Qatar signed a military protocol, and Turkey opened a military base in Qatar with a capacity for up to 5,000 troops.

Following the attempted Turkish coup in 2016, the emir was the first leader to make a solidarity call to Erdogan and there were reports

that 150 elite Qatari special forces soldiers were sent to Turkey for close protection of the president after the coup.

Turkey sent food by sea and air after Qatar's only land border was closed when Saudi Arabia, the UAE, Egypt and Bahrain severed all diplomatic and trade links in June 2017.

Boeing has delivered 45 Boeing Business Jet (BBJ) versions of the 747, 11 of which are 747-8s. Three of these were delivered to Qatar's Amiri Flight, which operates them in the normal livery of Qatar Airways, the commercial flag-carrier airline, or in a variation of this colour scheme.

However, the aircraft delivered to Turkey was not one of these three 747-8s and wore a different purple, white and grey colour scheme with the State of Qatar emblem on its tail.

**Take-off: The prototype T625 made its maiden flight on September 6 at TAI's facilities in Ankara.**





This Boeing 747-8 was operated from Bournemouth Airport on behalf of the Qatari Government. It is the aircraft donated to Turkey.

It had been operated out of Bournemouth Airport alongside a similarly painted Boeing 747SP and was owned by Worldwide Aircraft Holdings, but leased to the Qatar Government.

There was some speculation that these aircraft were forward-deployed in Europe for use by visiting members of the Qatari royal family, or that they were assigned for the use of Hamad bin Khalifa Al Thani – the present emir's father, who abdicated in 2013 having ruled since 1995 – or even his grandfather, Khalifa bin Hamad Al Thani, deposed by Hamad in a bloodless coup after ruling from 1972-1995, who died in 2016.

Both of these aircraft were put up for sale in early 2018.

The aircraft was originally delivered to Qatar in 2012 but only entered service in 2015 after

extensive and lengthy interior upgrades.

After conversion, it was equipped to carry 18 crew and 76 passengers, rather than the usual 467, and featured a master state room, a main-deck lounge for 14 passengers, a conference room, seven bedrooms and two boardrooms, multiple bathrooms, first-class seating areas, and even a medical room/hospital, including a gyro-stabilised surgical bed.

#### Just 200 cycles

The aircraft logged just 200 cycles, totalling 436 flying hours, before being put up for sale by Swiss-based AMAC Aerospace in March 2018.

The aircraft made a circuitous eight-and-a-half-hour delivery flight from Basel on September 11, routing out over the Atlantic,

towards the Azores, before heading back to Brussels and then turning southeast over Budapest and to Istanbul's Sabiha Gokcen Airport.

It then underwent modifications and received a bright new scarlet and white colour scheme in Turkish Technic's HABOM maintenance, repair and overhaul hangar. It made its first flight post modification on October 5 2018.

The aircraft joined a 12-aircraft VIP aircraft fleet, which also includes an Airbus ACJ340 (previously owned by the deposed Tunisian dictator, Zine El Abidine Ben Ali, and purchased by Turkey for \$78 million in 2016), an ACJ330, an ACJ318, a pair of ACJ319s, a Bombardier CRJ200, four Gulfstream G550s, a G450 and a GIV. ■

## TURKEY'S INDIGENOUS TAI T625 TAKES TO THE SKY

The first prototype of the Turkish Aerospace Industries (TAI) T625 multi-role helicopter made its 20-minute maiden flight on September 6 2018, at the company's facilities in Ankara, writes Jon Lake.

The helicopter's general handling, transmission and rotor systems were assessed and the aircraft performed as expected.

Wearing the Turkish civil registration TC-HLP, the aircraft made its maiden flight in primer finish, and with its doors and upper fuselage fairings absent.

The T625 is a new-generation, six tonne, light intermediate helicopter designed to meet a range of military, paramilitary and civilian requirements.

It was completely developed by TAI and all critical systems, including the transmission, rotors, landing gear, and aerostructures, have been designed and built by the company.

The T625 is powered by two LHTEC CTS800 turboshaft engines, while Aselsan is providing the state-of-the-art avionics, including two wide touchscreens (8×20 inches) and two smaller touchscreens (8×10 inches) for the cockpit.

The aircraft has a large cabin for its weight, and accommodates two pilots and up to 12 passengers.

Initially named Özgün (Original), work on the T625 began in 2010.

The indigenous helicopter programme was formally launched in June 2013 when TAI and the Turkish Undersecretariat for Defense Industries (SSM) signed an initial contract.

The T625 designation was revealed and explained in December 2016. The digits chosen denote the six tonne maximum take-off weight, the two engines, and the five bladed main rotor.

Civil certification of the helicopter is already ongoing with the Turkish Directorate General of Civil Aviation, and the European Aviation Safety Agency (EASA) certification is targeted for 2020, with full production set to begin in 2021.

Several government agencies in Turkey have expressed an interest in acquiring the T625, including the ministry of health, and the forestry and police services.

The Turkish Army also intends to replace its 86-strong fleet of Bell UH-1Hs with the T625.

TAI also hopes that the aircraft will perform well on the export market.

In December 2018, President Recep Tayyip Erdoğan revealed that the T625 would be named Gökbey. Erdoğan made the announcement during the Turkish Defense Industry Summit at the Beştepe Presidential Palace complex in Ankara. ■

# It's time spare parts played

*The aircraft parts market is at a crossroads as demand challenges suppliers to come up with solutions that satisfy the requirements of both airworthiness and economics. Chuck Grieve reports.*

**T**oday's civil aircraft operators are faced with a proliferation of choices as they look for the optimum route for maintaining the airworthiness and value of their fleets.

Service providers hope the well-publicised agreement reached between the International Air Transport Association (IATA) and CFM International will persuade more original equipment manufacturers (OEMs) to loosen their grip on maintenance, repair and overhaul (MRO), giving more opportunities for parts manufacturer approval (PMA) spares suppliers.

Others see a strong market developing in used serviceable materials (USMs).

Meanwhile, on the horizon, is additive manufacturing (AM), which aviation industry specialists believe will fundamentally change the way engineers design aircraft and engines, OEMs make them, and MROs maintain them.

Older engines can present a particular challenge, explained Justin Blockley, commercial director of UK-based parts and services supplier Bii.

OEMs will be understandably reluctant to tool

up for remanufacture of a limited number of parts – an expensive and time-consuming exercise.

For legacy parts, Blockley says it's more economical to buy serviceable materials from stockists or operators who have torn down an airframe. On new generation aircraft, such as Airbus A320s, "the maths doesn't work" for a small player to tear down the airframe and recondition parts itself.

Blockley said Bii sometimes "struggles to find the material we want" in the market where it competes with other independent suppliers and airlines. Parts that wear out the fastest – engine accessories, valves, pumps, even items in the cockpit area such as inertial reference units (IRUs) – are in greatest demand.

It was a very busy summer – better than 2017 – in the spares market, he said, with the Middle East a particular bright spot for Bii. "We've been busy supporting Boeing 747-400s and 767s, for both airlines and leasing companies. The RJ-146 market has tailed off this year."

It would be a "very difficult industry in 2018" in which to set up a broad-based trading



## WHY ADDITIVE MANUFACTURING COULD BE ADDICTIVE

The potential applications in MRO are among the many attractive features of additive manufacturing (AM). This disruptive technology, also known as 3D printing, holds promise as – among other uses – a cost-effective way to reproduce legacy spares, reduce inventory, manufacture parts on the spot, and make tools and new designs in limited numbers.

While primes, including Rolls-Royce, Airbus, Boeing and BAE Systems, are using AM to manufacture parts for engines and airframes, others are finding interesting applications in cabin interiors, where modification and customisation contribute to brand differentiation.



In the Middle East, Etihad Airways Engineering (EYEng) began exploring the use of AM in 2015 and was the first MRO to gain European Aviation Safety Agency (EASA) approvals to design and certify AM cabin parts in the high-performance thermoplastic Ultem 9085.

The Abu Dhabi MRO collaborates in research and development with a number of organisations and is an active member of the committee defining AM standards for aviation.

Its technical and commercial partnerships with world-leaders in cabin interior parts, suppliers of large-scale AM printers and cutting-edge AM technology, complement its own research into new processes and new materials for aviation. The company also has partners in the UAE with strong investment and skills in 3D printing techniques.



EYEng's Bernhard Randerath with the first certified AM aircraft part made in the UAE.

"This supports our vision to have a significant percentage of cabin interior parts manufactured using AM printing techniques within 10 years," said EYEng's Bernhard Randerath, vice-president - design, engineering and innovation.

"Additive manufacturing enables us to enhance our cabin modification by quickly designing and producing customised parts," he added.

"The ability to make parts on demand reduces inventory and cuts cost, while allowing us to optimise parts for weight reduction and appearance. The ability to make custom tools and jigs is an additional benefit.

"We have no doubt that AM will make a huge impact for airlines and MROs," said Randerath, adding that "some challenges" need to be addressed to achieve this, including the limited selection of material currently available.

In Germany, Lufthansa Technik (LHT) has set up an AM centre in Hamburg to expand the MRO's competence and experience in the new technology.

Dr Aenne Koester, head of the centre, said it will serve as "a collaborative hub... to increase the degree of maturity of the technologies and to develop products that are suitable for production".



# more of a leading role



Parts for the best-selling CFM56 family of engines are increasingly in demand as older examples approach the end of design life.

company to cover numerous platforms, he observed. "The days of one-man bands are gone. You have to be well-established and have a good supply chain in place. It comes down to relationships, service and, of course, price. It's very competitive."

He said more OEMs are recognising that they can't keep up with the demand for spares and are allowing more parts to be manufactured on their behalf under PMA. "Before it was a closed shop. Opening up to third-parties is good for us and our customers."

#### Opening up to trading

OEMs are also opening up to trading; many have their own trading divisions. "It's good for us as traders and stockists," he said.

Liebherr-Aerospace recently started offering its systems and equipment in USM condition as an alternative to new. The service is centrally managed from its Dubai service centre.

The company says it refurbishes systems and equipment sourced from aircraft destined for teardown and releases these units with appropriate airworthiness certification.

Joël Cadaux, Liebherr-Aerospace customer services director marketing & sales, said customers with legacy and mature fleets look to

alternative solutions to support their operations cost-effectively.

The use of USM parts "is widely accepted by our customers and represents a legitimate option", said Cadaux. "Our initiative is aimed at satisfying customers' demands in terms of performance as part of our drive to innovate with solutions that meet the market's expectations."

USM is also a growing part of MTU Maintenance's business. "We are experiencing double-digit growth in this area each year," said Patrick Holzkamp, head of purchasing engines and used parts. The unit uses and sells USM materials.

Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) also employs used engine parts and rotatable components from mature fleets.

At Lufthansa Technik (LHT), Manuel Huensch, senior manager of corporate purchasing, said savings are "more than 50% overall, plus a quality improvement if the parts are overhauled in our shops."

LHT says it prefers used material over new material if the part is overhauled in the MRO's shops, or within its network. "This ensures the quality our customer expects and reduces costs," Huensch said. ■

## FOR MROs...

A key focus of the LHT research is the development of AM repair processes. This poses "quite a challenge" as industry standards in the process of development and the goals of the parties involved – OEMs and MROs – "differ substantially".

LHT and Swiss engineering group, Oerlikon, are midway through a one-year agreement to develop "robust and repeatable processes" for AM in MRO. The partners are using three AM printers in three locations to achieve a better understanding of the parameters influencing the performance of a part manufactured using this technology.



The goal of the triple test is to shrink the process tolerance and to establish methods and standards to achieve the desired performance goals with the required level of certainty. The two companies intend to share the results of their study with relevant industry bodies to help define standards for qualification and approval of aircraft components.

LHT says it has made significant progress in its work with nickel-based alloys used in highly stressed engine components. It is among the few companies currently able to perform a powder bed fusion hybrid batch repair – an AM process in which a damaged part, such as a blade, is repaired by replacing lost material.

■ Etihad Airways Engineering is hosting the first airline/MRO additive manufacturing conference on March 6-7 at the Etihad Innovation Centre in Abu Dhabi. For information, visit [aircraft-cabin-additive-manufacturing.redcabin.de](http://aircraft-cabin-additive-manufacturing.redcabin.de) ■

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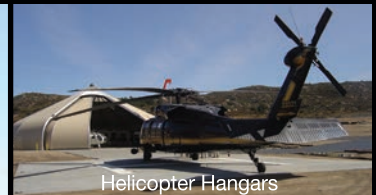
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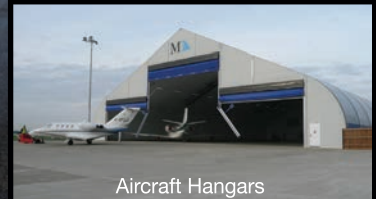
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*Airbus has a vested interest in helping MROs and airlines manage their aircraft. Guillaume Mille explained the European airframer's approach and goals to **Chuck Grieve**.*

**skywise** Reliability  
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RELIABILITY ANALYSIS

A number of Middle East customers, including Emirates, now use data collection and analysis tool Skywise.

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- List of operational interruptions

\*Average Flight Duration, Daily Usage, Daily C...

→ Increased efficiency of the reliability process

## Connected world keeps repair times in check

**T**ime on the ground is costly, which is why Airbus places such emphasis on finding ways to improve the efficiency of MRO on its aircraft.

Essential to that drive is good analysis of performance, constant improvement in airframe maintenance and components repairs, and closing the loop through feedback – and Airbus has all three covered.

Guillaume Mille, head of Airbus Services sales for the Middle East and Africa, said research has found that a 0.1% drop in operational reliability equates to a \$1 million cost to an airline operating 50 A320 family aircraft.

Minimising time spent in heavy checks is something Airbus focuses on, he said.

### Increasing intervals

New technology, processes and materials used in manufacturing result in airframes that need less maintenance. This has an impact on increasing the intervals between checks, but engineers who service the aircraft also have a crucial role in determining any changes to the safe parameters of performance.

“We collect data from our partners that we analyse to highlight trends and evaluate the health of our aircraft and take these reports back to the authorities,” said Mille. “This helps us demonstrate opportunities to spread out mandatory maintenance tasks. This is how we achieve extension of intervals between main maintenance checks.

