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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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Having the resolution to inspire and aspire

As we head towards the end of another calendar year, reflecting on the successes or the challenges of our aerospace industry is as much on our minds as our personal New Year resolutions.

As this is also the start of the season of events, it is a great time to really look at what we have achieved – and where we go to next.

The Arab world will be celebrating the achievement of Hazzaa Ali AlMansoori, the first man to reach space from the UAE (and only the third Arab of all time following Prince Sultan bin Salman Al-Saud of Saudi Arabia, who flew in the US Space Shuttle in 1985, and Syrian astronaut, Mohammad Faris, who made a space flight in 1987, as part of a joint Syrian-Soviet mission.

AlMansoori reportedly had “a blast” during his visit to the International Space Station, but very differently from his predecessors, he shared his experience “live” via video links to schoolchildren and fans on the ground.

By so doing, he fired the imagination of young people to follow in his footsteps and appreciate the value of the scientific and engineering exercises that are being carried out in space – and on the ground – to improve our knowledge and our technology.

Later this month, another showcase offers hands-on knowledge of the new technologies that are improving the sustainability and the productivity of the aviation and defence sectors. This is, of course, the Dubai Airshow, now firmly in its place among the top three of such B2B events in the world.

The growth of the event is illustrated by the numbers of exhibitors and trade visitors anticipated – an almost 10% increase of exhibitors to 1,300 is expected to attract an even larger increase in attendees, with 87,000 aerospace trade professionals attending the event throughout its five-day run.

As someone who attends dozens of aerospace events, conferences and air shows throughout the year, I can sympathise with the grumbles of “too many



shows”, but the Dubai Airshow is different. It has been a vital part of establishing Dubai as the aerospace hub for the Middle East and, indeed, for demonstrating the importance and the capability of the Middle East market as a stand-alone geographic segment.

Another triumph that will be reflected at the show, is the amazing transformation of Joramco, the Jordanian MRO and engineering specialist. Now part of Dubai’s DAE, and led by our cover personality, Jeff Wilkinson, this is a great story of looking at the culture and ethos of a business and reshaping it to meet new demands – and it is working.

If you have an equally amazing turnaround story, or are doing things differently in the region’s aerospace scene, then please visit us at the Dubai show and share your stories.

Safe landings,
Alan Peaford, editor-in-chief

COVER: Man with a mission – Joramco chief executive Jeff Wilkinson. PICTURE: JORAMCO

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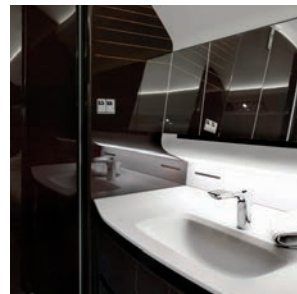
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Etihad engineers the appliance of science

Etihad Engineering welcomed a group of 15 students from the UAE's 'future scientists' initiative for a comprehensive tour of its 500,000sqm state-of-the-art facilities in Abu Dhabi.

The initiative is a joint venture between Airbus and Al-Bayt Mitwahid, and provides students with the opportunity to discover the aerospace industry over a three-year period. Throughout the programme, students attend workshops, industrial site tours, lectures and events, both internationally and in the region.

Abdul Khaliq Saeed, chief executive officer, Etihad Engineering, said: "This is a remarkable initiative for UAE students with a passion for aerospace and it is with great pride that we welcome them to Etihad's extensive engineering facility."

Loan boost for DAE

Dubai Aerospace Enterprise (DAE) has signed a \$500 million seven-year unsecured term loan with a group of six banks. Abu Dhabi Commercial Bank served as initial mandated lead arranger, bookrunner and underwriter. The loan will be used to repay secured debt and support the future financing needs of the business.

Firoz Tarapore, CEO of DAE said: "This loan further underpins our ambition to structure our funding and liquidity predominantly around unsecured debt. This transaction brings the total liquidity we have raised in the last 18 months to \$3.5 billion. This gives us considerable funding certainty to pursue our aggressive growth agenda."

African connections

Oman Air and Kenya Airways have expanded their existing codeshare cooperation, increasing the destinations available.

The codeshare expansion became effective in October and will allow seamless connectivity to Oman Air guests travelling beyond Nairobi to Entebbe (Uganda) and Johannesburg (South Africa).

Similarly, Kenya Airways guests can now extend their travel beyond Muscat (Oman) to Karachi (Pakistan) and Lahore (Pakistan).

That's entertainment

Emirates clinched its third consecutive award for 'best entertainment' at the 2020 Passenger Choice Awards held during the APEX EXPO in Los Angeles, USA.

The airline was also given a five-star global airline official rating, the highest in the first programme, based solely on verified and certified passenger feedback.

Dishing up fish

Emirates SkyCargo has teamed up with Dubai start-up, Seafood Souq, for efficient and transparent sourcing and transportation

of seafood, starting with a shipment of Scottish salmon from Glasgow Airport.

While the initial focus is on delivering fresh seafood from markets such as Norway, Cyprus, Chile, the US and Scotland to customers in the UAE and the Middle East, the start-up has plans to harness the potential of Emirates SkyCargo's global network to reach a global clientele.

Global success

Bombardier celebrated the entry-into-service of the latest addition to its Global family, the Global 6500 jet, in October.

David Coleal, president, Bombardier Aviation, said: "We're proud of the work our team and our suppliers have done to deliver a technologically advanced aircraft that exceeds our customers' expectations in terms of unparalleled comfort, superior performance and an incomparable smooth ride."

The Global 6500 aircraft has a class-leading range of 6,600 nautical miles, with a top speed of Mach 0.90, and Bombardier's smooth ride technology. It can connect New York to Dubai.

First A320neo

Kuwait Airways has taken delivery of its first A320neo aircraft.

The delivery, a milestone in Kuwait Airways' 65th anniversary celebrations, marks an important step in the airline's ambitious fleet renewal and growth plans, which will phase-in 15 A320neo aircraft to its fleet in the coming years, following a purchase agreement signed in 2014.



Blue ribbon event: Mikail Houari, Mohammed Al Zarooni, director general DAFZA, and Stefan Roemelt, head of centre of competence cabin and cargo at Airbus, formally open the new facility.

ACE is a winner for Middle East service

Airbus Cabin Electronics (ACE) inaugurated its first service centre for the Africa and the Middle East regions at Dubai Airport Freezone (DAFZA) in September.

The facility will serve local and regional carriers, as well as customers in India and Turkey, and will be an important addition to Airbus' continued growth and investment in these regions.

It will provide repair and spare part

services for cabin components and systems, as well as customer on-site technical services, such as cabin system training.

Mikail Houari, president, Airbus Africa and the Middle East said: "By creating greater proximity to our customers here at Dubai Airport Freezone, we will be able to continue providing world-class services in a region where we continue to see growth and opportunities for further expansion."

A close-up photograph of a pilot's hand reaching up to adjust a control panel in a cockpit. The panel features several toggle switches and a small illuminated orange display. The background shows the cockpit's instrument panel with various gauges and screens.

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Bahraini pilots fly home

Gulf Air has welcomed a new batch of Bahraini pilots, who have started operating flights after completing all the necessary vigorous ground and base training courses.

The new pilots join the national carrier from a number of neighbouring regional airlines, to be part of their home airline serving the Kingdom of Bahrain.

Gulf Air's deputy chief executive officer, Captain Waleed Al Alawi, said: "With more than 70% of our pilots being Bahrainis, this is a major milestone for us to be a leader among carriers from our neighbouring countries by having local, specialised and professional talents representing our glorious kingdom in the skies."

Systems support

SITA is providing key systems to support the smooth operation of Algeria's new international terminal at Houari Boumediene International Airport in Algiers.

The new facility, which opened to the public in April 2019, is among the first airports in north Africa to use SITA's airport management solution.

Using the suite of integrated software

Restored Spitfire attempts to polish off world trip



Flying friends: Matt Jones and Steve Brooks, founders and co-owners of the Boulton Flight Academy, ready for the so-called 'longest journey'.

A restored wartime Supermarine Spitfire MK IX will visit a number of airfields in the Middle East during an ambitious journey around the world.

Two British pilots will take it in turns to fly the single-seat fighter during the multi-leg, 43,000km journey, which is planned to include 150 stops in more than 30 countries.

The aircraft left Goodwood, England, on August 5 and is expected to return to the UK by December 7.