“Traditionally, this process has been manual. The idea is to switch this on to more powerful tools using digitalisation.

“This is where the future lies: MROs have to move to a more connected world.”  
Airbus is working with the US data



**Guillaume Mille:**  
“MROs have to move to a more connected world.”

analysis specialist, Palantir, to develop Skywise, its data collection and analysis tool. A number of Middle East customers, including Emirates, now use it.

As part of the programme’s development, artificial intelligence (AI) is being harnessed to analyse data for trends and opportunities for improvement. Mille describes the AI as self-learning routines: “The more they work, the cleverer they become, the faster we can progress.”

Equally important is Airbus’ work with airline customers and MROs to improve efficiency in the shop. Digitalisation helps to better organise tasks, manpower and spares planning for major tasks.

Mille said: “We’ve been surprised to find, through exchanges with customers, that MROs trying to predict spare parts utilisation for a scheduled maintenance check achieve accuracy levels as low as 25% when the planning is done by humans who work with statistical data.”

Digitalisation to improve that prediction level “is a key development for us,” he added.

Airbus is also launching a new concept, the ‘hangar of the future’, to test tools in the working environment and develop new ones. For example, work is under way with Airbus subsidiary, Testia, to develop better non-destructive testing (NDT), such as a new way of assessing skin thickness around areas where dents have been repaired.

### Mechanical method

“The traditional mechanical method is a time-consuming manual job,” said Mille. “Our new thickness tool is like a wheel that takes thickness measurements as it rolls over the skin, greatly reducing the time required for such a task during C-checks without compromising on safety.”

Other early-stage developments, such as the use of automated cameras to inspect aircraft, benefit from “very promising benchmarking” against work in other industries, such as automotive.

Airbus set up the Airbus MRO Alliance (AMA), a grouping with six MROs – two each in the US and Asia, one in Europe and one in the Middle East – to cooperate on providing services to customers, and exchanging ideas and knowledge to develop best practices.

MRO tends to be a very regional market, said Mille, although some long-range aircraft may travel further afield for mandatory checks. “We’ve seen some aircraft from South America coming to Etihad Engineering, for example.”

He said it’s important to Airbus that there’s enough capacity to service its customers. Manpower is a challenge.

“We’re trying to launch programmes with partners, whether governments, airlines or education institutions, which will provide some sponsorship for students to get more people into the market.”

This initiative will benefit the Middle East, which relies heavily on technicians trained outside the region.

Mille said Airbus has the same focus as airlines on the successful operation of its aircraft. “We have the same interest as our customers in keeping that aircraft flying,” he said. “Our customers, in flying their aircraft, are flying our brand as well.”

*Maintenance planning software and other applications of the new technology are changing the face of MRO as big data, artificial intelligence (AI) and analytics make an impact.*

**Chuck Grieve** reports.



# PREDICTING A TRANSFORMED FUTURE

**P**redictive maintenance is getting a lot of attention in aircraft MRO circles, and for good reason. This practical application of big data promises a revolution in how aircraft and their systems are maintained with, if anything, better safety parameters.

Predictive maintenance planning “has become a game-changer for both the civil aviation and defence industries”, said Gary Vickers, chief executive of UK-based Aerogility.

“It resolves the complex competing factors to make smarter, lower-risk and more cost-effective decisions about how best to manage assets, and truly understand fleet needs.

“Smart forecasting solutions, based on predictive analytics, are leading to more efficient maintenance planning systems and, in turn, stronger MRO, capable of meeting the increased demands.”

Scarcely an original equipment manufacturer (OEM) exists today that is not seeking to capitalise on the developments in digital technologies that have made real-time condition monitoring possible. Leading MROs are also in the frame, with solutions to help operators get the best use from their data.

Vickers said developments in big data analytics, machine-learning and AI hold great potential for the future of predictive maintenance.

AI is at the heart of “ground-breaking” multi-agent maintenance scheduling software developed by Aerogility and used by a number of



**Smart forecasting solutions, based on predictive analytics, are leading to more efficient maintenance planning systems.**

GARY VICKERS

prime contractors and airlines, including Lockheed Martin, Rolls-Royce and EasyJet.

The company’s interactive tool can simulate entire fleet operations years into the future, predicting when maintenance events should occur. These forecasts include the analysis of systems such as engines, landing gear and airframes, allowing the airline’s planning team to respond quickly by presenting alternative strategies and potential solutions to day-to-day challenges.

Vickers said the Aerogility system helps clients work through complex ‘what-if?’ maintenance policies and plan efficiently. “Operational data about each aircraft in the fleet is extracted from their asset management operating system (AMOS) and integrated into the Aerogility planner,” he said. “The planners can forecast when multi-functional heavy maintenance must be applied, factoring in existing plans with their third-party suppliers – and simultaneously incorporating other fleet upgrades and modifications programmes.”

Mike Fleming, vice-president of Boeing’s commercial services division, said big data is getting bigger. “The amount of data coming off an aircraft will double in the next 20 years.”

To manage it, he said, and help customers gain the benefits of big data in their operations, Boeing is “evolving our portfolio of tools and developing new applications and analytics”.

Among the new apps in its global services portfolio is the reliability advisor, which is

Continued  
on Page 76

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**AVIATAR**

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CONTINUED FROM PAGE 74

designed to let an airline's engineers monitor trends on the aircraft and deploy maintenance programmes as required.

Speaking to the Farnborough International News Network (FINN), Fleming said: "Boeing Global Services is a broad portfolio, which services pretty much all aspects of the airlines market."

The US airframer's airplane health management, described as a maintenance decision support tool provided through MyBoeingFleet.com, gives airlines an advanced capability to monitor their aircraft in real-time.

"The data coming off it helps our customers prioritise what they should work on, and allows them to turn unscheduled maintenance into scheduled maintenance, which allows the airline to run more efficiently," said Fleming.

Looking ahead, Fleming said operators could expect Boeing to build on its position and domain knowledge with more apps. Aviation, he added, is a very competitive market requiring

continuous improvement to airlines' business models. "We have to evolve with them."

For Air France Industries KLM Engineering & Maintenance (AFI KLM E&M), specific issues with Airbus models spurred the development of its Prognos predictive maintenance software.

Jacques-Olivier Guichard, AFI KLM E&M vice-president digital, told reporters at MRO Europe it was a deliberate company choice to focus on analysis of data from components and systems to "follow a system to the end".

Five systems on the A380, including landing-gear components and the supplemental cooling system, had predictive maintenance applications developed for them.

Additional applications have been developed for landing gear and pneumatic components on A320s and A330s, and for other equipment on Boeing 787s and 747s, which proved the concept on legacy aircraft.

Guichard said this work enabled AFI KLM

E&M's digital engineering team to mature a predictive algorithm that could be reused and adapted, in its basic form, for different systems on different aircraft.

Collaboration is the key to new capabilities that component and systems OEM Liebherr-Aerospace is developing to help airlines maintain their fleets more effectively.

Liebherr applied its analytical expertise to the data contained in Airbus' Skywise platform in a group of pilot projects to assess the potential of big data. Based on the success of the pilots, Airbus and Liebherr are now exploring opportunities to expand to other areas of investigation.

In the pilots, Liebherr and Airbus used Skywise to develop deeper and better understanding of the in-service behaviour of on-board systems and components developed, manufactured, certified and serviced by Liebherr.

The work demonstrated how expert analysis could reveal previously unknown relationships that could be used to build and operate equipment in a more reliable manner.

Liebherr said this data-backed understanding and enhanced know-how will allow it to advise Airbus and its airline customers on ways to optimise aircraft operation and significantly reduce operating costs.

### Digital platform

Lufthansa Technik (LHT), with its Aviatar digital platform, is attempting to transcend competition by deploying an open and neutral aviation platform for international cooperation.

Its objective is to ensure airlines, component manufacturers, other MRO providers and leasing companies, are in control of their data and can use common interfaces based on a digital twin.

Ten partners and customers are now working with Aviatar; more than 1,000 aircraft are live on the platform, which supports a variety of apps developed by the MRO and its co-creators.

Among apps launched by LHT at MRO Europe was PartsMate. Accessing a pool of certified components, it allows airlines to simplify their inventory management and share parts through loan and exchange transactions. LHT said the tool "improves material availability, optimises inventory levels and reduces capital lockup and overall costs".

Alongside, LHT launched major asset realtime components (MARC) to simplify the search for large spare parts, such as inlet cowls, thrust reversers and radomes. "There are only a few of these components on the market, which, up to now, has made the search complicated and time-consuming," said LHT.

Apps such as Aviatar's APU health management provide detailed analyses that "can significantly reduce maintenance costs and increase aircraft availability simultaneously". ■



**Dr Johannes Bussmann:** "MRO providers, airlines and other market participants need to find common ground for the creation of a truly independent, digital, industry platform."

## Who owns the data?

With so much data being generated by so many parts of the aircraft, there are bound to be questions surrounding its exploitation, especially for commercial advantage.

Dr Johannes Bussmann, Lufthansa Technik (LHT) chairman and chief executive, is among those who have expressed concerns.

As he sees it, the data generated by the thousands of sensors and systems in new aircraft is the property of the operators; they need to be able to control their data and choose who uses it.

"This is the only way to create genuine competition for data-based services," he said.

Operators need unencrypted access to data from their flights to meet their responsibilities for the airworthiness and safety of their fleets. However, the new aircraft types also enable encrypted data to be transmitted to the original equipment manufacturer (OEM), which then, ultimately, has the power to decide how that data is used, including for predictive maintenance.

Bussmann said: "This is a threat both to the

independence of airlines and the MRO industry – and it has implications for data protection and flight safety. That's why I want to be crystal clear on this point: the operational data belongs to the airlines – not to the airframers, not to MROs and not to anyone else."



LHT sees competition developing around pooled expertise and a neutral entity that includes regulators and key organisations such as the International Air Transport Association (IATA).

"MRO providers, airlines and other market participants need to find common ground for the creation of a truly independent, digital, industry platform," he said.

The real value of data lies in how it is used. "This is where competition is needed that is open to ideas, solutions and a breadth of skills that no single company – not even a market leader – can claim to provide alone."

# INDEPENDENTS DAY?

*Despite original equipment manufacturers (OEMs) angling for a larger share of the aftermarket, independent MROs believe they have a bright future, as **Chuck Grieve** reports.*



**TS&S:** In the Middle East there's a gap in the market for partnerships between OEMs and MROs.

It should be no surprise that aerospace OEMs are moving into the aftermarket: who wouldn't want a slice of a growing multi-billion-dollar market?

Boeing has been frank about its ambitions to more than triple its aftermarket business over the next decade to as much as \$50 billion a year; Airbus's goal is \$10 billion by 2025.

While this may worry independent MROs, industry observers suggest taking that big a slice of the total market may be unrealistic.

The big two civil airframers have the advantage of being able to package after-sale services with an aircraft sale and to undercut MROs on price.

Operators appear to be split over the choice between dealing with a single entity or going direct to multiple OEMs through their accredited suppliers.

But MRO is also a service industry and it's not just about price, as AMAC chief executive, Kadri Muhiddin, pointed out. In his view, independent MROs have a number of key advantages, starting with trust. "Once that's established, why would a client want to go elsewhere?"

Organisations such as AMAC have an agility that larger enterprises cannot match. "While other people are still thinking about something, we've done it," said Muhiddin. "There's no bureaucracy."

The economies of scale, so important in manufacturing, can have the opposite impact in MRO. "If someone has a portfolio of \$40-50 billion, a customer with a job worth \$500,000 is lost," said Muhiddin. "He gets the feeling the big company doesn't really care about him."

Market projections underline the positive story for independents. David Stewart, partner at global management consultant firm, Oliver Wyman, says the current 'super-cycle' of aircraft deliveries means airlines are making money, which "flows down to the supply chain, including MROs".

Speaking to the Farnborough International News Network (FINN) at MRO Europe, Stewart said MRO market expansion would top the 3% projected annual fleet growth. "The MRO market, which is \$77 billion today, will rise to more than \$100 billion in 10 years' time, growing at a slightly higher rate of 4%."

Oliver Wyman's annual supply chain survey showed MROs are turning a wary eye on the prime contractors and their services strategies. Engine and component OEMs have been active in the aftermarket for some time, and now the airframers are saying they're going to grow their services side.

"They're going to grab market share from somebody, somehow," said Stewart.

But Kevin Michaels, president of consulting firm AeroDynamic Advisory, told Reuters that Boeing "has to be agile and cost-competitive enough to win business from established players. They need to be entrepreneurial. That's a challenge."

Partnerships work for both interests. Mansoor Janahi, acting chief executive of Abu Dhabi's Turbine Services & Solutions (TS&S) says in the Middle East there's a gap in the market for partnerships between OEMs and MROs. Speaking at MRO Asia, he said: "OEMs are focused on many different things and they need hungry and capable partners."

## Control intellectual property

OEMs may control intellectual property and the sale of parts, but independent providers have important roles to play by investing in MRO capacity on behalf of OEMs. About 65% of TS&S' business is OEM-based.

On the same conference panel, Fraser Currie, chief commercial officer at Joramco, said the perceived OEM threat isn't making much impact. Besides, he said, customers operating the three aircraft types – Airbus, Boeing and Embraer – that the Jordanian MRO serves "would have to have their aircraft serviced in three different locations if Joramco wasn't an independent provider."

Older types "remain our bread and butter," he is quoted as saying. For newer aircraft, strong links with OEMs were essential.

MTU Maintenance senior vice-president, Leo Koppers, speaking at MRO Europe, said his company benefits from OEM aftermarket programmes by joining them. MTU has approvals for new generation engines including Pratt & Whitney's geared turbofan.

Koppers said about a third of the engine work coming into MTU's shops in Germany is related to OEM power-by-the-hour (PBH) agreements.

Elsewhere, Koppers said lifecycle optimisation made a compelling case for the independents. "The MRO provider can look after your assets during the entire revenue service, and potentially beyond," he said.

Mature engines, in particular, benefit from the "creative solutions" that an MRO can offer, ranging from repair options, customised builds, leasing, teardown for parts and more.

"It's about getting the best out of your engine at whichever point it is in the lifecycle."

*Al Ain International Airport is poised for growth – cargo is already expanding and the search is on for more passenger traffic, as Alan Dron discovered.*

## Could Al Ain be the UAE's sleeping superstar?



**Al Ain International Airport has important cargo and training roles.**

Potential is the word that springs to mind when talking about Al Ain's airport. Serving a steadily expanding aerospace manufacturing hub plus growing population centres, and with space to grow, it is well-placed to become a substantial contributor to the UAE's burgeoning aviation economy.

Situated slightly less than two hours' driving time east of Abu Dhabi, Al Ain city sits in a small notch of UAE territory jutting into Oman. Located 18km northwest of the city, its airport has been in operation since 1994, and is Abu Dhabi emirate's second international gateway.

The single terminal is relatively modest, having just four gates for aircraft. However, the airport possesses a 4,000m runway, with a parallel 4,000m taxiway that can double as a second runway if required.

The terminal can handle around 8 million passengers annually, but operates at a fraction of that capacity; the first 10 months of 2018 saw around 80,000 passengers pass through.

At present, only two airlines serve Al Ain on a regular basis – Egypt's Nile Air, which flies to Cairo; and Air India Express, which operates to Kozhikode.

Other carriers include Al Ain in their seasonal timetables, including Royal Jordanian and Pakistan International Airways.

### Modest passenger figures

Despite these modest passenger figures, the airport records a disproportionately large number of aircraft movements – 76,800 in 2017. This is partly because of training activities from two aviation training colleges and an increasing number of cargo flights.

The growing freight flights mirrors the growth of the industrial hub alongside the airport, which plays a vital logistics role for the UAE's first aerospace cluster, the Nibras Al Ain Aerospace Park.

This cluster operates as a catalyst for economic development and diversification and is an important provider of local employment.

The 25sqkm aerospace park, jointly developed by Mubadala Aerospace and Abu Dhabi Airports, brings

together world-class aerospace manufacturers and suppliers, research and knowledge institutions, and educational and scientific bodies.

Already operating there are advanced composites manufacturer Strata, unmanned air vehicle (UAV) manufacturer Abu Dhabi Autonomous Systems Investments, and maintenance, repair and overhaul (MRO) specialists SR Technics.

Under the UAE's industrial plans, the focus over the next decade will be on attracting global original equipment manufacturers (OEMs), industry suppliers and small to medium-sized enterprises (SMEs) to the site.

However, the existing companies are already providing considerable business for Al Ain airport in the form of cargo; by the end of October last year, 428,000 tonnes had passed through the airport.

According to the airport's acting chief operations officer, Ahmed Al Shamisi, Al Ain holds good potential for a low-cost carrier (LCC) and negotiations are on-going with several candidate airlines.

### Secondary airports

Although a relatively remote airport may seem an unlikely attraction for a carrier, one of the world's most successful LCCs – Ireland's Ryanair – built up its network in Europe largely through the use of secondary, or even tertiary, airports.

For example, small airports such as Skavsta and Torp served the Swedish and Norwegian capitals of Stockholm and Oslo respectively, despite being 100km away. Ryanair solved the problem of transporting passengers to and from the cities by hiring local bus companies to coordinate their schedules with the airline's timetables.

Al Ain city has a population of 400,000 and the airport also serves other nearby towns, giving a reasonable pool of potential passengers; and good surface transport links could make the airport attractive for budget travellers heading to Abu Dhabi.

The growing catchment area around Al Ain means there is definite potential for an LCC to operate from the airport, said Al Shamisi. The airport has gained valuable experience in working with one of the existing carriers, Nile Air, he added, which catered both for residents and for tourists heading to and from Egypt.

To meet forecast traffic growth, driven by the growth of the emirate's economy and Al Ain's aerospace industrial activities, plans have already been drawn up for a series of enhancements to the airport.

These include an increase in the sizes of the departure lounge and check-in areas, expansion of a cargo terminal, a new airline in-flight catering facility and a VVIP terminal.

These improvements will be executed when the business need arises: "If we see there's an increase in the potential of attracting traffic and passengers we will definitely expand," said Al Shamisi. ■



**Ahmad Al Shamisi: Al Ain holds good potential for a low-cost carrier and negotiations are on-going with several candidate airlines.**



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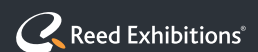
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With a capacity of 12 million passengers, Algiers will become one of the largest airports in Africa in terms of capacity.

# Algiers ambition opens a new gateway to Europe

*The Algerian airport services and infrastructure management company (SGIA) is finalising the new terminal project at Houari Boumediene International Airport in Algiers.*

**Vincent Chappard and Anuradha Deenapanray report.**

Algeria is entering a new phase in air transport development with operations starting at the new terminal of Houari Boumediene International Airport, south east of Algiers.

With a capacity of 12 million passengers, Algiers will become one of the largest airports in Africa in terms of capacity.

Even though it ranks only 10th in terms of traffic, the airport has registered a constant growth of between 6% and 13% since 2011.

Algiers International Airport is, today, composed of three terminals.

The first is dedicated to international flights, the second to domestic flights, and the third is home to charter flights and low-cost airlines.

The national airline, Air Algérie, serves Africa, Europe, Canada, China and the Middle East from this platform.

Tassili Airlines, a subsidiary of Sonatrach Petroleum Corporation, operates flights to Morocco, Turkey, Spain, France and the UAE.

With constant growth in air traffic, capacity pressure and oncoming saturation forecasts, a development masterplan was launched in 2009 to extend Houari Boumediene International Airport.

The capacity of the airport actually increased from 3.5 million passengers per year to 7.8 million to date. The threshold of 8 million was going to be crossed rapidly.

Measures were, thus, taken to face the new challenges. A short, medium and long-term plan was created to build a new terminal in 2018.

An international call for tenders was launched to carry out the technical studies for the future terminal and group of three design firms – Llywin Davis, Prointec and Brea – was chosen. Work began at the end of 2014.

The Chinese group, China State Construction Engineering Corporation (CSCEC), was selected to build the new terminal.

According to the Minister of Public Works and Transport, Abdelghani Zaalane, the project is estimated to cost around 80 billion DA (\$674 million) and requires close coordination between national and foreign companies.

Algerian authorities are also extending the metro line linking El Harrach to the airport.

A new train connection will also be provided to facilitate access to the airport as from 2020.

The project includes the construction of the main building, the control tower and the rehabilitation of the runway to enable long-haul aircraft (A380) to land at the airport.

Two aircraft stands with three loading bridges will also be provided.

In parallel, work will be carried out on the taxiway and SGIA will provide 33 additional parking spaces for aircraft.

As *Arabian Aerospace* was going to press, technical tests concerning infrastructure management were being carried out. Teams were conducting flight simulation tests to check the entire system – a crucial step before moving to the operational phase, which will be gradual.

Tahar Allache, director general of SGIA, said Houari Boumediene International Airport aims to become a real hub between Africa and Europe.

This will help Air Algérie create its hub. The national carrier is presently the main operator of this platform alongside Aigle Azur, Air France, British Airways, Emirates, Lufthansa, Qatar Airways, Royal Air Maroc, Tunisair and Turkish Airlines. Furthermore, passengers coming from Africa will be able to benefit from connections in Europe.

The current terminal will be refurbished to accommodate companies from Gulf region countries and flights dedicated to Hajj and Umrah.

Terminal 3 will eventually be demolished and SGIA plans to build a new terminal in a new master plan for the coming decades. ■

*Muscat's revitalised airport is coping with the pressures of steadily mounting passenger numbers with a new-generation security system. Alan Dron reports.*

# Muscat busy securing its future

Until recently, Muscat International Airport, serving the Omani capital, has been a source of complaint from airlines and passengers.

The original terminal building had become too small for the growing numbers of passengers passing through it.

Although its capacity was just 3.5 million, around 7 million people were using it annually. Rapidly-expanding national carrier, Oman Air, was becoming increasingly constrained by the building's shortcomings and had made its feelings public on the matter.

The launch of a second terminal in March 2018 was, therefore, welcomed. And to match the new building's modern facilities, a new integrated security system was also installed by European defence contractor, Thales.

Ensuring state-of-the-art technology for operations and security infrastructure was of great importance to Oman's Ministry of Transport and Communication, which is why it selected Thales, a key international player in security, to fulfil its big ambitions.

Thales, a major provider of integrated security and telecommunications solutions for critical infrastructures, has successfully met the demand for enhanced security at the new airport thanks to its role as master system integrator for the implementation of the integrated security management solutions.

The technologies provided by Thales focus on the airport operation control centres and include an advanced perimeter intrusion detection system.

This allows several types of sensors to be integrated into a single system, with information gathered via system-integrated acquisition modules or through connections with other sub-systems, giving the operators a single, collated view of the situation.

Thales is also providing a suite of other security-related systems, including video surveillance with video analytics, access control, passenger screening equipment, E-gates and security checkpoints, as well as a full airport IT suite. This manages airport operations, supported by an information broker to handle integration and communications between the various systems.

This security infrastructure is complemented by fully redundant data centres, including server farms and a storage area network, plus trunked radio systems and network security appliances to ensure high performance, reliability and quality of service.

Before installation, Thales put all the new systems at Muscat International Airport through 45 operational readiness tests. These involved more than 26,000



The technologies provided by Thales focus on the airport operation control centres and include an advanced perimeter intrusion detection system.

PICTURE: THALES.



Since 2009, terminal throughput at Muscat International Airport has risen by a minimum of 5% annually.

participants and, said the company, successfully met and surpassed all standards.

"We are delighted to have partnered with Muscat International Airport to meet the needs for integrated security and operations protocols at the new airport," said Roger Daix, vice-president, Thales Middle East.

"Through our industry-leading solutions, we are ensuring efficient operations and the safety and security of the overall infrastructure as well as that of the passengers."

Thales noted that the successful implementation of the security system at Muscat was the latest of several projects confirming its position as a leader in airport master system integration, airport security and operational solutions.

Among its previous projects in the MENA area covering high-profile, state-of-the-art critical infrastructure, are airports in Dubai and Qatar. ■

## A STORY OF CONTINUED GROWTH

Muscat International Airport has seen steady growth in passenger numbers in recent years. Since the financial crisis in 2009, terminal throughput has risen by a minimum of 5% annually; in 2017, it was a substantial 16.7% more than 2016, taking numbers to 14 million. A further 10% increase was anticipated for 2018 when statistics are finalised.

The opening of the new second terminal in March 2018 has boosted capacity to 20 million. At present, around 70% of passengers are in transit, but with Oman seeking to develop its tourism sector as a major source of revenue, larger numbers of arriving passengers will be using the airport as the end point of their journeys.

Following the latest expansion, including the new 580,000sqm terminal, the airport is now fully equipped to help the sultanate realise its goals in line with its national strategy for tourism 2040.

This growth in visitor arrivals is complemented by an increase in aircraft movement, with Oman Air announcing the addition of new routes and a steadily expanding fleet to serve Europe and north Africa.



# The back-seat driver

*Inmarsat's latest study shows that in-flight Wi-Fi remains a key element in forming customer loyalty and satisfaction among airline passengers across the United Arab Emirates.*

**Steve Nichols** reports.

Inmarsat's fourth annual global in-flight connectivity survey, conducted in association with market research company, Populus, found that Wi-Fi is already an essential part of everyday life on the ground, with more than eight out of ten UEA respondents (85%) believing that it is "fundamental" to daily life.

With two thirds of UAE passengers (67%) describing in-flight Wi-Fi as crucial, meeting that demand in the skies is key to improving passenger experience and driving loyalty in the region.

Wi-Fi is now so critical to passengers that more than eight in ten (82%) would be more likely to rebook with an airline if high-quality Wi-Fi was available.

It found in-flight Wi-Fi is now considered the most important factor for UAE passengers when choosing an airline, followed by the carrier's reputation.

The impact of Wi-Fi on loyalty and satisfaction is particularly significant for passenger groups most keen to remain connected in the air.

Nine in 10 UAE passengers (89%) would use in-flight Wi-Fi if it was available on their next



**Ben Griffin: "Wi-Fi is essential to daily life on the ground, and airline passengers see no reason why their time on a flight should be restricted or spent any differently."**

flight, with high-value customers, parents, and young passengers among those most likely to use the service – 90% business travellers, 94% passengers travelling with children and 90% 18-30-year-olds.

The survey found on-board Wi-Fi could also lead to more productive business trips, as four in five UAE business travellers (82%) say they would use in-flight Wi-Fi to continue working on the aircraft.

Access to Wi-Fi is also an important driver of choice for the UAE's nervous flyers. Three-quarters (73%) said that they would use the technology to remain in contact with family and friends on the ground.

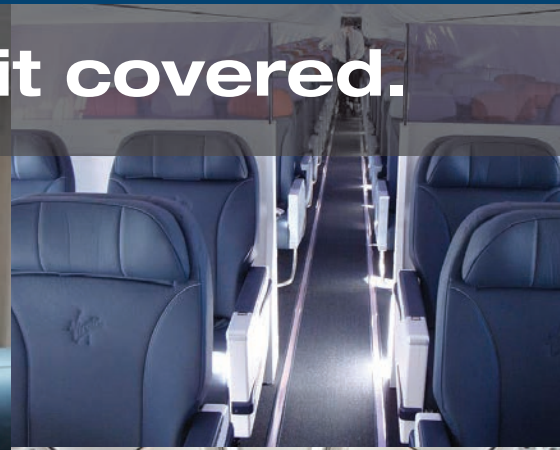
But the Wi-Fi must be reliable – 57% of respondents said no Wi-Fi at all is better than a poor quality service.

Ben Griffin, vice president Middle East, Africa and Asia Pacific at Inmarsat Aviation, said: "Wi-Fi is essential to daily life on the ground, and airline passengers see no reason why their time on a flight should be restricted or spent any differently.

"From sending that important work e-mail to entertaining

Continued  
on Page 84

# Sabeti Wain: we've got it covered.



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Some of Emirates' A380s are fitted with both Inmarsat SwiftBroadband and Panasonic Ku-band GCS in-flight connectivity.

CONTINUED FROM PAGE 82

children, staying online is becoming a crucial part of the in-flight experience for today's airline passengers."

He continued: "The desire to stay connected in the air is especially true to passengers in the UAE, as this year's survey reveals that 90% want to use in-flight Wi-Fi if it is available on their next flight."