The Spitfire was scheduled to arrive in the Middle East in early November, and stops should include Al Bateen Executive Airport, Bahrain International Airport, Kuwait Airport, Aqaba/King Hussein International Airport, Hurghada Airport, and Cairo International Airport. There could also be other stop-offs in the region.

applications, designed to effectively manage airport operations from the terminal to the airfield, the airport is able to centrally manage everything from passenger processing and baggage-handling to the real-time allocation of fundamental resources across the terminal.

Facing the future

Emirates has become the first airline outside America to receive approval for biometric boarding from the US Customs Border Protection (CBP).

Soon, customers flying from Dubai to any of Emirates' 12 destinations in the US, will be able to choose facial recognition

technology at the departure gates, reducing the time taken for identity checks to two seconds or less.

No pre-registration is required, and customers may also choose not to use the technology. Emirates does not store any biometric records of its customers – all the data is managed securely by CBP.

Aviation growing up

The world's passenger and freighter aircraft fleet is set to more than double, from nearly 23,000 today to almost 48,000 by 2038, with traffic growing at 4.3% annually.

The forecast, from Airbus, also says there will be a need for 550,000 new

pilots and 640,000 new technicians.

Christian Scherer, Airbus CCO, said: "By updating fleets with latest generation fuel-efficient aircraft, such as the A220, A320neo family, the A330neo and the A350, Airbus believes it will largely contribute to the progressive decarbonisation of the air transport industry and the objective of carbon neutral growth from 2020, while connecting more people globally.

"The 4% annual growth reflects the resilient nature of aviation, weathering short-term economic shocks and geo-political disturbances."

Express orders

Tunisair Express and ATR have confirmed a firm order for three ATR 72-600s. The aircraft will renew Tunisair Express's regional fleet and supply essential connectivity, both domestically and internationally. The modern ATR turboprops support airline operations by burning 40% less fuel and emitting 40% less CO₂, compared to a regional jet.

The ATR -600 cabin will introduce the best on-board experience to passengers, including the ATR's Cabinstream in-flight entertainment system, enabling passengers to access a range of multimedia content on their personal electronic devices.

Vertis adds Falcon 900EX to its fleet

Swiss-based Vertis Aviation has added a Dassault Falcon 900EX to its Vertis charter management programme.

The latest addition is managed and operated by a UK air operator's certificate (AOC) holder and is now exclusively marketed through Vertis.

Based at London Farnborough Airport, the Falcon 900EX is available for international charter immediately through any of the Vertis offices, including Dubai.

The Falcon 900EX is configured to seat up to 12 passengers.



Campaign for women

The International Air Transport Association (IATA) has launched the 25by2025 Campaign – an airline industry initiative to advance gender diversity in the airline industry by 2025.

The campaign is a voluntary commitment by participating IATA member airlines – including Qatar Airways.

It aims to increase the number of women in senior positions (to be defined by the member airlines) by either 25% against currently reported metrics or to minimum representation of 25% by 2025, as well as increasing the number of women in under-represented jobs (pilots and operations) by 25%.

Flydubai retrofit wings in

Flydubai has completed the first split scimitar winglets installation on its fleet of next-generation Boeing 737-800 aircraft, becoming the first airline in Middle East to invest in this fuel saving technology.

The retrofit programme will see up to 30 737-800s fitted with the new technology between now and October 2020.

Upon completion of the programme, the airline's retrofitted aircraft will benefit from greater fuel efficiency, while producing less carbon emissions.

By reducing the drag created at the end of the wingtip and distributing the lift of the aircraft more evenly across the whole wing, the winglets reduce fuel consumption by 1.5%. The improvements could reduce Flydubai's annual fuel consumption by more than 200,000 litres and reduce CO2 emissions by more than 510 tonnes per aircraft per year.



Fired up by new helicopter possibilities

Russian Helicopters has delivered three Ka-32A multipurpose helicopters to Turkey for firefighting missions. "The Ka-323A11BC has the best technical equipment for firefighting missions," said Russian Helicopters CEO, Andrey Boginskiy.

The manufacturer sees a potential for several dozen firefighting helicopters for the Turkish market.

The aircraft is designed to perform complex firefighting

operations, special search-and-rescue and high-altitude construction operations, as well as transporting cargo inside the fuselage and on the external sling, logging forests, transporting patients and evacuating injured people.

It can be equipped with various fire extinguishing systems and is capable of extinguishing flames on the highest floors of high-rise buildings and on oil-and-gas industrial facilities.



Signing on the dotted line: SKAN Aviation president, Ashraf Nasser, and Ahmed Adel.

Partners SKAN a positive future

EgyptAir maintenance and engineering has signed a partnership agreement with SKAN Aviation to establish a line maintenance station in Dubai International Airport.

The new facility will provide technical services for A330, A320, B737-800, B777, and B787 aircraft.

"We look forward to attracting more customers to our new station; it is going to be a real challenge for us as we seek to expand our network in the region," said Pilot Ahmed Adel, chairman and CEO of EgyptAir Holding Company. "It is a step forward and we consider our partnership with SKAN a strategic and promising one."

Fuelling a new deal

Global mission management provider, Universal Weather and Aviation, has signed a definitive agreement to sell its UVair fuelling division to World Fuel Services.

"We didn't achieve our 60-year track record of success and remain the industry leader in international mission support by standing pat and being satisfied with the status quo," said Universal chairman, Greg Evans.

"We've always been nimble, and not afraid to make bold decisions that will allow us to adapt to changing markets and better develop solutions to our customers' future challenges."

Five-star Oman

Salalah became the first regional airport in the Middle East with a five-star ranking at the Skytrax 2019 world awards, held in London.

Sheikh Ayman bin Ahmed Al Hosni, chief executive officer of Oman Airports, said: "Salalah Airport's achievement of this rating is a confirmation of the level of care that we and our strategic partners have given to our airport users.

"It also shows our continued interest in following up on their comments regarding the services provided.

"I congratulate the Salalah staff, the entire Oman airports family, and the Sultanate of Oman on this significant rating."

Hawk history

Air Marshal Julian Young, the UK Royal Air Force's chief engineer, has revealed in a Tweet that the first Hawk 165 to be assembled in the Kingdom of Saudi Arabia recently, was, coincidentally, also the 1,000th Hawk to be built. ■ Pillar Hawk, page 50.

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Kenya coup for Joramco

Joramco has, for the first time, carried out a heavy maintenance agreement with Kenya Airways.

The work includes performing out-of-phase (OOP) checks for six B787 aircraft, in addition to major upgrades to the in-flight entertainment wiring system and Oxygen modules passenger service units (PSUs).

Joramco successfully delivered five aircraft between May and June, while work on the sixth was taking place as *Arabian Aerospace* went to press.

Mighty military training


L3Harris Technologies and Advanced Electronics Company (AEC) are collaborating to establish a rotary and fixed-wing flight training and aircraft maintainer programme for the Royal Saudi Armed Forces.

L3Harris and AEC, a Saudi Arabian Military Industries (SAMI) company, will deliver military training solutions to develop pilots and maintenance technicians, as well as provide performance-based logistics to the armed forces.

Great call of China

Abu Dhabi Airports has signed a memorandum of understanding (MoU) with Beijing Daxing International Airport (BDIA), which will

Gulf Air's magnificent 7th recaptures the Dream



Gulf Air went back to the future as it received its seventh 787-9 Dreamliner.

The airline received the aircraft at Dulles International Airport in Washington DC, just ahead of its 70th anniversary.

Gulf Air chairman, Zayed R Alzayani, and United States Secretary of Commerce, Wilbur L Ross, were two of the dignitaries who toured the aircraft, which displayed a redesigned vintage version of the Golden Falcon Lockheed TriStar livery, representing the company's iconic design from the 1970s.

Alzayani said: "It gives me great honour to reveal this special livery, which would definitely resonate nostalgically with our global audience. The revival of this livery is a homage to our resilient national carrier as it celebrates being one of the first established carriers in the Middle East, and which continues to connect Bahrain to the world."

see both parties exchange knowledge for the benefit of passengers and visitors from around the world.

The signing took place at the BDIA Management Centre in China.

Bryan Thompson, CEO of Abu Dhabi Airports, said the agreement is the result of close social and economic ties between the UAE and China.

Slow growth

The International Air Transport Association (IATA) reports that global passenger traffic in August 2019, measured in total revenue passenger kilometres (RPKs), climbed 3.8% compared to a year ago.

Middle Eastern airlines posted a 2.9% traffic increase, up from a 1.7% rise in July.

While this was better than

the average of the past 12 months, it remains far below the double-digit growth trend of recent years.

Falling business confidence in parts of the region, combined with some key airlines going through a process of structural change and geopolitical tensions, are all contributing factors.

Capacity increased 1.3%, with load factors rising 1.3 percentage points to 82.4%

Qatar at its best

Qatar Airways was named 'best airline' at the prestigious 2019 *Business Traveller* Awards in London. The carrier was also awarded 'best long-haul airline', 'best business class' and 'best Middle Eastern Airline'.

Qatar Airways Group chief executive, Akbar Al

Baker, said: "To be recognised once again by the readers of *Business Traveller* is a huge honour for Qatar Airways and an appreciation of our promise to consistently deliver a truly world-class service."

Dans deal

The Dubai Air Navigation Services (dans), the entity responsible for air traffic control at Dubai's airports and the northern emirates, has extended its joint collaboration agreement with Serco of the UK for another two years.

The renewed agreement will contribute to continually upgrading and strengthening the service levels at both Dubai International Airport and Al Maktoum International Airport, while also ensuring a superior operational efficiency and

continuity of the service. Top award for DXB

Dubai Airports has picked up two trophies at the 2019 Aviation Business Awards – including seeing Dubai International (DXB) named airport of the year.

In 2019, as well as technology implementations, Dubai Airports announced its commitment to transforming the customer experience with the launch of brand DXB, creating a destination within a destination.

The second award, for tech innovation of the year, was for the delivery and implementation of realtimeDXB, a bespoke cloud-based platform with the ability to gather and visualise data generated by more than 50 operational systems across Dubai Airports and partners at DXB.

EgyptAir A220-300 makes history

EgyptAir has taken delivery of its initial A220-300 aircraft – of 12 on order – becoming the first A220 operator based in the MENA region and the sixth operator worldwide.

"We are proud to welcome our very first A220 – the most innovative and technologically advanced aircraft in the world – and to launch commercial operations," said Ahmed Adel, chairman and CEO, EgyptAir Holding Company.

"Airbus' A220 airliners are integral to the execution of our business development strategy – Horizon 2025 – and our fleet optimisation plan."





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Lebanese flag-carrier, Middle East Airlines (MEA), is a rare breed in the Arab aviation market: small, commercially cautious and highly profitable.

Martin Rivers talked to chairman, *Mohamad El-Hout*, about his winning formula.

BEIRUT FORCE...

During the early years of Syria's civil war, Middle East Airlines (MEA), the flag-carrier of neighbouring Lebanon, benefited from an uncomfortable spike in demand due to its proximity to the battleground.

With Syrian airspace all but closed to civilian traffic, most refugees who could afford airline tickets drove 110km from Damascus to Beirut before boarding their flights.

Syrian footfall in Lebanon has subsided in recent years as the war-torn state hobbles towards some semblance of normality.

At home, flag-carrier Syrian Arab Airlines is plotting to re-build its network with new Russian aircraft that are not subject to western sanctions. Abroad, a handful of international airlines have tentative plans to resume operations in Damascus.

Although falling cross-border demand might seem like bad news for MEA, Mohamad El-Hout, the airline's long-standing chairman, actually wants the trend to continue.

"Out of more than eight million [passengers per year at Beirut's Rafic Hariri International Airport], you have a maximum 800,000 Syrians using the airport," he noted.

Millions of tourists

"During the time when Syria was stable, you had around 300,000 Syrians who were using Beirut Airport. So we hope that the situation will go better in Syria.

"If we lose 500,000 passengers at the airport as a whole, for sure we will benefit from millions and millions of tourists and passengers – because of the stability in the area."

El-Hout's optimism is borne out by government statistics: the number of people passing through Beirut Airport grew by 7.3% last year as violence in Syria abated. On August 16, 2019, the gateway handled 22,800 departing passengers – its highest ever daily figure.

Asked why MEA's market share at the airport is only about 35% – well below the home advantage of most Middle Eastern carriers – El-



Ground-breaking: MEA will become the first operator of the A321XLR in 2023.

Hout said the figure reflects Lebanon's commitment to fully deregulated skies.

The country's policy was underscored in July, when Ryanair, Europe's largest low-cost carrier, gained approval for a thrice-weekly service to Beirut from Paphos in Cyprus. Chief financial officer, Neil Sorahan, later hinted that more Beirut links are planned – likely under the operating licence of subsidiary Malta Air, which was created to extend Ryanair's reach in the Middle East and north Africa.

Franco-Dutch low-cost carrier, Transavia, also operates flights to Beirut from Amsterdam, Paris Orly and Lyon, while Spain's Vueling serves the Lebanese capital from Barcelona.

"We are competing with 40 carriers... and we are happy with this number," El-Hout affirmed. "We are keeping the competition, so [ticket] prices are going down.

"However, we have made it clear [to other countries] that we need reciprocity. If somebody is allowed to come with nine flights per day to Beirut, then at least we should be allowed to have three flights per day [to their airport]."

The chairman would not identify which countries are flouting their obligations under Lebanon's open-skies treaties. But, in a previous interview with *Arabian Aerospace* in 2015, he indicated that the UAE is one of the worst offenders.

"The minister of transport is taking care of this," El-Hout added. "Others are asking for additional flights and he's telling them, 'You are

welcome, but Middle East Airlines should be granted flights [as well] otherwise it will not be open skies. It will be a closed market'."

Besides the competitive headwinds, management have another reason to favour conservative growth.

Their caution is an acknowledgement of the mistakes made in the 1990s, when MEA expanded aggressively in a bid to capitalise on Lebanon's post-war recovery.

That strategy involved chasing after members of the diaspora with commercially dubious routes such as Sydney (Australia) and Sao Paulo (Brazil). MEA's headcount ballooned at the same time as the government quelled political dissent by dishing out jobs at the flag-carrier.

Better path

It was El-Hout's appointment in 1998 – one year after MEA posted its heaviest annual loss of \$87 million – that put the company on a better path.

The former central banker's willingness to cut routes, retrench staff and re-negotiate contracts, delivered swift results, returning MEA to the black in 2002. It has stayed there ever since, weathering successive waves of economic and security unrest: the war in Iraq, the global financial crisis, the Arab Spring uprisings, and repeated military confrontations with Israel.

"We don't do aggressive growth. We do sustainable growth. And the results we are achieving are great," El-Hout smiled. "I prefer to



“We need reciprocity. If somebody is allowed to come with nine flights per day to Beirut, then at least we should be allowed to have three flights per day to their airport.”

MOHAMAD EL-HOUT

keep sustainable growth and to be able to absorb shocks in the area, if we have any shocks.”

Predictably, the airline’s risk-aversion has given rise to a small but stable point-to-point network with almost no connecting traffic.

About a dozen routes are operated to Europe, including last year’s addition of Madrid (Spain). Fifteen points are served in the Middle East, north Africa and the Caucasus. And three in west Africa: Abidjan (Cote d’Ivoire); Accra (Ghana); and Lagos (Nigeria).

Although Lebanon President, Michel Aoun, said in September that MEA wants to resume Sydney flights, El-Hout made no mention of resurrecting the Australian connection. The airline’s head of commercial strategy and alliances, Walid Abillama, also downplayed the prospect in a recent interview with *Executive Magazine*.

Instead, management are focused on building capacity in existing markets, while cautiously exploring new opportunities in Africa. Their fleet plan reflects this by prioritising extra seats over the addition of extra aircraft.

MEA’s fleet currently comprises 13 Airbus A320 narrow-bodies and five A330-200 wide-bodies. That should inch up to 19 or 20 units by the middle of the next decade, with firm orders in place for 11 A321neos, four A321XLRs and four A330-900neos.

Nine of the A321neos will arrive next year, followed by two in 2021. The wide-bodies are also scheduled for delivery in 2021, while MEA will

become the first operator of the A321XLR in 2023.

The narrow-body contract was originally split between 126-seat A320neos and 150-seat A321neos, but management revised it to cover only the stretched variant.

“There is demand [to fill the A321neo] and crew commonality [is an advantage],” El-Hout said of the decision. “Having lower load factors on three or four aircraft is much easier than changing planes [based on the route]. For a small fleet, it’s better to have one aircraft type.”

Another change came at the Paris Air Show in June, when MEA was confirmed as the launch customer of the A321XLR – an extended range version capable of flying 4,700nm. All four units will be delivered to Beirut in 2023.

Game-changer

El-Hout described the A321XLR as a “game-changer” for the airline, primarily because of its ability to replace wide-bodies on African routes.