Griffin said that he considered the UAE as being at the "top end" of the chart in terms of the take-up and interest in in-flight connectivity. He said this was because carriers in the region invested in the service very early on.

"For example, if we consider Emirates, it was the first airline to have fax machines on board and the first to have a phone in every seat, plus SMS messaging and e-mail," he said.

"Etihad has a 100% connected fleet and FlyDubai is connected through Global Eagle Entertainment. The fleet and route penetration of aircraft equipped with in-flight connectivity in the UAE is greater than anywhere else."

**Faster services**

Many carriers started with Inmarsat SwiftBroadband, but have moved on to faster Ku- and Ka-band services as the technology has developed.

Griffin said take-up rates for connectivity varied depending upon the time and duration of the flight and the dependability of the service.

"But, overall, the averages are significantly higher than they used to be. In the early days it was around 3-4%, but we are definitely seeing uptake rates in the teens now, and sometimes into the 20s.

"We are seeing a higher proliferation of people connecting because they know they can. It is either affordable or even free, depending upon your flight status."

Griffin added that the system of charging for in-flight connectivity by the megabyte was dead as far as he was concerned.

"No one really knows how much a megabyte gives you any more – if I bought 10 megabytes of data I really don't know how long that would last to be honest," he said.

He pointed out that many devices are constantly downloading updates in the background so a limited data allocation can soon be used up.

"Terrestrially, we don't buy our internet packages by volume any more, certainly not in the UAE," he said.

"I think airlines can leverage real value from loyalty or from other ways of capturing and maintaining contact with passengers. They can offer concessions or a free service to frequent flyers," he said.

For example, while all Emirates passengers receive 20Mb of free in-flight Wi-Fi, the carrier's Skywards members can enjoy unlimited complimentary or discounted Wi-Fi, depending upon their membership level.

FlyDubai, on the other hand, offers passengers the choice of buying a 30-minute pass (for flights more than two hours), or an all-flight pass.

"Airlines are happy to offer free Wi-Fi as long as they get some information from the passenger that has some value," Griffin said.

Another model sees airlines team up with other commercial entities to offer deals to passengers on a range of goods and services.

"For example, Indonesia's Citilink, which recently signed a fleet-wide contract with Inmarsat for our GX Aviation product, is working with Mahata to bring brands together that have revenue-earning potential through advertising and other media," he said.

But the dilemma is always, do you offer free Wi-Fi to all, but suffer from overuse, slow speeds and a poor level of service. Or do you charge, automatically reduce the number of concurrent users, but then offer passengers a better experience?

Emirates picked up quite a lot of flak when it launched its free Wi-Fi service. On the website onemileatatime.com, travel consultant and blogger, Ben Schlappig, wrote: "Wi-fi on Emirates is excruciatingly slow to the point that it's almost unusable. They have a limited amount of bandwidth they're working with on the plane, and there's a huge difference in usage depending on the pricing."

He concluded: "Personally, my preferred Wi-Fi systems are from airlines like Etihad and Singapore, which let you purchase a Wi-Fi pass for the entire flight for \$20, which has no data cap. The speeds are good that way, and the price isn't unreasonable."

**Global communications service**

Emirates currently uses Inmarsat SwiftBroadband (L-band) and Panasonic Avionics (Ku-band) on its fleet. Its Airbus A380s were traditionally fitted with SwiftBroadband, but a small number of the fleet have also been outfitted with Panasonic's global communications service, offering a megabit or multi-megabit experience.

In a memo sent to staff in June 2017, when it adjusted its pricing structure for Wi-Fi, Emirates wrote: "At Emirates, the overall customer experience is always at the core of everything we do. We constantly review our products and services across all cabins to make sure we continue to surprise and delight our customers and add value to their experience.

"At the same time, we streamline our services based on customer demand and feedback. The Wi-Fi service has proven to be massively popular, with around 750,000 customers connecting every month.

"Now customers can choose a plan to suit their needs, rather than paying a flat fee for a set number of megabytes.

"And all customers can still connect on board for free for up to two hours." ■

*Aircraft Interior Middle East (AIME) is the only dedicated aircraft interiors show in the Middle East region, making it the ideal platform for business.*

**Marcelle Nethersole** *finds out just what makes the event so successful.*

# Design of the times



**Well dressed:** The event showcases new designs, innovative cabin fittings and technological advancements.

**A**IME will once again be co-located with MRO Middle East, taking place on February 11-12 at Dubai World Trade Centre (DWTC).

The event showcases new designs, innovative cabin fittings and technological advancements for the region's aviation market.

AIME also features an innovative airline buyers' programme, bringing together visitors and exhibitors for prescheduled one-on-one appointments.

This year the event organiser, Tarsus F&E Middle East, expects 4,800 trade visitors to attend the two-day run – an increase on the 4,541 from 2018. Exhibitors from more than 30 countries could hit the 330 mark.

"AIME has grown each year since its inception and feedback from exhibitors indicates that the show is very important because of the potential of the Middle East aircraft interiors market," said Caryn McConnachie, aerospace director, for Tarsus F&E Middle East.

### Three different aerospace areas

Each year the show attracts new exhibitors. An example for 2019 is the SACS Boysen aerospace group, which represents three different aerospace areas, all of which will be at AIME2019 – SACS (manufacturing), Boysen (distribution), and XBAG (fire and safety solutions for lithium batteries).

"The Middle East market is growing and it's important to present ourselves and showcase our products and capabilities for the region," said Pierre Chamoun, CEO of SACS Boysen's new establishment in the UAE. "The biggest challenge in the region is the local availability of

material; we are here to support the customer requirements from our Abu Dhabi office and warehouse."

Middle East airlines have invested heavily in new aircraft and, in addition, Emirates began refurbishing its existing fleet with roll-outs of its 'completely refreshed' multi-million-dollar upgraded interiors earlier this year.

Research Report Insights recently stated that the global aircraft refurbishing market would bring in annual revenues of more than \$7 billion by 2026, increasing from \$4 billion in 2018.

Returning to the event for the fourth time will be Austrian leather manufacturer Boxmark, which is planning to display its methods using design tools to visualise functional properties; ensuring seat cushions appear more voluminous, within the constraints of smaller, lighter airline seats.

In addition to seating, exhibitors at AIME2019 will include industry sectors such as cabin lighting – predicted by Technavio to grow annually by 5.87% to 2021 – and in-flight catering, which ResearchAndMarkets believes will increase at a compound annual growth rate (CAGR) of 6.41% until 2022."

### Regional forum

Also returning to AIME is the hugely successful Inflight pavilion, workshop and awards. This includes a regional forum dedicated to in-flight entertainment and connectivity (IFEC) and cabin technology.

"Inflight Middle East has firmly established itself as the premier IFEC event in the MENA region," said Alexander Preston, editor of Inflight.

"The 2019 event aims to be our best yet with exhibitors, located in our pavilion area, showcasing the latest innovations in passenger experience, and engaging debates taking place at our Inflight workshop over two days. Our confirmed panellists include experts from Flyadeal, Latitude Aero and Inmarsat."

The Inflight awards, taking place on February 12, will recognise outstanding product or service offerings from suppliers and airlines serving the MENA region.

"So far we've received a number of award nominations from a variety of airlines and suppliers serving passengers across the region," said Preston.

The aircraft cabin interiors market is projected to grow from \$16.87 billion in 2016 to \$29.16 billion by 2021, at a CAGR of 11.57%.

"Combine this with the fact that the Middle East will increase its market share of revenue in this market by 30% in 2020 compared with the previous decade and it is easy to understand why AIME is becoming increasingly important for interiors providers," said McConnachie. ■

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Parents of young people do want their kids to have a university education. That might be one of the reasons why we have a significant problem finding enough pilots, engineers and air traffic controllers.

CAPTAIN TILMANN  
GABRIEL

*The dedication and commitment in time and money required to qualify as a pilot or air traffic controller often militates against obtaining a rounded education. Now someone is trying to do something about it.*

## Navigating pilots to higher education

As they move through their careers, pilots and air traffic controllers often wish to go into management. However, they often lack the skills and background required to exploit their potential to the full.

This is detrimental to the long-term development of the aviation industry as it advances on an ever-more complex future.

Captain Tilmann Gabriel, the City, University of London's senior lecturer at the school of mathematics, computer science and engineering, and director of its MSc aviation management programmes, is determined to do something about the problem.

"We do not have an academic education arm for aviation jobs," he explained. "All licensed jobs are driven by the International Civil Aviation Organization (ICAO) annex 1. That means two things. When you are a pilot, air traffic controller or an engineer, or in senior management, such as crew management, you have no university education. You just have a licence."

City, University of London is one of a number of international academic institutions trying to rectify the problem. It offers MSc courses in air transport management, air safety management, and aircraft maintenance management. In August 2018, it launched the airport management programme, a new discipline for senior airport staff, who have at least two years' vocational training.

"This is a part-time MSc programme next to the job and takes three years. It costs you a

Continued  
on Page 88

CONTINUED FROM PAGE 87

relatively mild £15,900 (\$20,000) and gives you the option of four different degrees – for more and more airlines now the requirement to get into management.”

With more than 400 part-time students from the aviation industry now enrolled in its MSc programmes, and over 1,500 alumni at its campuses in London, Dubai and Frankfurt, City has a key executive education responsibility for future global aviation leaders.

“Four years ago I joined City University, which is now part of the University of London, by taking over a programme that was started by [the late] Professor [Roger] Wootton in 1998. After 40 years as an airline captain and in many aviation leadership positions, this was a great opportunity to support the industry with leadership education,” Gabriel said.

Industry veteran Gabriel’s CV reads like a textbook management career, including posts as training captain and executive, at Lufthansa (1976-96), and leadership roles at Abu Dhabi’s Royal Jet (2003-05) and Qatar Executive (2011-13), as well as at Afghanistan’s Safi Airways (2007-09).

He obtained his air transport pilot licence (ATPL) at Lufthansa in 1979 and has been a fellow of the Royal Aeronautical Society since 1985. He was appointed executive chairman of the International Pilot Training Association (IPTA) council and president of the IPTA executive board in August 2016. He is also researching a related PhD.

**New generation**

His latest posting only underlines the need to smooth the career paths of the new generation, given the times he, himself, has had to forego his management career to obtain additional qualifications.

“My longstanding – since I started at Lufthansa – intent has been to see how can we bring aviation into a regulated vocational and university-trained programme. We have several ideas. Already in Germany we have the University of Worms working together with the Airline Transport Pilot (ATP) [certificate]. You have it in the US, with Embry-Riddle Aeronautical University (ERAU) and several other institutions there.

“The US has a dilemma in that you have a four-year college education, which is, in itself, very expensive – around \$100,000 – and then the ATP combined with it is another \$100,000, so it is a very expensive choice,” he said.

Gabriel argues that a way should be found to marry the bachelor degree with a standard ATPL, or other vocational licences, so that individuals can tackle the MSc with the earlier degree in hand.

“One idea, other than these postgraduate or master’s programmes, for people who are in the business, who are pilots and middle managers and so on, is that we do the pilot and air traffic control (ATC) education licensing first, because

## Why pilot retraining must be streamlined

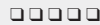
**Times have changed from 40 years ago, when a pilot at a European flag-carrier had a ‘job for life’, the only question being exactly when, between the ages of 55 and 65, to retire.**

**Today, a typical career pattern can involve, among others, stints at a European low-cost carrier, then a move to Middle East long-haul, and on to another low-cost or flag-carrier.**

**“Today, on average, a pilot changes employers seven times. That’s seven times, on average, a pilot has to redo his three-to-six-month operational conversion course (OCC),” said Gabriel.**

**“We have 500,000 pilots today in the world, which means that 40,000 pilots at any given time are in an OCC. The goal is to reduce the OCC to a couple of days,” Gabriel said.**

**“A surgeon, for example, joins another hospital and, based on his or her competencies, starts operating the next day. An Airbus or Boeing customer-support pilot can fly in any country or in any airline the next day. He or she gets a validation from the local authority... and then flies without any further ado.”**



**“That’s where I would like to have a standardised training organization, so that a pilot is a pilot is a pilot. Of course, there are many issues around quality, assessment, and capacity, and not everyone can fly in an airline (due to cultural or political differences). That is the way: to get to a profession that gives you the right to fly [anywhere in the world].”**

**Gabriel said the aviation industry was growing at a rate of 100% every 15 years. “The crisis is already here – the pilot shortage – but it is increasing day-by-day because we are already short, and since we are not doing much [about it], it’s getting more and more problematic.**

**“Now Airbus, for example, has started their own flight school... in Mexico. Airbus’ plan is to start two new flight schools a year. Boeing is thinking about it and is engaging third parties in the US.”**

**Training costs \$60,000-\$100,000 per pilot. “You need about 10 pilots for every short-haul aircraft. So you need to invest 10 times \$60,000 – that’s \$600,000 – to get a \$52 million A320 aircraft [into operation].**

**“To get \$52 million in revenue for the A320, Airbus would need to invest \$600,000 in pilot training. That makes sense. It is even more important for an A380 or B767, where you need 15-20 pilots for a \$300 million aircraft,” he said.**

**“There are thousands of people who would love to become a pilot, but they don’t have \$100,000. Is it possible to get a standardised pilot and kick off a career that makes him or her happy? That is, for me, the big question.”**

they are heavily needed, but then add a BSc on top of it while they are working as pilots. That BSc is then a part-time programme that gives them the undergraduate degree.”

To support the Middle East and Africa, Gabriel developed further the City facility in Dubai. Programme modules, of which there are 28, are also taught at the Dubai International Financial Centre (DIFC) Academy in Dubai. “We have students from all around the world and they can choose whether they go to London to our university campus, or here, to the DIFC in Dubai, or to Frankfurt. We are looking into other country locations,” he said.

“That means that Qatari students, who cannot go to Dubai at the moment, can come to Frankfurt or London. We have a very flexible programme for our student customers, who can very easily fly to other locations.

“The principal module structure is that you have an initial reading phase, where you have to read several books and articles, then you have three days onsite, either in Dubai, London or Frankfurt, at the moment, and then you have six weeks to write a coursework. You choose eight modules for the 120 credits post-graduate diploma, and then you write a complex academic dissertation for your MSc.