“We can increase the frequencies to [existing routes in west] Africa,” the chairman noted. “Also, a smaller aircraft [than a wide-body] will give us the flexibility to operate thinner routes to Africa that we cannot operate now, like Kinshasa [in the Democratic Republic of the Congo] or Abuja [in Nigeria].”

“And it opens for us possibilities to go to the east, if needed in the future, to India.”

Management are still deciding whether the

other A321s will be the LR variant, which has a range of up to 4,000nm thanks to its extra fuel tanks. MEA does not need the LR for its own network, El-Hout said, but it usually favours high-specification models due to “their residual value and the possibility of re-selling them”.

The airline aims to have an average fleet age of five or six years, meaning that most of its aircraft are sold in their 10th or 11th year.

Future-proofing was also a consideration in the wide-body order, though MEA’s ability to fully exploit its A330neos is far from certain. “We are taking the new -900neo with the highest maximum take-off weight, the 251t version,” El-Hout noted. “It has longer range [than the other variants], although we are not going to use it... [We ordered it] in case we are allowed again to fly to the United States.”

MEA was banned from America in 1985 after the hijacking of TWA Flight 847 – a three-day intercontinental ordeal that killed one US serviceman and left dozens of passengers held hostage in Lebanon for a fortnight. America blamed Lebanese militant group, Hezbollah, for the terror attack. It denied responsibility.

Three decades after Lebanon’s civil war ended, MEA is still counting the cost of its troubled past. Though there can be no guarantee of happier times ahead, El-Hout’s leadership has given the airline the best possible hope of a long and profitable future. ■

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Saudi Arabian carrier, Flynas, plans to tap into the country's drive to attract more Moslem pilgrims and holidaymakers – as it prepares for a major expansion of its fleet. Alan Dron reports.

Bander Al-Mohanna:
"Flynas believes in the capabilities of the kingdom's youth – male and female alike."



Pilgrims are not the only way to progress

Tourism has not traditionally been regarded as one of Saudi Arabia's major industries. However, that situation is likely to change dramatically in the next few years as the kingdom powers ahead with attempts to diversify its economy away from the hydrocarbons sector.

It wants tourism to rise from 3% to 10% of gross domestic product (GDP) by 2030.

It has, of course, one major advantage. As a pilgrimage to Mecca is one of the tenets of the Islamic faith, which every able-bodied Moslem should undertake during his or her lifetime, there is an inexhaustible supply of travellers to the desert nation.

However, beyond religious tourism, the Saudi authorities believe that they can put their country firmly on the map for 'ordinary' tourists. New resorts are springing up and, in September, the country relaxed its visa requirements for 49 countries, as well as its strict dress code for female visitors.

On top of that, the liberalised domestic air market, which now has five competing Saudi carriers compared to only two just a few years ago, is continuing to grow significantly, providing more traffic.

To deal with these factors, Saudi low-cost carrier, Flynas, signed a deal with Airbus in 2017 for 80 A320neo-family aircraft, plus purchase rights for a further 40. By the end of 2019, five are scheduled to have arrived. If all 120 are eventually received, deliveries will continue until 2026.

At this year's Paris Air Show, Flynas topped up its orders with a memorandum of understanding (MoU) for 10 A321neoXLRs, the newly launched, long-range variant of the single-aisle aircraft, and also announced that it would swap 10 of its existing ordered A320neos for larger A321neos.

According to Flynas CEO, Bander Al-Mohanna, the larger aircraft will help meet the airline's plans to help transport the increasing numbers of Moslem pilgrims. Over the last Hajj season, Flynas flew around 200,000 pilgrims to and from Saudi Arabia.

"Considering these large-scale operations, Flynas currently pursues its duty to meet this rising demand while leasing larger aircraft. So, our plans are to upgrade our purchase to include A321neo aircraft to serve the Hajj and Umrah markets," emphasised Al-Mohanna.

"Flynas targets the Umrah markets to transport around five million pilgrims annually, which will contribute to increasing the number of pilgrims in line with the kingdom's vision 2030 [project] to receive 30 million annually.

"We currently operate a fleet of 30 aircraft and we transport pilgrims and visitors on our fleet of Airbus 320s. Additionally, we lease special large-sized aircraft to cater to the influx of pilgrims during the Hajj. Flynas has leased 13 wide-body and high-capacity aircraft, including the Airbus A380, the Boeing 747 and 767."

New destinations

As well as religious tourism flights, Flynas is currently undertaking an expansion strategy unveiled last year, which includes starting flights to new destinations. Those include Lahore, Islamabad, New Delhi, Lucknow, Calicut, Sarajevo, Vienna, Batumi, Tbilisi and Baku.

"On the domestic front, we are moving forward with our expansion strategy by creating new direct routes that have not been served before," added the CEO.

"Recently, we launched three direct flights a week connecting Al-Ahsa to Jeddah and Al-Ahsa to Madina. Moreover, new direct flights from Abha to Madina and Dammam to Al Qurayyat were also recently launched."

Together with other Saudi carriers, Flynas has recently begun to employ Saudi female flight attendants. For cultural reasons, this has always been controversial. However, said Al-Mohanna, the new policy had been very well received.

"We had a great response from both female Saudi flight attendants and our guests. In addition to that, Flynas believes in the capabilities of the kingdom's youth – male and female alike – and, therefore, we have launched several programmes to localise aviation jobs, some of them targeted at Saudi women."

These have included opportunities for Saudi women to train as pilots and flight attendants. The first batch of Saudi female cabin crew took to the air in January 2019.

"The flight attendants programme, which aims to attract 300 Saudi male and female flight attendants within two years, reflects Flynas' adherence to our cultural values," said Al-Mohanna. This includes both working hours and a uniform for female flight attendants in line with Saudi cultural norms. ■

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Low-cost carrier (LCC) Air Arabia is on the verge of a major expansion programme as it develops a new airline – Air Arabia Abu Dhabi – with Etihad Airways and prepares to double in size. Alan Dron reports.

Airbus or Boeing: which way will Air Arabia jump?

The announcement by Air Arabia that it is teaming with Etihad Airways to create an independent, joint venture, low-cost airline, came out of the blue in mid-November.

Details of the newly formed Air Arabia Abu Dhabi's fleet and timetable to launch were not immediately revealed, but the deal aims to tap into the growing demand for travel in the Middle East.

The new company "will complement Etihad Airways services from Abu Dhabi", the airlines said.

It will be a rival to neighbouring LCC Flydubai, and perhaps helps to explain Air Arabia's previously announced search for 120 new aircraft. It is unknown whether some are destined for the new airline.

Air Arabia has around 50 Airbus A320s at present and is halfway through receiving six A321neoLRs.

Although 2019 will be remembered for the worldwide grounding of Boeing's 737MAX after two crashes, Air Arabia is considering the aircraft for its planned order, which will more than double the size of the fleet.

"We're talking to both Airbus and Boeing," said CEO Adel Ali. "We're evaluating what each brings. Of course, you've got the Boeing challenges at the moment with the MAX, while Airbus has got slow deliveries. We're sure that by the time the delivery comes – whether from Boeing or Airbus – all the problems they have today will be behind them."

"The discussions that are going on between our team and the two suppliers are very much based on commercial and delivery timelines. We hope to have concluded a decision by the end of the year."

Although Air Arabia is an Airbus-only operator at present, this does not give the European manufacturer an advantage in the competition for Air Arabia's order, he said.

Whichever manufacturer is chosen, the huge order backlogs held by both airframers means that it will be several years before the new aircraft start to appear at the airline's Sharjah base. Given that situation, does Air Arabia anticipate bringing in temporary capacity to maintain its

expansion in the short term? "Very much so," said Ali. "We're not going to slow down things because of delivery times."

Traditionally, Air Arabia has favoured buying its aircraft direct from the manufacturers, rather than acquiring them via third-parties. However, "We're open to leasing aeroplanes. I'm sure we will be going to the market and getting some aircraft for the interim," said the CEO.

He made the point that the Airbus A321neoLRs now being delivered have been taken from US company, Air Lease Corporation.

"To date, our policy has been a direct purchase. The intention [with the next batch of aircraft] is to order them directly, just like the other 50 we bought last time.

"We've got to make sure that, whatever we do, it does cost us the least. Logic says that, with the

A321: "On quite a number of routes we operate today there is more demand for seats than the A320 can cope with. The A321 gives us around 50 more seats."