**Graduation ceremony**

“That is the line-up of our programme, which is very successful. And [our] graduates are everywhere. One recent student was not even allowed to attend the graduation ceremony in Dubai or London, because the minute he was finished, as soon as he qualified for his MSc, he was appointed chief operating officer of his airline.

“It is a very much-needed education qualification in many parts of the world, for many airlines, especially in the Middle East, to go into senior management.”

The MSc in airport management is another course Gabriel added so that the middle managers who show talent, and who often only have a vocational education, can get a post-graduate degree and then become senior managers or executives for an airport. He said this important qualification was supported by the Airports Council International (ACI) in Montreal.

“It is fascinating, at my age, to give back with these MSc programmes, especially [with] my research area, which is very much focused on the future of pilots, the future of the aviation industry, and how we can develop a much better organised education framework for the aviation industry,” he said.

“Parents of young people do want their kids to have a university education.

“That might be one of the reasons why we have a significant problem finding enough pilots, engineers and air traffic controllers. We are all in the same boat, looking for young people who want to join our industry.”

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*Reporter Alan Dron and photographer Ian Billingham visited Abu Dhabi to take a look at three very different aspects of the Etihad Aviation Group's work, which all have one thing in common – they very much look to the future.*

# ETIHAD'S DECK IS FULL OF ACES

*With a global pilot shortage looming, Etihad is seizing the opportunity to help train the next generation of flightdeck crew.*

**O**n the sidelines of last November's Bahrain International Air Show, a senior Boeing executive opined that if anyone wanted to make money out of aviation today, the best way to do it was to open a training school for pilots.

With the world's airliner fleet predicted to double over the next two decades and a steady stream of retirements from among the current workforce, Boeing reckons that 790,000 new pilots will be needed between now and 2037.

Even after subtracting business aviation and helicopter pilots from that figure, that adds up to a lot of training.

With that in mind, the newly revamped Etihad Aviation Training (EAT) organisation could bring in a useful additional stream of revenue for the group in coming years.

## Maintenance training

Early in 2018, Etihad Airways Group brought together Etihad Flying College, and its maintenance training activities, rebranding them as EAT. The former college catered for both pilots and cabin crew. Ground-based training activities take place at Etihad's home base in Abu Dhabi itself, while the flying training is carried out in the less congested skies around Al Ain, some 140km away.

At Al Ain, EAT maintains a fleet of 10 Cessna 172s, six twin-engine Diamond Aircraft DA42s, four Embraer Phenom 100 light business jets and two Extra 300 aerobatic aircraft for teaching the increasingly important skill of upset recovery.

Etihad Airways currently takes up around 50% of the utilisation of EAT's training centre in Abu Dhabi. Etihad has around 2,500 pilots, who each go through



**Cooperation:** In December, Gulf Air struck a deal to have some of its pilots train on the Abu Dhabi establishment's simulators.

the centre for conversion or refresher training twice a year. That number is now stable, after the rapid expansion of a few years ago: in 2015, for example, a record-breaking 741 new pilots joined the company and there are no fewer than 147 nationalities represented on Etihad's flightdecks.

EAT emerged when Etihad bought the fixed-wing component of the Horizon flying training school in Al Ain from the latter's owner, state investment body, Mubadala, in 2014 and started to offer multi-crew pilot licence (MPL) training as well as airline transport pilot licence (ATPL) courses.

It took on 350 ab initio students – predominantly Emiratis – for Etihad and around 200 of them are now flying with the airline, with the remainder still going through their training course.

However, training pilots for Etihad is only half the story, said James Collishaw, EAT's head of business development. From

January 2018, EAT was re-launched as a commercially focused operation, offering training to other carriers.

Training pilots from third-party airlines "was the whole concept behind EAT" and partly designed to ease the cost of its operation. Pilots from other airlines pay their own way.

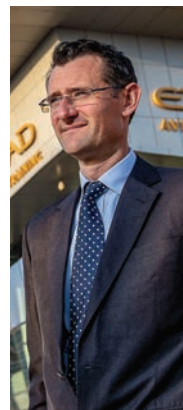
"Our number one target will be to go out to other airlines and sell those 50% of places, but we also have quite a high customer base of individuals; any pilot can approach us for training."

## Strict checks

However, EAT mounts strict checks on individuals wishing to join its courses; it has not been unknown for some pilots to exaggerate their existing qualifications. "We check the validity of their licences," said Collishaw. "It's an industry-wide problem that we're well aware of. We obviously make sure we do our homework."

But other airlines, rather than individuals, remain the main target for EAT's sales teams. In December, for example, Gulf Air struck a deal to have some of its pilots train on the Abu Dhabi establishment's simulators. This was one of the first results to flow from a co-operation memorandum of understanding (MoU) struck by the two carriers during the November 2018 Bahrain International Air Show.

Bahrain-based Gulf Air pilots who will operate on the airline's incoming fleet of Boeing 787-9s will travel to Abu Dhabi to undertake training on the type. Under the agreement, Gulf Air will dry-lease simulators from EAT, with instruction being undertaken by Gulf Air personnel.



**James Collishaw:** "Our number one target will be to go out to other airlines and sell 50% of places."

Ready for anything: Cabin crew go through the full gamut of training, including planned and unplanned emergencies, depressurisation and one of the biggest risks on board an aircraft, fire.



“This is the start of on-going projects with Etihad Airways and Etihad Aviation Training,” Gulf Air’s COO, Captain Suhail Abdulhameed Ismaeel, explained.

EAT operates 11 full-flight simulators for the Airbus A320, A330, A340 and A380, as well as Boeing 777 and 787 types. The two Boeing 787 simulators will be joined by a third early in 2019. Each simulator is backed up by a flight-training device.

Collishaw said that EAT had “done particularly well in the Middle East” in winning training business from airlines. “There’s not many we don’t have and we’re tendering for another couple of low-cost carriers. Europe is a big target for us now, as we’re a fully certified approved training organisation.” EAT is the first UAE training establishment to be certified by the European Aviation Safety Agency (EASA).

Despite EAT’s early successes: “If there’s one thing we underestimated, it’s how long it takes to get contracts over the line. It’s not an easy process. The worst one has been eight months.” However, the organisation was “moving ahead into a very strong 2019” and was in a stronger position than “the rather slower start that, with a little more experience, we might have anticipated”, he said.

At the start of 2019, a scheme was launched where the 8,500 pilots registered with the UAE’s General Civil Aviation

Authority with initial, overseas, licences could renew their validity at EAT. “It’s in every pilot’s interests to keep their home licence, in case something happens and they have to go home,” said Collishaw.

EAT does not only provide training for flightdeck personnel; cabin crew also form part of the annual throughput.

They go through the full gamut of training, including planned and unplanned emergencies, depressurisation and one of the biggest risks on board an aircraft, fire.

**Simulate fires**

To train them to deal with the latter contingency, the training centre has a section of fuselage with installed gas-fired burners that can simulate fires in a variety of locations, including overhead bins, the galley ovens and toilets.

The burners can also fill the fuselage mock-up with smoke in a matter of seconds, which all cabin crew (and pilots) then have to walk through while wearing smoke hoods.

Cabin crew also have to practice emergency evacuations, in which they have first to block the doorways with their bodies, to prevent a stampede of panicking passengers as soon as the exits are opened. They also need to practice voice projection and assertive attitudes, to

keep control of a situation that could very easily descend into pandemonium.

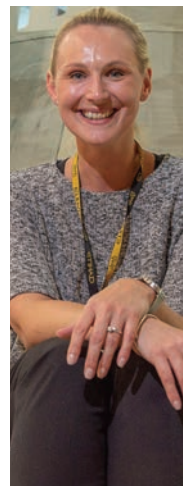
One major problem with which cabin crew have had to contend in recent years is the increasing tendency for passengers to try to take carry-on luggage with them during evacuations. There have been several incidents where, incredibly, passengers have been seen strolling away from burning aircraft, wheeling their carry-on bags.

There are three main problems with this: the extra seconds it takes to haul baggage out from overhead lockers or underneath seats; the resulting increased congestion in the aisles and the risk that baggage will rip the escape slides. “If I have to take a bag off someone, I will,” said EAT marketing officer Laura Davies, an experienced cabin crew member herself.

There is also an indoor swimming pool, in which cabin crew and pilots can practice using liferafts, in the event of an airliner having to make a forced landing on water.

As Etihad Aviation Group CEO, Tony Douglas, said of EAT last year: “The growth of the business will mirror the expansion of the global training market.”

With providers already struggling to keep up with demand, EAT seems set to bring in a useful contribution to Etihad Airways Group’s bottom line for the foreseeable future.



**Laura Davies: “If I have to take a bag off someone, I will.”**

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*Plans to produce sustainable bio-fuel in Abu Dhabi for airliners are nearing the next stage on the road towards full-scale production.*

The small fenced compound in Abu Dhabi's Masdar City scarcely attracts attention from anyone driving past to their jobs and homes in what is being developed to become the world's most sustainable eco-city.

A few months ago, there would at least have been large patches of greenery to attract the eye of passing motorists. Today, however, the shrubbery has been harvested and hard-packed sand is once again the dominant theme, offset only by a few large metal water tanks and the sunken ponds of a small fish farm.

The site, however, is the starting point for what is hoped will become a major source of bio-fuel for Etihad Airways.

The search to find a 'green' substitute – or at least supplement – for fossil fuel-derived kerosene has been continuing for at least 15 years. Several promising plants have been tried as a source of oil that can be refined into fuel, but almost all have been ruled out because growing them competes with both agricultural land needed for food crops and water.

#### Valuable commodity

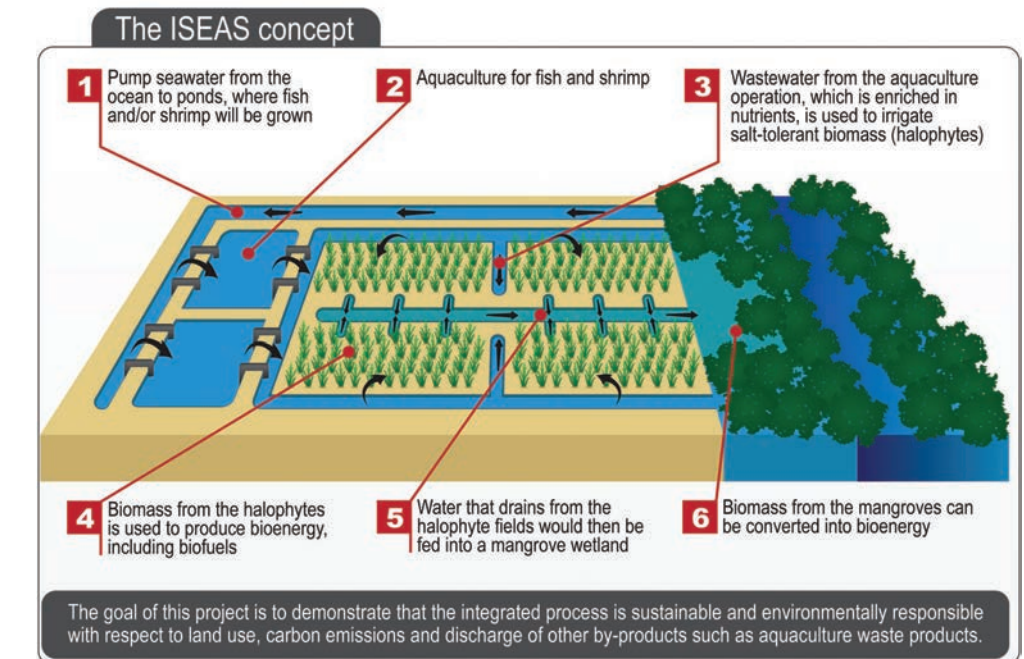
In the Gulf, of course, the latter is a particularly valuable commodity.

That is why considerable interest is being aroused by a small shrub, *Salicornia bigelovii*. A close relative of the native *Salicornia* in the UAE, this plant is indigenous to North America and is a member of a family called halophytes, which do not need agricultural-quality land on which to grow and, importantly, can thrive on salt water. This means sea water can be used as irrigation.

*Salicornia*'s tiny seeds produce an oil that can be converted to aviation fuel, while the rest of the plant can be used as bio-mass for energy creation.

Behind this initiative is a consortium consisting of the Khalifa University, ADNOC Refining, Etihad Airways, Boeing, Bauer Resources GmbH, plus engine manufacturers General Electric and Safran.

The plan is that seawater will be used in coastal fish farms. To eliminate one of the biggest problems surrounding such farms – disposing of the excreta from the fish – the contaminated water will be fed into the fields of *Salicornia*, which will absorb



## Going fishing... for a jet fuel breakthrough



**The starting point: Water tanks and the sunken ponds of a small fish farm.**

the fish waste from the water as fertiliser, boosting their growth.

Water and nutrients not taken up by the plants will be channelled into rows of mangroves, which absorb more of the waste material. By filtering through several bands of the fast-growing mangroves, the water that eventually passes back into the sea will be substantially cleaned.

As an added benefit, mangroves are excellent at locking up carbon dioxide, the 'greenhouse gas', in their massive root systems.

Initial tests of the proof-of-concept site at Masdar City have recently concluded and the experience is being studied. "The trials showed there weren't really any problems," said Linden Coppell, Etihad's

head of sustainability. "We're making sure we distribute the water [to the plants] when it comes out of the fish ponds and we're looking at the proportion of mangroves to *Salicornia*."

Another offshoot of the proof-of-concept stage is a breeding programme to isolate the best versions of *Salicornia* for future planting.

The best time for planting is September/October so they are well-established before temperatures start to climb in the spring. The plants start to dry out naturally in early summer and are harvested in late July/early August.

After harvesting, the oil-bearing seeds are separated from the plant. They are so small that winnowing machines may have to be redesigned slightly to take this into account, said Coppell.

Despite that problem, the oil was extracted from the seeds and dispatched to ADNOC Refining. ADNOC worked with another local organisation, Abu Dhabi Vegetable Oil Company, which provided advice on the oil. It was initially a dark brown substance that undergoes some pre-treatment before going into ADNOC's systems.

"ADNOC has never been given anything other than crude oil before," explained Coppell. "Despite this, they are

Continued  
on Page 94

CONTINUED FROM PAGE 93

hugely enthusiastic about it. Clearly, we want them to be the ones to refine this in future. The quantity given to ADNOC was very small, measured in tens of litres. Depending on the quantities [in future], you would probably have to have some sort of add-on facility. It might be that they would take this through a whole separate process.”

Even if a separate refining route is necessary, the key requirement is that what emerges at the end of the process must be absolutely the same as ‘normal’ jet fuel, so that it can be used in aircraft engines with no adjustments to the powerplants.

That requirement is being put to the test. As *Arabian Aerospace* went to press, that initial small batch of Salicornia-derived fuel was due to be mixed with standard jet fuel and used in an Etihad Airways flight.

The next step is a demonstration plant, covering 200 hectares, to scale up the cultivation and harvesting processes. This is likely to be situated in the west of the emirate.

“Although the site will require seawater for irrigation, it doesn’t have to be right next to the sea,” said Coppell.

Water could be pumped inland to a site, as the actual coastline is prime land.”

Salicornia seeds contain about 30% oil. That means that two tonnes of seeds would produce 600-700 litres of fuel per hectare, although this figure reduces as refining takes place to make the oil suitable as an aviation bio-fuel.

Meanwhile, naturally occurring sugars in the rest of the plant can be extracted and refined into ethanol, another type of fuel with multiple uses.

Ethanol derived from sugar cane produces fuel for millions of cars in Brazil, for example, and new technologies have been developed to convert it into jet fuel.

Although the main focus of the Abu Dhabi project is, ultimately, on producing viable quantities of jet fuel, producing food for the UAE’s expanding population is another consideration.

Traditional farming is not particularly sustainable, as it requires a lot of water to be taken from underground aquifers, which are becoming increasingly salty as seawater gradually intrudes on them. So, fish farming is a favoured option.

At present, the species chosen for the project are tilapia and Indian white shrimp. Fish farm ponds tend to be warmed easily by the sun and the waters of the Gulf are saltier than most seas, factors that mean not all fish are suitable.

There is still some way to go. The demonstration scale 200ha plant has to be designed, with construction scheduled to start in 2020. The construction process is fairly simple, however, “and it should be operational in the next three to four years”.

Ultimately, if this pilot plant is a success, it is possible to envisage hundreds of thousands of hectares being planted with these shrubs that tend to grow naturally alongside many roads in the UAE. That very much depends on government policy. But it is a product that appears to have many upsides and no obvious disadvantages. Time will tell. ■

**It is possible to envisage hundreds of thousands of hectares being planted with these shrubs that tend to grow naturally alongside many roads in the UAE. ■**

*With much of its work coming from external airlines, Etihad Airways Engineering is providing a valuable revenue stream for the group, as well as keeping the carrier’s own fleet in the air.*

## ENGINEERING A VISION FOR THE FUTURE

**A**bu Dhabi’s Vision 2030 calls for a transformation of the emirate’s economy, moving away from dependence on the oil sector and towards knowledge-based industries.

Etihad Airways – and its engineering division – are major players in that vision.

“Our third-party customers make up around 70% of our business,” explained the division’s CEO, Abdul Khaliq Saeed. “We have customers from all around the world – South America, Australia, the Far East, Europe and Africa. That’s one of the things that makes us unique to this business.”

A combination of a skilled workforce and state-of-the-art facilities attracts third-party clients, said Saeed. Around 300 aircraft pass through Etihad Airways Engineering’s hands in the course of a year.

One indication of the scale of the business’ success comes from the fact that it books 10,000-12,000 hotel room nights a year for airline representatives who accompany their aircraft and keep a watchful eye on them as they go through the maintenance procedures.

The organisation’s routes date back to 1987, when it was set up as the Gulf Air Maintenance Company (Gamco) to support Gulf Air’s fleet; at the time Abu Dhabi was one of four Gulf states that made up the airline.

Gamco became Abu Dhabi Aircraft Technologies, then changed its name to its current title when Etihad acquired it from Abu Dhabi’s state investment company, Mubadala, in 2014.

All 14 engineering workshops at the Abu Dhabi site are under the one roof, with no fewer than 11 bays available for aircraft – hangar six is sufficiently large to take three Airbus A380s

simultaneously.

In addition, two paint hangars can accommodate aircraft up to Boeing 777 size: “That’s a capability that not many people have in this part of the world.”

A new hardstanding near the hangars, capable of handling up to four Boeing 777s, will become available around the start of February, increasing capacity.

Etihad Airways Engineering was also gearing up, at the time of writing, to gain approvals to perform MRO services on the Airbus A350, with the expectation that this would be granted some time in Q1 2019.

The operation already holds approvals for several types – Boeing 737, 757 and 767 – not in Etihad’s fleet, widening its attraction to third-party airlines.

### Expressed concerns

Many aviation industry commentators have expressed concerns over the looming shortage of airline pilots and technicians but, with the latter group at least, Saeed said it is facing few problems.

Employment in the division is steady at around 2,200 staff and there were several reasons why Etihad seemed not to be suffering from a shortage, he said: “We have 60 different nationalities, so our reach into the market is big. And we don’t see many people leaving.

“That tells us two things. One, we’re a good employer and people stay longer with us. Two, we are situated between east and west, so it’s easy to bring in people from the Far East and Indian subcontinent and adapt them to us. We know how to handle these guys and bring them on board.”

He noted that 57 UAE nationals – a remarkable 40% of them women – had just graduated from the company’s





**In control:** State-of-the-art facilities attract third-party clients.



**Left: Plenty of room:** All 14 engineering workshops at the Abu Dhabi site are under the one roof, with no fewer than 11 bays available for aircraft.

engineering training centre. They now had their basic engineering licences and were going on to train on their specific jobs. The airline has more than 200 people coming through the pipeline at the centre, where they undertake a four-year course.

As a sign of the division's skills, Saeed points to its design and innovation department. "We're the only company in the Middle East that has European Aviation Safety Agency (EASA) Part 21J and 21G approvals to design and manufacture cabin components and upgrades. We design, do the certification using the supplementary type certificate (STC) approval, and manufacture."

One example of innovation is a new system of draining aircraft fuel tanks to remove water that gradually accumulates in them. Traditionally, they have used

gravity. Members of Etihad Airways Engineering's team developed a novel piece of maintenance equipment to hasten the process. As time equals money in the airline business, the reduction of time to drain a tank from around an hour to 10-15 minutes is a useful measure. The equipment has now been patented.

The division's EASA design and production approvals mean that it can design, certify and manufacture a wide range of materials, ranging from galley components to seat covers.

The engineering division also has the only laboratory in the Middle East for handling burn tests on all types of cabin materials. Created in collaboration with Swiss company, Lantal Textiles, it means that airlines no longer have to dispatch materials to Europe for such tests.

The division is also putting considerable effort into expanding its expertise on composites, which form an increasingly large percentage of airliners' airframes: "We're putting a lot of attention into this and can expand it further," said Saeed.

**Major structural work**

Engineering also handles major structural work on more traditional airframe materials. Installing connectivity capabilities on four Boeing 777s, for example, saw it working with the US manufacturer to gain an STC to replace a 10m x 2m strip of metal on the top of the fuselage, known as a crown skin reinforcement.

Among the attractions for other carriers at the engineering division's Abu Dhabi base is a centre of excellence for the Airbus A380, set up in conjunction with the European manufacturer. A similar centre is being created for the Boeing 787 in collaboration with the US manufacturer.

The Abu Dhabi organisation's capabilities on the 787 can be illustrated by two incidents. It was the first MRO to perform a full composite flush repair on an aircraft whose fuselage had been holed by a piece of ground equipment; and it was the first organisation other than Boeing to undertake a full strip and repaint of the twinjet, after Latin American airline group, LATAM, changed its branding.

An important attraction for other carriers interested in sending their aircraft to Etihad Engineering for maintenance, added Saeed, is that it 'thinks like an airline', unlike other standalone MRO shops. "I did 33 years with Gulf Air before I came here. I know exactly what an airline needs. The team leaders are all focused on that, to make sure that airlines' needs are our priority; if there's any pain, we take that pain away from them." ■

**The benefits of 3D printing**

**One area in which Etihad Engineering is pushing ahead is in 3D printing. It now has the ability to design any components used in its aircraft cabins, said Stephan Keil, head of production, project delivery & innovation.**

**This brings benefits in terms of time, complexity and money.**

**For instance, it has designed screen shrouds, the plastic surrounds to the seatback video screens in Etihad's aircraft. Whereas the previous models had a two or three-month lead time, the Etihad 3D printed version is a single piece, costs less than half of its predecessor and can be produced in 24 hours.**

**Additionally, as the shroud is Etihad's own design, the carrier can make further improvements to it, rather than having to engage with an external company.**

**Etihad has also started to produce small plastic cabin components by the 3D printing method and intends to expand this capability further.**

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Flying high: crowds were treated to spectacular displays.

# MARRAKECH DISPLAYS MOROCCO'S CONFIDENCE

Attracting hundreds of civilian and military aviation leaders from the region, as well as thousands of public visitors, the event was an opportunity for Morocco to showcase its growing presence in the aerospace technology and manufacturing industries.

Under the patronage of His Majesty King Mohammed VI, the sixth bi-annual edition of the International Salon for Aeronautics and Space was organised by Morocco's Ministry of Industry, Trade, Investment and the Digital Economy with full support from the country's air force.

Alongside the airshow itself, a symposium of around 100 defence chiefs from more than 40 countries was held in an event co-organised by the United States Air Force (USAF) in Europe and Africa and the Royal Moroccan Air Force (FRA).

Hardly surprisingly, the US had a strong presence at the show, with many aircraft on the ground and in flight, including the FRA's F16s.

According to Glen K Lawson, Lockheed Martin's international director, the show was "A very important meeting place for the USA and our company. There is a strong partnership with Morocco through major defence programmes."

But it was attack helicopters that were given pride of place. Bell used the event to introduce its Bell 305 and also its AH-1Z Viper twin-engined attack helicopter – a development of the US Marine Corps' SuperCobra.

According to the company's director of military affairs, Vince Tobin, the AH-1Z Viper, with its modern avionics and low maintenance costs, offers the best performance on the market.

The show was also important for Turkish Aerospace, as it presented its T-129 helicopter, which is of great interest to Morocco as well as to the air arms of many other African countries.

Vincent Chappard reports from the 2018 Marrakech Airshow, which took place at the Royal Moroccan Air Force's air base and flying school near the city from October 24-27.

PICTURES: JEFF HOLMES, BILLYPIX



Damien Allard: "This show reflects the potential of the market, both in Morocco and elsewhere on the African continent."



Vince Tobin: Introduced the Bell 305 and also the AH-1Z Viper twin-engined attack helicopter.

Turkish Aerospace has a joint venture with Lockheed Martin, with whom it has produced more than 300 F16s, as well as 40 T-129s that are currently serving in the Turkish Air Force. The company's marketing and communications director, Tamer Ozmen, said Turkish Aerospace has been in talks with Morocco since 2017 regarding the kingdom's attack helicopter requirements.

Europe's leading aerospace company, Airbus, was much in evidence too, concentrating on its C295 from the Portuguese Air Force along with an A330 MRTT from the UK's Royal Air Force.

The show was also a good opportunity to celebrate the UK RAF's centenary and the many years of cooperation between the air arms of the UK and Morocco.

For Damien Allard, Airbus' sales manager in Morocco and west Africa, the show was dynamic, generating

Continued on Page 98

## CONTINUED FROM PAGE 97

meetings with the many delegations. "This reflects," he said, "the potential of the market, both in Morocco and elsewhere on the African continent, where 206 C295s are currently on order (166 in use) in 29 countries."

In Africa, the C295 is operated by Algeria, Egypt, Ghana, Mali and DAC Aviation in Kenya, which uses the equipment for regional humanitarian operations.

Continued US participation in the show, which has been held every two years since 2008, promotes strong ties with Morocco.

"Air shows are really an area where we can all come together because we have a common bond," said Heidi Grant, deputy under-secretary of the US Air Force's international affairs department. "We can talk about challenges that our air forces are seeing, not only in the region but globally as well."

Stephanie Miley, the US chargé d'affaires at its embassy in Morocco, added: "Last year we celebrated 240 years of Moroccan-American friendship. The air show and all that we do with our top military cooperation reinforces how important that relationship is."

Business aviation company Jetex, a major show supporter, has been present in Morocco for two years. Since 2016, it has developed five stopovers – in Casablanca, Marrakech, Agadir, Rabat and Dakhla.

According to the company's Julian Pitaresi, Morocco stations manager, the show was an excellent opportunity to meet with present and future customers.

**Develop in partnership**

He said: "We completed the refurbishment of our FBO in Casablanca in March and continue to develop in partnership with ONDA, the Moroccan airports authority. The construction of our new Marrakech FBO is anticipated by many of our customers as it will be a true flagship destination for business aviation. We hope that it will open for business in 2019."

Jetex sees many opportunities in Africa, where it is already present through bases in 11 countries, the most recent opening for business in Abidjan.

"Africa is a dynamic market that we want to develop. The proposed airport of Tit Mellil, near Casablanca, interests us greatly," said Pitaresi.

Belgian group, SABCA, was present to promote its services in the region. SABCA specialises in military MRO for F16s, Alphajets, Mirages and unmanned air vehicles (UAVs). It is also involved in producing parts and undertaking machining, surface treatment and assembly for Airbus, Boeing Dassault and Embraer.

According to Raphaël Samson, SABCA Morocco's objective is to develop the existing assembly units. "We also have an on-going project for MRO activities in Morocco through a partnership between SABCA and Sabena Aerospace."

Worldwide climate change, leading to an



**Mohammad Khasawneh:**  
"Our ambition is to promote our academy as fast and as widely as possible. The show is our starting point."



**Julian Pitaresi:** "We completed the refurbishment of our FBO in Casablanca in March and continue to develop in partnership with ONDA."

increased risk of forest fires, means that the Viking CL-45 amphibious water bomber is attracting worldwide attention and it also created a talking point at the show.

Morocco has five of the specialist aircraft and several countries are showing interest as they can undertake maritime surveillance and rescue missions along with firefighting.

The Moroccan Aviation Private Academy (MAPA) has obtained European Aviation

Safety Agency (EASA) approval for the training of aviation maintenance technicians up to B1 and B2 standards and compliance with European standards for pilots is under way.