That drives down Air Arabia's seat costs and gives it the ability to increase market share on those routes. And the A321neoLR's extended range gives the company the opportunity to expand its reach, so mid-range destinations in regions such as south-east Asia, or more westerly parts of Europe, become viable.

"We're testing the aircraft and it's doing a good job," said Ali. "The first two work very well in going to [destinations such as] Vienna, Prague, Tunis, etc."

Air Arabia operates a multi-hub model, with 10 aircraft based in Casablanca (operating out of five Moroccan airports), three in Alexandria in Egypt, two in Ras Al Khaimah and the remainder in Sharjah.

However, Air Arabia's earlier foray into Jordan has effectively ended. In 2015, it took a 49% stake in Jordanian carrier, Petra Airlines, and planned to open a new hub at Amman's Queen Alia International Airport, after having tried to start operations in Jordan for some years.

By 2017, however, it had largely limited its operations from its Jordanian hub to charter flights, after

being unable to secure enough traffic rights to allow it to expand its scheduled services.

And now: "We closed down the Amman base. It was just not viable. You were not allowed to fly wherever you wanted. Our expansion was going to remain very small, so we decided to move the energy elsewhere."

Ali declined to say whether the local authorities were trying to shield national carrier, Royal Jordanian, from competition, but he found it strange that an 'open skies' airport attempted to put limits on services.

Despite this setback, Air Arabia has been able to maintain its financial performance, in contrast to some poor results from other airlines. "Having a simple business model always helps," said the CEO. "The fact that our business is largely point-



New look: Air Arabia freshened its brand in 2018, reversing the traditional colours and enlarging the size of the airline's seagull motif, seen here on one of its new Airbus A321neoLRs.

current interest rate in the market, money is inexpensive to borrow." So, at present, financing aircraft is much more beneficial than leasing. "But we're going to put a major order in and there's a big lead time and the financial markets do change."

Airbus' A320neo range has significant improvements over the earlier 'ceo' models that make up the bulk of the existing fleet. "The neo – whether A320 or A321 – obviously has an operational cost advantage. That's important because, while at the moment [the price of] oil is on the lower side, you can never guarantee it will remain there. That's a purely economic thing; we should always have the most fuel-efficient and economical aircraft in the fleet."

There is another advantage in using the larger



“ We’re sure that by the time the delivery comes – whether from Boeing or Airbus – all the problems they have today will be behind them. ”

ADEL ALI

to-point and doesn’t have a lot of fifth- and sixth-freedom is also important.

“Being a low-cost carrier, your focus is always on the cost and I guess the customers seem to like us. Levels of repeat travel are significant, because we offer value for money but also good quality service and good aircraft.”

Successful fuel hedging has also played a part in keeping costs down and profits up. Around 68% of Air Arabia’s fuel purchases are hedged this year and hedging goes out to 2023.

And, despite turmoil in the marketplace, that market is still growing, said Ali: “People do want to travel.”

Despite having to face a series of regional crises: “We see people are resilient and continue to travel and to enjoy themselves. The youth keep travelling. We hope that markets such as Syria will come back, which was a very big market for us. Iraq is getting much better. The Saudi economy has slowed down a little, but is extremely positive. Air Arabia’s home market in the UAE is also healthy.”

Positive factors

This combination of positive factors means that the airline is confident that year-on-year growth in the 6% - 9% band should be achievable.

The company’s platform for growth should be strengthened further by planned expansion at its home hub.

“Sharjah Airport did an expansion around 10 years ago that moved terminal capacity from 3 to 8 million. But throughput is now 14 million and the airport is congested,” explained Ali. “It’s still a good terminal and it works. But now the government is investing AED1.5 billion, (\$500 million) in expansion.”

That expansion work will be completed by 2023 and annual capacity will leap to 22 million.

“For us, that’s exactly what we need. It will be a great terminal. It still won’t be too big for our customers [to navigate]. It will be a combination of expanding the existing terminal and building new arrival and departure wings. Once both of those [wings] are ready, they’ll completely renovate the existing facilities. But all will be linked together in one big terminal.”



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MAROC CLIMBING

Abdelhamid Addou, Royal Air Maroc chairman and CEO, wants to accelerate the national airline's development to turn it into a continental leader. Vincent Chappard reports.



Royal Air Maroc (RAM) is facing fierce competition at domestic, regional and international level. Its chairman and CEO has a simple target – to enhance the airline's efficiency and competitiveness on the five continents to support Morocco's economic development and open up the country to the world.

"We will also work to make Casablanca the main hub of the African continent," said Addou.

At the end of September, Addou unveiled his new strategy to establish a long-term economic model. This will involve doubling RAM's fleet and strengthening its network to reach 120 routes. The contract between the Moroccan state and RAM is almost finalised.

The airline will, thus, be better equipped to be a global player, sustain its growth and better serve the interests of national tourism.

According to Addou, a "slight profitability" will not enable the national company to develop fully.

Competition is growing at a rapid pace. "Airlines like Ethiopian or Turkish have tripled or even quadrupled the size of their fleet," explained Addou.

The option of privatisation or partnership is, however, not on the agenda. "It's still premature. The size of the company does not allow us to bring on board a partner or go for an initial public offering (IPO)," he added.

Continued
on Page 30



Abdelhamid Addou: "The non-availability of our four B737MAXs has had a major financial impact that is unfortunately increasing as the aircraft continue to be grounded."

Top: A Royal Air Maroc B787-8 takes off on another trip.



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AWC WORKS TO ACHIEVE SAUDI ARABIA'S VISION 2030



A word from the CEO and Founder, Mr. Khalid Al-Otaibi

Airports World Company Ltd (AWC) is a professional aviation services company serving customers in Saudi Arabia, the Middle East and worldwide. Through our proven expertise in **aircraft chartering and trip support**, AWC is setting a new standard for excellence in the holistic aviation industry.

From our proud heritage in Saudi Arabia, we find the inspiration to continually expand our operations, closely tying our goals with that of HRH Prince Mohammad Bin Salman's **Saudi Vision 2030**. This vision is built on three pillars: **a vibrant society, a thriving economy and an ambitious nation**.

Through the collective work of Saudi's citizens, these pillars will lead to a sustainable and prosperous future for Saudi society and other nations. At AWC, we are proud to play our part in this progressive vision.

Through these efforts, **new job opportunities** for Saudis and the expanding of **tourism** within the Kingdom will result in reducing dependence on oil revenues for our economy. **Trade improving, stimulating economic growth and investing in aviation technology** will support Vision 2030 and strengthen the international industry in regions reaching far beyond the Kingdom.

In support of Saudi Arabia's position as the core of the Arab and Islamic worlds, Vision 2030 has undertaken the mission of **modernizing and increasing the passenger capacity** of the nation's airports. In an effort to better facilitate Hajj and Umrah visitors, the Kingdom has initiated a **third expansion** to the Two Holy Mosques and recently launched the **Makkah Metro** project.

Helping pilgrims from around the world to complete their **Hajj and Umrah** journeys with greater ease and efficiency leads to an enhanced experience for passengers traveling through our **improved airport facilities**. The promotion of religious tourism in Saudi Arabia also assists in Vision 2030's ambitions to **stimulate economic growth** and bolster a vibrant society with strong roots.

This year, AWC has fulfilled various **air charter** requests for Hajj and Umrah, and we are continuing to operate more flights in support of Vision 2030 and our customers.

I founded AWC with the purpose of placing customers at the center of a full set of high-quality **holistic aviation services** available through **a single professional company**. Our team is bringing a **new solution** to the Saudi market, providing companies coming to and operating within the Kingdom with **the most knowledgeable and economical** services.

We offer complete, customized solutions that go beyond any one segment of aviation operations. From **consultancy to operation**, **AWC is the standalone platform for the worldwide aviation industry**.

CONTINUED FROM PAGE 27

Digital transformation and innovation are the main pillars of RAM's development plan. The company is launching a new instant information service via WhatsApp to provide customers with information on their flight and baggage in real time and enable them to print their electronic boarding pass. The chatbot will also help improve customer service and the information process.

Furthermore, the Moroccan Airports Authority (ONDA) has launched a new passport control area at the arrival zone dedicated to passengers holding Moroccan passports. These new measures will help improve passenger flow and reduce waiting time.

RAM has also launched two routes to Boston and Miami, hence strengthening its network to America, which already has four destinations – Montreal, New York, Sao Paulo and Rio de Janeiro.

RAM will launch its Casablanca-Beijing route in January to seize new opportunities in this fast-growing market. According to Addou: "This new route will contribute to the development of Morocco by serving the world's largest tourist provider. It will help further strengthen the trade and economic relations between Morocco and China."

Links between two kingdoms

In August, RAM signed a code-sharing agreement with Royal Jordanian. "This cooperation consolidates the links between our two kingdoms and supports the Casablanca-Amman flight launched last April," underlined Addou.

The airline is well connected to the Middle East and serves Amman, Beirut, Doha, Istanbul, Jeddah and Riyadh.

The big breakthrough will undoubtedly be the integration of RAM within the Oneworld alliance.

"We have set up a project management office with 26 tasks, bringing together 100 employees representing all the professions," he explained. "The project is progressing according to the set targets and RAM is expected to be formally integrated within Oneworld by mid-2020."

RAM will be the first African airline to become a full-fledged member of Oneworld. "It will not only be a recognition for Morocco but also of the quality of services offered by the airline, its leadership and its strategic ambition. Access to our tourist destinations will be facilitated and we will be able to better connect our continent to the rest of the world," said Addou.

RAM remains the leader in the domestic market, despite competition from Air Arabia Morocco.

The Moroccan national airline has a public service strategy and ensures air connectivity within the country, including landlocked regions.

The airline opened a base in Laayoune in June, after signing a partnership agreement with the

A strike on the nerve

Casablanca Airport was affected in the summer by a strike at RAM's baggage-handling subsidiary, which generated significant delays and complaints.

ONDA has entrusted ground services to RAM Handling, which looks after nearly 70% of the flights transiting the airport, Swissport and Ground Force.

ONDA CEO, Zouhair Mohammed El Aoufir, said: "Disturbances recorded in the processing of luggage at Mohammed V Airport are mainly due to the strike of the zealous GPI staff." GPI is a subcontractor of RAM Handling.

Council of the Laayoune Sakia Al Hamra Region. It includes connections to Agadir, Dakhla, Guelmim, Marrakech, Smara and Las Palmas.

"The improvement of air connectivity with our southern provinces will undoubtedly contribute to the economic and social development of our regions by strengthening their economic attractiveness, enhancing their tourism potential and enabling our fellow citizens to travel," said Addou.

RAM's network development has, however, been thwarted by the grounding of its B737MAX aircraft – supposed to be the backbone of its fleet.

The company has rented four additional aircraft for more than six months to respect its commitments to customers, especially during summer holiday months. New routes to Amman, Athens and Vienna, as well as additional flights to Brussels and London, are also concerned.

Today, RAM's fleet includes 37 B737NGs, six ATR-600s, four E190s, two B737MAXs, nine B787s and two B767s. It should have taken delivery of its two additional B737MAXs during the first half of 2019.

"The non-availability of our four B737MAXs has had a major financial impact that is unfortunately increasing as the aircraft continue to be grounded. Leasing under these circumstances generates additional costs and operating expenses," said the CEO.

Best connectivity to Europe

According to Addou, RAM is the African operator with the best connectivity to Europe. "We are more dynamic on Europe and America. We must develop this strong positioning," he added.

There's also a need to deploy a better network in eastern Europe, Asia and Africa.

Royal Air Maroc has transferred its activities to the new Terminal 1 at Casablanca International Airport, which was inaugurated in January.

This terminal is dedicated to RAM and its partner airlines. It is equipped with a new self-service check-in process. Mohammed V Airport becomes the first airport in Africa to offer self-service end-to-end registration.

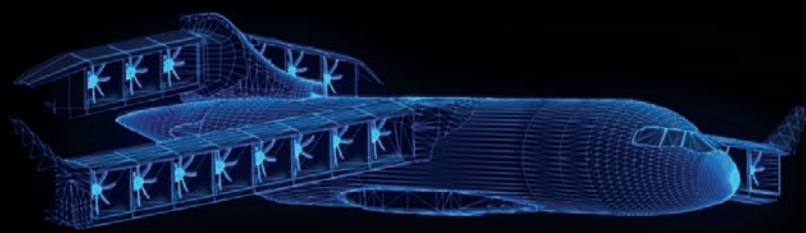
Addou's unquenched thirst to fly RAM higher and smarter is why he supports the single African air transport market (SAATM), which he describes as a promising initiative that needs to be encouraged by stakeholders.

"You have to move forward. If you want to generate more traffic, attract more tourists and flows between different countries, it is important to optimise costs and taxes in order to be profitable and competitive," he said.

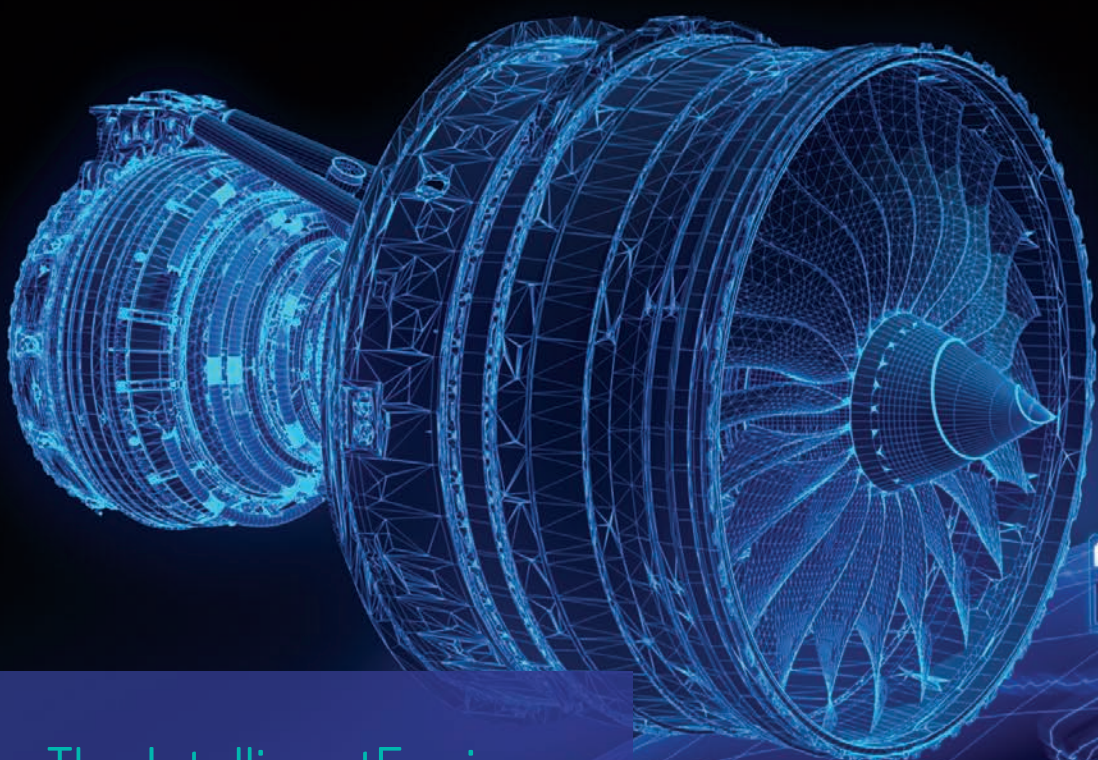
Finally, the airline wants to consolidate its cargo business. It has recently renewed its partnership agreement with the Moroccan Association of Exporters (Asmex) to offer preferential tariffs to its members. The aim is to help companies dealing with export to "improve the competitiveness of their products on international markets through optimised logistics offers at each step of the supply chain". ■

RAM will be the first African airline to become a full-fledged member of Oneworld.

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Our performance has been significantly affected by the grounding of the Boeing 737MAX aircraft.

GHAITH AL GHAITH

MAX IMPACT

Low-cost carrier, Flydubai, looks to the future as it operates against the backdrop of the grounding of the Boeing 737MAX. Alan Dron reports.

First, the good news: Flydubai's CEO believes the future is essentially bright, with a growing regional market and visa restrictions gradually being relaxed in several of the low-cost carrier's (LCC) destination countries.

However, those positives have been viewed over most of this year through the prism of uncertainty generated by the grounding since March of the airline's fleet of Boeing 737 MAX aircraft.

"Financially, without the MAX it will be a challenging year for us," CEO Ghaith Al Ghaith told *Arabian Aerospace* at the end of September.

Just 72 hours after his remarks, the airline's half-year results to June 30 appeared and laid out the extent of the problem.