According to its quality assurance manager, Mohammad Khasawneh, MAPA is the first academy to receive this certification in Africa. "Our ambition is to promote our academy as fast and as widely as possible. The show is our starting point and we are aiming specifically for the African market."

**Three agreements**

ONDA and the country's aerospace industry representative body, GIMAS, have recently signed three agreements with investors in the aerospace industry – Ratier Figearc Morocco, the Moroccan aerospace tool company EFOA, and Laroche France.

For Zouhair Mohammed El Aoufir, CEO of ONDA, the project is leading to concrete progress in both the growing strength of the companies involved and job creation.

He also announced the completion of work on the new Mohamed V airport terminal in Casablanca and the launch of a project to build a new terminal in Rabat, as well as the business aviation airport at Tit Mellil. ■

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The acquisition of 24 Rafales has brought a lot of business to Dassault and the likes of MBDA, Safran and Thales. This model is seen equipped with the MBDA Scalp stand-off weapon.

PICTURES: ALAN WARNES.

# EDEX DEBUT PROVES TO

*Egypt held its first ever international defence exhibition in early December. Alan Warnes was there.*

**T**he Egyptian Defence Exhibition (EDEX) went some way to building on the pledge by President Abdel Fattah El-Sisi, a former Army officer, to strengthen the military after he took office in 2014.

The on-going war with Islamic militias, now centring around the Sinai Peninsula, is the main focus of Egypt's military.

There is also the problem of Iran, a major threat to stability in the region, which is engaged in a proxy war with Saudi Arabia in Yemen.

All this means Egypt is keen to arm itself with the best that is out there, with much of it coming from Saudi Arabia and the UAE.

Recent issues with the Islamic Brotherhood in Egypt has meant Turkey and Qatar, which supported its uprising, have been given the cold shoulder by the new Egyptian Government. It meant the likes of Turkish Aerospace, Roketsan, and Aselsan, usually ever-presents at defence events like this, were not there.

EDEX was held at the Egyptian International Exhibition Center (EIEC), a fairly new facility in the desert suburbs of Cairo. Apart from the logistics of getting to and from the venue, it was a pretty robust event. All aspects of defence – air,

land and sea – were present, which provided for a busy looking spectacle.

Three very large halls brought together the best that the defence industry has to offer. Hall 1 included pavilions from France, Italy, Saudi Arabia, the UK, Ukraine, the UAE and the US, with an Egyptian Armed Forces VIP area in the middle.

Hall 2 had China, Germany, Greece, Pakistan, and Russia, as well as another US pavilion.

#### Static display

In hall 3, India, Spain, Portugal and South Africa shared half of the area with a massive Egyptian MoD static display, as well as big exhibition areas for Alexandria Shipyard, Arab International Optronics, the Ministry of Production, and the Arab Organisation for Industrialization (AOI).

Saudi Arabia hosted the biggest pavilion. The Military Industries Corporation featured several unmanned aerial vehicles (UAVs) from the Prince Sultan Defense (formerly known as Prince Sultan Advanced Technical Research Institute).

The biggest was the Sky Guard, with the third prototype, SG-03 on view. According to a PSD

spokesperson, it is the last of three built for research and development, while a fourth is currently under construction.

SG-03 was fitted with a satcom, allowing the UAV to datalink data imagery up to 400kms (250 miles). It can stay airborne for eight hours.

The Sky Guard has a maximum altitude of 8,000 metres (19,000ft) and a maximum payload of 50kg (110lbs), which can include an electro-optical (EO)/infra-red (IR) turret. The company said it is now going into full-scale production for a customer but wouldn't confirm which one.

The Saudi Arabian Military Industries (SAMI) was also present but most of its display was devoted to the \$2.2 billion joint venture deal with Spain's Navanti and the purchase of five Avante 2200 Corvettes.

A close second in size to the Saudi set-up was the UAE, which had the likes of Abu Dhabi Aviation presenting its Maximus Air subsidiary; Abu Dhabi Autonomous Systems Investment (ADASI), with its UAS solutions; and Calidus with a cockpit simulator of its revolutionary B-250 two-seater training aircraft.

Calidus is keen to gain Arab support for the B-250 after unveiling it at the Dubai Air Show in November. It had also been at the Bahrain International Air Show two weeks earlier.

Down at Hall 3, the AOI was exhibiting



The AOI was keen to show off the capabilities of the Helwan-based Aircraft Factory, which assembled 120 K-8Es between 2008-2010.



Parked outside Hall 1, in the car park was this Egyptian Air Force Kamov Ka-52 which wore no marks except for a large Rosoboronexport sticker.

# BE THE PERFECT MODEL

products and services from the 13 companies that make up the business, which was launched in 1975.

The Helwan Aircraft Factory assembled 120 K-8Es between 2008 and 2010, and, since completing production, has been overhauling them. In doing so, the Aircraft Factory has increased the standard eight years mean time between overhaul (MTBO) advocated by the Chinese to 10 years.

The factory has also assembled 30 Chinese ASN-209 UAVs since 2010. They are used for tactical reconnaissance, with a payload of up to 50kgs – the one on display had a small EO/IR turret.

Located next to the Aircraft Factory display was Helwan for Development Industries (HFDI), which has been focusing on overhauling the EEF's Mi-8s, Mi-17s and SA342L Gazelles since 2004.

General director, Engineer Megahed Abdel, said: "We are licensed by Russian Helicopters to overhaul the Mi-8/17 and by Airbus Helicopters to overhaul the SA342L Gazelle for the Egyptian Armed Forces. We would like to gain an export licence to overhaul these helicopters operating with other Middle East and African countries."

When the Egyptian Government signed a €5.2 billion (\$5.9bn) deal for 24 Dassault Rafales in February 2015, it paved the way for France's aerospace industry to get a piece of the

action. So it wasn't surprising there was a big French presence at EDEX.

Dassault, and its Rafale International subsidiary, were present to spearhead its Rafale marketing campaign. A large model of a Rafale in EAF markings was the centrepiece of the latter's presence.

MBDA was displaying the Scalp stand-off weapon and Mica IR/RF air-to-air missiles that are arming Egypt's Rafales.

## Local expansion

Thales has been present in Egypt since 1982 and promotes local expansion in the region, which has seen the number of employees swell to 500, including joint ventures. Egypt is the first export customer for the Thales Talios multifunction targeting pod, which is expected to replace the Damocles on the EAF Rafales.

Safran was displaying one of its Armement Air-Sol Modulaire (AASM) Hammer precision-guided munitions, which arms the EAF Rafale. The company announced, in June 2015, that it had signed a contract with Egypt to cover all three versions of the AASM Hammer now in service: hybrid inertial/GPS guidance, inertial/GPS and terminal infrared guidance, and inertial/GPS plus laser terminal guidance.

US aerospace giants, Lockheed Martin and Boeing, were both present too. The former is keen

to upgrade the EAF's F-16s, and was displaying a model of a F-16 Block 50 with joint direct attack munition (JDAM) and AIM-120 advanced medium-range air-to-air missile (AMRAAMs). They could arm the 200 or so EAF F-16s if any upgrade does go ahead. Boeing was keen to show off the AH-64E gunship to the EAF, which is not surprising given the US Defense Security Cooperation Agency (DSCA) notified US Congress, just days before EDEX, of a possible sale of 10 AH-64E Apaches to Egypt worth \$1 billion.

From a Russian perspective, the EAF is currently taking delivery of up to 50 MiG-29M/M2s but RAC/MiG was keener to market the capabilities of its more capable MiG-35, with the Zhuka AE AESA radar.

Russian Helicopters displayed an EAF, Kamov Ka-52 attack helicopter, cramped up in a fenced area in a car park! There were no markings on it and it could easily have been missed as it was parked well away from the main outside exhibition area.

While 20 of the 42 Ka-52s have been delivered, the Russians are keen to sell a naval version, known as the Ka-52K Katran, for the two Egyptian Mistral-class large landing ships. They were built by France for Russia, but under sanctions imposed in the wake of Russia's annexation of Crimea in 2014, the deal was stopped and Egypt acquired them. ■

# Five-star spectacular

*It may be one of the newest of the region's airshows but Bahrain is also the fastest growing. Sheikh Abdullah bin Hamad bin Isa Al Khalifa officially opened the show, which proved to be the biggest yet with 120 exhibitors from around the world taking up the entire hangar. And, for the first time, the event added an extra public day after high interest from the 2016 edition. With spectacular flying – both day and night – pilots from the UAE, Russia, the UK and Italy delivered some breath-taking performances.*

**Marcelle Nethersole, Alan Dron, Alan Warnes, Steve Nichols and Alan Peaford** report from the Sakhir Airbase.



As the sun set over the Sakhir Airbase, all eyes were on the skies for the fabulous Global Stars aerobatic team. Fitted with specialised pyrotechnic effects, the Global Stars were topping off the show's air display. This four-ship formation team uses the German-built composite Extra and French-built Cap-232 aircraft, both of which are renowned for their aerobatic capabilities.

## SAUDIGULF'S HISTORIC \$2.1 BN DEAL

BIAS history was made when the biggest deal ever landed at the show was announced.

SaudiGulf Airlines crossed the causeway to strike a \$2.1 billion deal with Airbus for 20 A320neo/321neo aircraft (10 firm, 10 options).

The agreement was announced through airline owner, Al-Qahtani Aviation.

Tariq Al-Qahtani, chairman of the board and MD, SaudiGulf, said it expects to have a two thirds/one third split in favour of the A321neo over the A320neo, although this will depend upon what new aircraft are available for leasing.

He added that the carrier plans to take six to eight new aircraft annually from the second half of 2019.

The brand new aircraft will initially come via leasing agreements over the next three years, followed by deliveries direct from Airbus.

The first leased aircraft is expected to be delivered by the end of 2019, with further deliveries in January, February and June 2020.

The airline currently operates six Airbus A320ceo from its hub in Dammam, and flies from the Saudi capital Riyadh to Dubai, and to Pakistan, Karachi, Lahore, Islamabad and Sialkot.

SaudiGulf Airlines CEO, Samer Majali, said the airline plans to expand both its domestic and international flights further.

"We are a full-service premium boutique airline and want to expand," Majali said. "SaudiGulf Airlines enjoys the highest ratings in terms of service and



**Samer Majali:** The airline plans to expand both its domestic and international flights.

punctuality. We offer value for money and with the expectation that yields will improve over time."

Al-Qahtani said the airline expects to have up to 50 aircraft in service by 2023.

"This expansion is in keeping with our intention to see the Saudi aviation sector continue to develop and grow in support of the Saudi Vision 2030," Al-Qahtani concluded.

## BIA does the business for new VIP terminal

A new business aviation terminal is to be developed at Bahrain International Airport (BIA) to cater for VIPs and business leaders, it was announced at the show.

The Civil Aviation Affairs (CAA) building, which once served as the kingdom's main airport, will be transformed into a private aviation terminal, Bahrain Airport Company (BAC) said.

The new, state-of-the-art facility is expected to be completed by 2020 and will offer the services required to meet the requirements of private jet owners and users travelling through the airport.

The agreement involves the design and renovation of the 4,000sqm CAA building.

The deal was signed by BAC CEO, Mohamed Yousif Al Binfalah, and Gulf Engineering House general manager, Nawal Abdulkarim, in the presence of the Minister of Transportation and Telecommunications and Gulf Air Group Holding chairman, Engineer Kamal bin Ahmed Mohammed.

The minister said: "The project is part of the ministry's plan to offer services to private jet owners through BIA, especially in light of the sector's impressive growth rate in the Middle East. It is also part of a comprehensive strategy to enhance the infrastructure of BIA and one of the main components of the airport modernisation programme, which is expected to be finished by the third quarter of 2019."



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Kresimir Ku ko, CEO of Gulf Air (left) and Tony Douglas, group CEO of Etihad Aviation Group.

## Bahrain and UAE strengthen bonds

Gulf Air and Etihad Airways announced a deeper cooperation agreement at BIAS by signing a wide-ranging memorandum of understanding (MOU) offering scope to introduce joint codeshare operations between Abu Dhabi and Manama, as well as on the global flight networks beyond the two carriers' GCC hubs.

The deal also contains plans for greater commercial cooperation in the fields of cargo, engineering, guest experience and the optimisation of their pilot training facilities. The MOU was signed by Tony Douglas, group CEO of Etihad Aviation Group, and Kresimir Ku ko, CEO of Gulf Air.

Ku ko said: "The relationship between Bahrain and the UAE is strong in many fields, including aviation. This is an example of how two airlines can work hand-in-hand for greater mutual benefits. We are happy to work with our friends and colleagues in Etihad and support each other to achieve bigger goals."

Douglas added: "The deep ties between Abu Dhabi and Manama are well-known in the aviation world and date back nearly 70 years. Therefore, the natural way to build upon those ties is to examine ways in which the two flag-carriers – Etihad and Gulf Air – can work more closely together to improve business operations and enhance the experience for our guests."

"We look forward to the Etihad and Gulf Air teams coming together during the next few months to look at how we can put that in place, whether it is in codeshare, engineering, cargo, or through our frequent flyer programmes."

## FLEXIBLE FREIGHTER IS A WORLD-FIRST

Bahrain-based cargo airline, Texel Air, has a world-first on its hands – the first Boeing 737-700 FlexCombi freighter. The aircraft was delivered recently to Bahrain from US cargo conversion specialists, Pemco, and was so new in Bahrain that it still carried 'experimental' markings.

Having appeared at the show, it returned to the US for further flight-tests before finally being returned to Texel in early 2019, fully certificated by the US civil regulator, the Federal Aviation Administration.

Texel has previously operated earlier 737-300 conversions, but the new -700 FlexCombi gives it many more options and greater flexibility. Range with a full payload of 42,000lbs, for example, is around 2,200nm, roughly double that of the -300.

Texel played a major role in helping develop the new aircraft and will be able to fit several different seating, medevac and cargo configurations inside the fuselage. The interior layout can be changed in around 12 hours.

The aircraft has a 140in wide by 86in high cargo door and a strengthened floor to take heavy loads. It will also have a Rockwell Collins second-generation enhanced vision system (EVS).