Those showed a loss of AED 196.7 million (\$53.6 million). This was actually a 38% reduction, when compared to the first half of 2018. However, passenger numbers dropped 7.5% to 5 million during the first six months of the year as a result of the reduction in capacity caused by the absence of the MAX fleet from the schedules.

The company reported that 11 Boeing 737MAX 8 and three MAX 9 remained

grounded. Compounding the problem, five of the existing fleet of Boeing 737-800s left the fleet in the half-year.

"We had reported in our 2018 full-year results that we were cautiously optimistic at the start of 2019," Al Ghaith said in notes to the financial results. "We had seen positive results as our routes matured and, during the first few months of the year, we saw strong demand across the network. Our performance has, however, been significantly affected by the grounding of the Boeing 737MAX aircraft and our half-year results are not representative of what we had expected to report; we were expecting a significantly improved performance."

Suffered more

Flydubai has suffered more than most MAX operators, given the relatively high percentage of the latest-generation 737 model in its fleet.

The loss of capacity saw 14 aircraft grounded in March, but the airline should have received a further six over the course of 2019, replacing Boeing 737-800s that were coming to the end of their leases. Taken as an average from the mid-March grounding to late September, the loss of capacity was 17%, Al Ghaith said.

The company was also unable to extend lease contracts for aircraft that were scheduled to leave in 2019: "You have to have 18 months, on average, for notification to extend those aircraft leases, because they already had [other] customers to go to."

However, Flydubai has been able to extend until 2022 the leases of two 737-800s that were due to leave the fleet next year.

Naturally, the greatest priority for the airline has been to look after its customers in the ongoing situation and to give them the best possible product, considering the shortages faced.

"Usually, when you have a problem, it starts out as a big problem and gets smaller as you resolve it. This time, it's the other way around," said the CEO.

The uncertainty has also made it difficult to draft in extra capacity, as nobody has been sure for how long it will be required.

Despite this problem, Flydubai believes the air travel market remains buoyant.

The Middle East has seen rapid growth in LCCs and hybrid carriers over the past decade, despite early predictions that the region's

Continued
on Page 35



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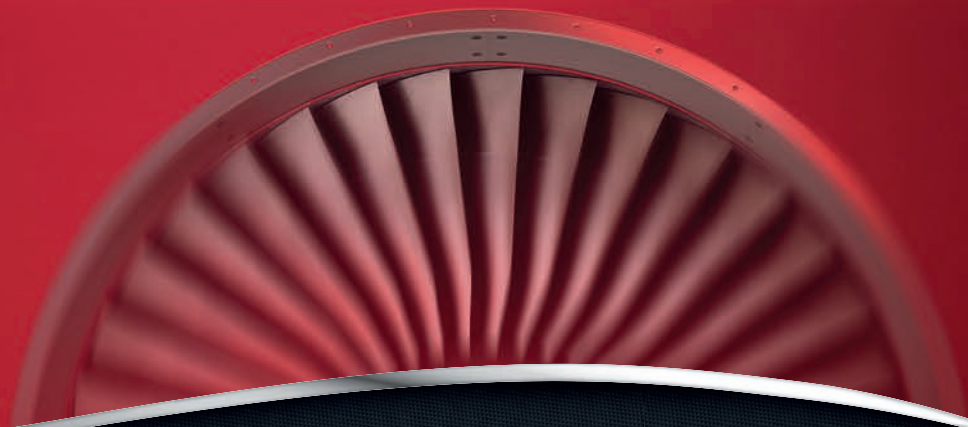
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Extraordinary together



Soldiering on: Some of Flydubai's Boeing 737-800s should have been entering the twilight of their careers with the carrier, but some are having their leases extended to give the company much-needed capacity.



CONTINUED FROM PAGE 32

travellers equated 'low-cost' with 'poor quality' and would be unlikely to abandon full-service airlines.

That has proved to be incorrect, as Gulf passengers have shown they like a bargain as much as anyone else. Not only that, Middle East LCCs have significantly stimulated the market, increasing the number of people flying.

This increase in rivalry does not worry Al Ghaith: "For us, competition is not an issue. Competition is good. The biggest challenge is we don't have an open market where you can operate without any restrictions. By having more competition, that proves there is a requirement for more lift."

Increase the pressure

He hoped that the growing number of LCCs would increase the pressure on those nations that do not have 'open skies' agreements to ease their restrictions.

"We created our airline based on open skies in Dubai and the UAE. After 10 years we're very proud of what we've achieved. We opened 65 new routes that previously didn't have any direct routes to Dubai."

The benefits of opening up a market could be seen in Saudi Arabia, said Al Ghaith. "We now have 14 or 15 destinations we operate to there, compared to three or four previously."

The biggest challenge for Flydubai is India. Given the strength of India's links with the UAE, routes between the two countries should be

some of the busiest in the network. Instead, Indian restrictions on flight frequencies mean that: "India represents 2-3% of our capacity, which is very, very small."

Al Ghaith sees growth in south-east Asia, where Flydubai is expanding. "But I personally believe there's more potential in the [Indian] sub-continent, Africa and the former Soviet Union, including Russia." With a relaxation of visa requirements by the Russian authorities for UAE citizens: "Moscow has become very popular this year with UAE visitors."

A major factor in the carrier's development over the past two years has been the greatly enhanced cooperation with sister company, Emirates. Much greater coordination of services and a codeshare agreement has seen a considerably increased number of passengers transferring between the two companies' services.

"When Flydubai was established, it was always intended to bring more routes, but I was told to make sure that we should work independently of Emirates to start with. I was to make sure that we stood on our own feet and created our own values," explained the CEO.

Today, cooperation with Emirates, or flying jointly on services, is very much the name of the game.

At the World Aviation Festival in London in September, Emirates' president, Sir Tim Clark, noted that Flydubai now opens up smaller routes on Emirates' behalf, such as Thessaloniki in northern Greece, and Catania in Sicily. Additionally, Flydubai operates Emirates routes

that are too quiet in winter to merit a Boeing 777-300, such as Zagreb in Croatia.

Another sign of the closer relationship with Emirates comes in the form of an increasing number of Flydubai services that have moved to Dubai International Airport's Terminal 3, to ease transfers with the long-haul carrier.

"I think that's a reflection of our close cooperation with Emirates but it's also a reflection of reality," said Al Ghaith. "Terminal 2 is limited in terms of capacity."

Runway closure

Further challenges to the airline's operations came in spring 2019, when the closure of one of Dubai International's two runways for 45 days of refurbishment forced Flydubai to move flights to 39 destinations to Dubai World Central (DWC). It was not the first time the carrier has moved services there temporarily, but the new airport will play a larger part in the carrier's plans in future. "We started flights from DWC in 2015, I believe. With the limited capacity at Dubai International, the only way to grow is in DWC and we think and believe there's big potential there."

In the immediate future, Al Ghaith is clear about the major challenges and opportunities facing the airline. "First, we need our MAX back. From our point of view, every year has its own challenges. Fuel prices continue to be around \$60, which is good; if that goes up, that will be a challenge. But our main challenges don't change – open access and border controls." ■

Gulf Air is increasingly looking towards France as it continues to modernise. **Steve Nichols** reports.

GULF AIR MAKES THE FRENCH CONNECTION



Sign on the dotted line: Thales and Gulf Air seal the deal.

PICTURE: BAHRAIN ECONOMIC DEVELOPMENT BOARD.

Gulf Air, the national carrier of the Kingdom of Bahrain, signed a number of agreements with French-based companies during His Majesty King Hamad bin Isa Al Khalifa's recent visit to France.

Thales announced that the carrier had chosen Inmarsat GX Ka-band connectivity solution for its Boeing 787-9 and Airbus A320neo-E (LR) aircraft.

Gulf Air also chose Michelin to equip every aircraft type within its fleet with tyres, including its brand new fleet of Boeing 787-9 Dreamliners, Airbus 320neos and Airbus 321neos.

It also finalised an agreement with CFM for the purchase of 65 LEAP-1A engines to power 17 Airbus A320neo and 12 A321neo aircraft. The engine order is valued at approximately \$1 billion at list price.

The airline also signed an agreement with Safran to equip its new fleet of 10 Boeing 787-9 Dreamliners and 12 Airbus A320neos with Safran landing systems wheels and brakes.

Finally, it entrusted maintenance of the APS5000 auxiliary power units (APUs) equipping the new Boeing 787-9 Dreamliner aircraft to AFI KLM Engineering and Maintenance (E&M).

The long-term contract includes a guarantee covering APU replacement. The repair services will be provided by AFI KLM E&M subsidiary, EPCOR.