Mounted in the nose, the EVS sensor will allow the aircraft to operate in low-visibility conditions, relaying an image of the ground to the pilot through a head-up display (HUD). The aircraft is believed to be the first Boeing 737 to have a HUD.

"We operate into a lot of second- and third-tier airfields that don't have instrument landing systems, so the aircraft is designed to meet that challenge," said Texel Air director George Chisholm.

□□□□□

Texel Air has operated 737-300s for around 10 years, moving everything from live animals and outside oil industry equipment to rock group support staff as far afield as the Far East and Europe.

The conversion process for the -700 took around 15 months after the aircraft – previously operated by Germany's Air Berlin and Russia's Yakutia – was retrieved from the 'boneyard' for disused aircraft in Victorville, California. Although having been put out to pasture, it is still relatively young for a modern airliner, having been built in 2004 and with a low number of flying hours and flight cycles.



Quick change:  
The interior layout can be altered in around 12 hours.



A strong presence: The Hercules launches the RBAF tactical transport capability.

## RBAF WELCOMES FIRST HERCULES

Bahrain's first Lockheed Martin C-130J flew into Bahrain to join the static display at the show.

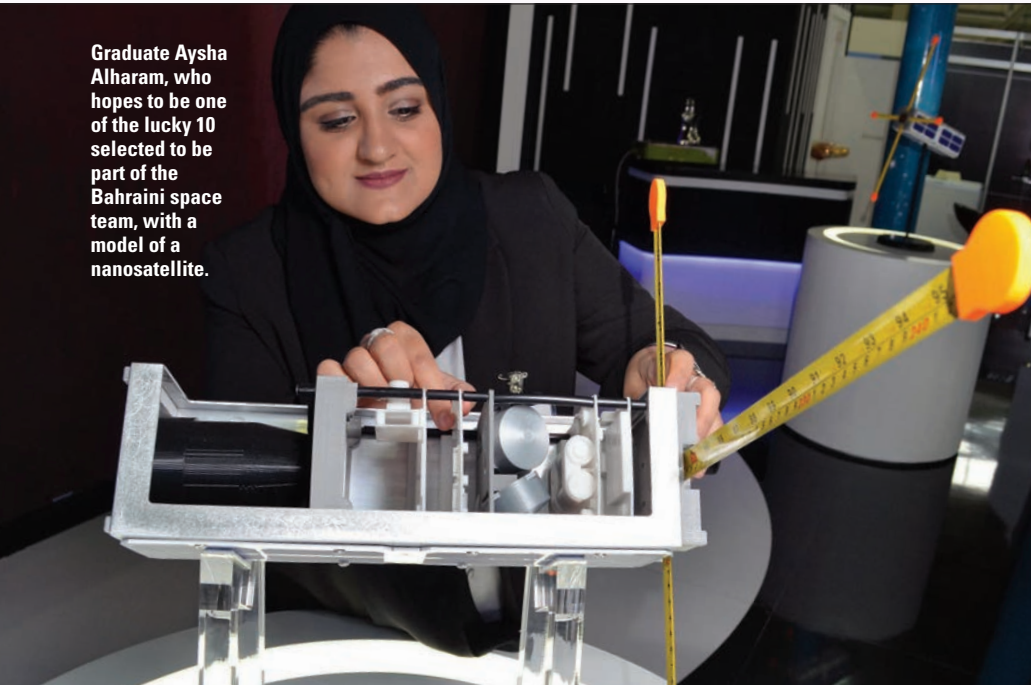
It had formerly been operated by the UK's Royal Air Force (RAF) and is the first of the J-class C-130s to be transferred between air forces.

This launches the Royal Bahraini Air Force's (RBAF) tactical transport capability.

A second aircraft is due to be delivered soon, the RBAF said.

The Bahraini Hercules have spent the last two years with Marshall Aerospace in Cambridge, UK.

Graduate Aysha Alharam, who hopes to be one of the lucky 10 selected to be part of the Bahraini space team, with a model of a nanosatellite.



## Nanosatellite target for Bahrain

Bahrain's National Space Science Agency (NSSA) has outlined its plans for building the kingdom's first nanosatellites, with the initial launch likely to be in 2020 or early 2021.

NSSA signed a memorandum of understanding (MoU) with the UAE Space Agency and Khalifa University at the show that will see the organisations working together on a two-year study programme for the kingdom's future space scientists.

The agency launched a campaign in the summer to attract competent Bahraini nationals and build a 10-strong "space team" to create its first nanosatellite.

NSSA says it is close to selecting 10 science,

engineering and IT university graduates, who will form the first team. Further cohorts could follow as the programme develops over time.

Nanosatellites are ultra-lightweight spacecraft that can be as small as a cube with sides only 10 centimetres long.

Their standard size means the satellite can be built to be one, two, three or more 'cubes' in size, depending upon its actual mission.

At this stage, the NSSA has not decided on the first 5-7kg satellite's application, but communications, weather imagery, or scientific payloads are all possible.

## MENA AEROSPACE SET FOR NEW MRO PLATFORM

Mena Aerospace is gearing up for a 2019 launch of a new maintenance, repair and overhaul (MRO) platform.

Its Bahrain-based aviation maintenance and support solutions (AMASS) business should be up and running by around mid- to late-2019.

The company says it is developing a one-stop shop to offer cost-conscious operators and MROs a fully equipped hangar, complete with workshops, to carry out engineering tasks without having to endure the cost of their own facility.

This will include businesses as diverse as winglet fitting and modification, to full supplemental type certificate (STC) services.

Mohammed Juman, managing director and founder of Mena Aerospace, said: "Being strategically positioned on the airfield of a centrally located major GCC international airport, such as Bahrain, allows easy access to any number of airlines and MROs throughout the GCC, north Africa and Indian sub-continent.

"They will be able to come and use our state-of-the-art facility to complete anything from simple modifications through to scheduled maintenance checks."



Looking forward: Mohammed Juman, managing director and founder of Mena Aerospace.

## SHOW NEWS IN BRIEF

### Thales opens Bahrain office

Thales has opened a dedicated office in Bahrain's Financial Harbour to be closer to its long-standing customers, such as the Bahrain Defence Forces and Bahrain Civil Aviation Authority.

Thales has fostered strong partnerships with public sector organisations over the past 30 years and was recently awarded a contract for the provision of security and operations at Bahrain International Airport.

### ATC modernisation plan

Bahrain is to get a new 2,650sqm air traffic control centre as part of its modernisation programme to handle aviation growth in the region over the next 20 years. Mohamed Thamir Al Kaabi, Bahrain's undersecretary for civil aviation affairs, signed a \$6.4 million contract with Al Jameel Construction at the show.

### Quartet of deals

Bahrain used the show to sign agreements with a quartet of countries that aim to smooth the path of future air services between the nations.

In a series of ceremonies, Bahrain signed the aviation accords with Saudi Arabia, the UAE, Brazil and Brunei. They will help ensure more rights, both to the national airlines of the countries involved, and also to other carriers operating in those countries.

### New approach

Bahrain Internal Airport (BIA) has engaged airport expert, ADPI, to secure a \$2.5 million upgrade to its instrument landing system, moving it from CAT II to CAT III capabilities. The work will improve the airport's landing safety procedures and efficiency, the government said at the show.

### Deal signed on new BIA cargo area

Bahrain Airport Company has appointed French engineering company, Egis, as a consultant to provide design and supervision services for Bahrain International Airport's new \$58.3 million cargo area. The facility will comprise warehouses, aircraft parking and associated infrastructure, helping to turn logistics and air cargo into one of Bahrain's primary industries.

### Engineering the future

The Airbus Foundation, in partnership with the Bahrain Ministry of Transportation & Telecommunications, held a series of Airbus 'Little Engineer' workshops at the show. Around 100 students, aged between 13 and 16, took part in the daily sessions aiming at promoting science, technology, engineering and mathematics (STEM) learning.

### A Moog point

Abu Dhabi-based Etihad Aviation Group announced a strategic 15-year collaboration with US company, Moog. The partnership will provide Etihad with global access to the Moog component pool, as well as complete repair support from the US supplier on a range of parts fitted to the airline's fleet.

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Chairman of the Saudi Space Agency  
Founder and Chairman of Saudi Aviation Club

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## There's plenty of space for partnerships

*The Global Space Congress, hosted by the UAE Space Agency, is being held in Abu Dhabi from March 19-21. As Steve Nichols reports, it will attract the world's leading experts to the region.*

The Global Space Congress is a strategic gathering of industry leaders, bringing together more than 700 key space agencies, commercial organisations, academics and end-users.

For 2019, it has been enhanced with an extensive programme of additional activities, industry briefings and presentations showcasing opportunities to invest in space and support new technologies.

With a focus on partnerships, the congress will enable attendees to look at collaborative development and the implementation of core space and satellite technology strategies. It also features discussions and initiatives that will have a practical and lasting impact on the overall development of the space sector in the Middle East and globally.

Organiser, SMG, says this year's event will feature an expanded exhibition space, including more national pavilions.

New for 2019 is a start-up zone, where delegates can showcase their product or service to venture capitalists looking to invest in the space sector. The organisers say this is a chance to demonstrate to industry and investors, take part in quick-fire pitching sessions, and receive candid feedback.

### Young space leaders

A full-day young space leaders forum (YSLF) will also inspire the next generation of leaders and engineers.

The YSLF will feature inspirational role models from the international space scene and celebrate the passion and dedication to science and learning of the future leaders of the Emirati space programme.

A space security and defence stream will identify the critical steps needed to develop and implement a coherent national space security policy.

Speakers lined up to attend the congress include George Whitesides, CEO, Virgin Galactic; Laurent Jaffart, vice president – head of future programmes Airbus Defence and

Space; Jean-Yves Le Gall, president, Centre National d'études Spatiales (CNES); Minoos Rathnasabapathy, research engineer, PhD Massachusetts Institute of Technology; Sir Martin Sweeting, executive chairman, Surrey Satellite Technology Ltd (SSTL); and Alice Bunn, international director, UK Space Agency.

Previous congress events have always been popular. Joerg Kreisel, CEO of JKIC – a delegate at the 2017 congress – said: "GSC2017 put the UAE and its space activities on the global map and contributed with a different and useful format to the global exchange in the space arena."

### Enjoyable and essential

Mike Lawton, chief executive officer, Oxford Space Systems, added: "[GSC2017 was] a productive, enjoyable and an essential event to understand the space landscape of the UAE and beyond. It was vital for any space sector organisation serious about doing business in the Middle East."

Edward Haines, head of content, Streamline Marketing Group, added: "The congress is a platform for up-and-coming space agencies and commercial players. By looking at opportunities for new entrants to contribute to the industry, the congress aims to support the diversification of the space sector."

"It also highlights the growing trend towards investment in space programmes and technology across the MENA region."

The UAE has a lot to celebrate at the congress. It recently launched KhalifaSat – its first 100% engineered and developed satellite; it is on track for the launch of its Hope Mars probe, which is scheduled to arrive at the Red Planet in early 2021; plus its astronaut programme is preparing the first Emirati and Arab astronaut to travel to the International Space Station.

The congress takes place at the St Regis, Saadiyat Island. ■

## Carlos Brana

**Marcelle Nethersole** speaks to the senior vice-president WW marketing and sales at Dassault Aviation.



“The market appears to be turning the corner.”

1

■ What current projects are you working on in the Middle East – both business and defence?

The Falcon 7X has been very popular in the Middle East, with close to 20 aircraft in service there, and has enabled us to raise our share of the regional market in the long-range segment.

Our new Falcon 8X ultra-long-range trijet is also receiving a warm market reception in the region, with several aircraft deliveries in the two years since its entry into service.

In response to rising sales, we have reinforced our presence to be closer to customers in Saudi Arabia, the Gulf and north Africa, beginning with a sales office in Dubai and a new engineering office in Cairo.

We are also continuing to build up our regional product support network. We have two authorised service centres in Dubai and Jeddah and operate a spare parts centre in Dubai.

Our Dubai warehouse stocks thousands of spares, primarily for the Falcon 7X, the Falcon 900LX long-range trijet and the Falcon 2000 series.

2

■ Has the company recovered from the trauma of scrapping the 5X programme?

The decision to shut down the Falcon 5X programme was a hard one for Dassault Aviation. But the persistent delays due to development issues with the 5X's Safran Silvercrest engine had become a source of continuing frustration for our engineering and marketing teams.

All that is now behind us. The new Falcon 6X we announced in February will build on the innovative design of the Falcon 5X, while offering even more cabin space and range, thanks to the aircraft's 13,460lb thrust Pratt & Whitney Canada PW812D powerplant.

3

■ Can you tell us more about the new Falcon programme?

Initial deliveries of the Falcon 6X are anticipated in 2022. That's a tight schedule but one we are confident we'll be able to keep to.

The aircraft has been well received in the marketplace. It will arrive a little bit late compared to other new models in its class but we have great sales arguments that we expect to sway customers.

The cabin will be the highest and widest of any purpose-built business jet, offering the largest cross-section on the market. The 6X will also come equipped with the industry's most advanced digital flight control and cockpit technologies, drawing on heritage from other Falcon and fighter jet programmes.

Overall, it will offer the best combination of size, range, operating efficiency and airport performance in the 5,000nm segment.

4

■ How do you see the future of business aviation?

We are naturally optimistic at Dassault. Our long experience has taught us a lot about the ups and downs of the market and how to adapt our design and production resources to them.

Since the 2008 financial crisis, we have considerably improved the way we design, build and support our Falcons and have continued to invest heavily in fleet modernisation, beginning with the Falcon 8X and 6X and continuing with another new model we are currently working on.

The market appears to be turning the corner, with pre-owned aircraft inventory declining and pricing starting to firm up, and new aircraft sales on the way back up. We feel we're perfectly positioned to take advantage of this improving market environment.

5

■ What does a typical day hold for you in your busy role?

Part of my responsibility is to make sure that all our Falcon engineering, sales, and marketing resources are fully focused on reaching the goals defined by the company.

This also means helping our teams in their day-to-day activities and enabling them to meet our own challenges, while always keeping a close eye on what is going on in the marketplace.

I spend a fair amount of time each day gathering and analysing data, providing guidance to our teams and meeting with customers and operators to gauge their current and future expectations.

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