Over the years, Gulf Air has worked closely with Thales to support its strategic growth plans to elevate the customer

experience. The airline says the new connectivity deal is important because it needs to respond to evolving needs and aspirations of its passengers for a modern travel experience.

At the signing ceremony Krešimir Kucko, chief executive officer, Gulf Air, said: "We are proud to announce our partnership with Thales once again for the on-board connectivity project."

"Back in 2016 we selected the AVANT in-flight entertainment (IFE) system for our yet-to-receive orders of new aircraft and, today, we complement this partnership with Thales for another product – all to elevate the customer experience during the flight."

The airline selected the AVANT IFE system for its complete fleet renewal programme. With the pairing of Thales' IFE and global connectivity solutions, Gulf Air's passengers will enjoy a unique and engaging experience.

Thales will deliver the highest performing connectivity service on the market, providing a complete end-to-end connectivity solution. Through the connectivity portal and on-board Wi-Fi network, passengers can browse the internet, check social media, shop, and much more during their flights.

Connectivity solution

Thales' Ka-band connectivity solution leverages the Inmarsat Global Xpress satellite network. According to the company, it is designed as a robust, modular and full-featured platform for a best-in-class on-board experience with reliable, seamless high-speed global coverage.

AVANT offers a highly customisable passenger experience with full high-definition displays and a wide selection of features and applications.

Philippe Carette, chief executive officer, Thales InFlyt Experience, said: "Thales is proud to be a long-term partner with Gulf Air in their goal of excellence in passenger experience."

"It is an honour to equip Bahrain's national carrier with our connectivity solution and the AVANT high-performing IFE system on board their newest aircraft. Thales is committed to support Gulf Air in driving innovations and the highest standards in passenger engagement."

Thales generated revenues of €19 billion (\$20.81 bn) in 2018 and has 80,000 employees in 68 countries.

The contract signing ceremonies took place during a business lunch organised by the Bahrain Economic Development Board (EDB) and the MEDEF, France's main organisation of business owners.

Gulf Air operates double daily flights or more to 10 regional cities, in addition to select destinations in the Indian subcontinent and Europe, from its hub at Bahrain International Airport.



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Workhorse: The Royal Saudi Air Force has been operating the C-130 Hercules since 1969. This example – C-130H 477 – illustrates how well its camouflage blends into the desert background.

PICTURES: ALAN WARNES.



HERCULES STILL HAS THE POWER

Deserts, war, plus the vastness of many countries in the Middle East and north Africa, ensure there will always be a need for military tactical airlifters.

Alan Warnes has been looking round the MENA region.

There are around 240 tactical airlifters currently operating in the Middle East and north Africa with the most dominant being the C-130 Hercules.

Around 170 different examples of the aircraft are operating with every nation now, after Bahrain became the most recent user in November 2018.

The tactical workhorse has proved hugely popular flying around many of the big countries like Algeria, Egypt, Morocco and Saudi Arabia. Landing in hot-and-high conditions, as well as austere airfields, has only added to the Hercules' popularity, when needing a transport aircraft to visit military outposts and civilian communities.

The Hercules was first seen in the Middle East in 1962, when the Imperial Iranian Air Force (IIAF), under the Shah of Iran, took the first C-130B. More than 250 have been delivered to the region since then.

Today, the bulk of them are still operating, although several have gone through cockpit upgrades with Saudi's Alsalam Aerospace Industries or the UAE's Advanced Military Maintenance, Repair and Overhaul Center (AMMROC).

Spare parts are easily accessible, which is a necessity when an aircraft has an average age of 40. But Lockheed Martin's rule over the tactical transport market has slipped a bit in recent

years because most countries cannot afford to stump up the alleged \$150 million for a new C-130J.

The Hercules might be the best-selling tactical airlifter in the world but, in Africa, the acquisition cost is usually king.

Tunisia is the only north African state to opt for new-generation Hercules; the remainder have been happy to keep their old C-130Bs, C-130Es, C-130Hs and L100s airworthy, even if Lockheed Martin does not issue service bulletins for the likes of the C-130B/Es, meaning air forces have to check them regularly themselves and organise the repairs.

Fatigue with centre wing boxes, where the wings join the fuselage, are the main issues on the older aircraft and sourcing these can be an issue.

The young pretenders to Lockheed Martin's dominance in the market are the Leonardo C-27J and Airbus C295W.

Powered by a pair of Rolls-Royce AE 2100D3 turboshaft engines, engines, the C-27J has a maximum cruise speed of 583km/h and a maximum payload of more than 13,000kg, although standard is 8,000kg.

Leonardo successfully completed first flight-tests of the C-27J battlefield airlifter-configuration aircraft, with new winglets. The aircraft

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More modern: Qatar operates eight C-17A Globemasters IIIs and this example was the last to be delivered. The desert kingdom was the first Middle Eastern state to order the large transport aircraft.



CONTINUED FROM PAGE 39

benefits from better hot-and-high runway performance, increased payload, range and endurance, which should make it more attractive to the MENA air forces. So far, there is only one undisclosed customer, but they are not believed to be from the MENA region.

As well as being a strategic and tactical airlifter, the Italian option can serve as a multi-mission aircraft in electronic surveillance, fire-fighting and search-and-rescue operations.

While there have been sales to African states, Morocco is the only air force in the north to operate the C-27J – four of them – alongside a mixed fleet of old C-130 Hercules and seven CN235Ms.

The C295M, just like the C-27J, is marketed as a tactical airlifter serving the light and medium-lift role. Its two Pratt & Whitney Canada PW127G turboprop engines ensure the aircraft reaches a respectable 576km/h and a cruising speed of 480km/h.

Winglets and uprated engines

The new C295W version is equipped with winglets and uprated engines to deliver an improved performance. Being 41ft 8ins long, it has the longest unobstructed cabin in its class – albeit not as high as the C-27J – and a maximum payload of 9,700kg.

The Middle East's GCC nations have very strong operational links with the US and, not surprisingly, they usually buy American; hence the popularity of the C-130 Hercules and the C-17 Globemaster III in the region.

Bahrain took delivery in November 2018 of a former UK Royal Air Force C-130J, which had been overhauled by Marshalls of Cambridge. A second one is due for delivery soon. And, while six Royal Bahraini Air Force aircrew went to Madrid to train, there are some reports that ex-Pakistan Air Force aircrews will also join the fleet.

Iraq, which had flown mainly Russian transport aircraft until the overthrow of Saddam Hussein, now uses just six C-130Js, delivered in December 2012 and May 2013. Earlier in 2011 and 2012, six Antonov An-32s, ideal for the hot-and-high conditions, had been purchased.

Jordan operates four C-130Hs, delivered between 1978 and 1982. An ex-US Air Force example, delivered in February 1997, was lost in an accident in July 2000.

The two Ilyushin Il-76MFs, acquired in June 2011 and painted in Jordan International Air Cargo titles, were sold to the Egyptian Air Force in July 2019.

Iran still operates a large fleet of around 30 C-130E/Hs, despite military embargoes, because Iran Aircraft Industries (SAHA), working alongside the military, has been able to keep them in the air.

Kuwait's tactical transport capabilities received a significant boost in 2014, when it took delivery of three KC-130Js and two Boeing C-17As. They are believed to be supporting the needs of the Saudi Arabian-led coalition in Yemen.

Kuwait had earlier operated two L-100-20 and four L-100-30s, but they have all been retired.

Oman's tactical transport needs are met by four Airbus C295Ms that entered service in October 2013. They were joined in 2013 by a C-130J-30, and two C-130Js in 2014. There is a second order for two aircraft, made in 2014, that have yet to be delivered.

Qatar operates eight C-17A Globemasters, and was the first country to receive the giant airlifter in the Middle East, working alongside four C-130Js, delivered in 2011.

Saudi Arabia is, this year, celebrating the 50th anniversary of its first C-130 Hercules delivery in December 1969.

Since then, the Royal Saudi Air Force (RSAF)

has gone on to receive a further 10 C-130Es, 35 C-130Hs, three C-130H-30s, eight KC-130Hs, six L100-30s, and two VC-130Hs.

Of those, seven have been lost in accidents and six C-130Es were transferred to the Turkish Air Force.

The legacy Hercules were joined by two KC-130Js in March 2016. They are part of a \$6.7 billion US foreign military sales (FMS) deal, which covers five KC-130Js and 20 C-130Js.

However, no timeframe for the order or delivery of the outstanding aircraft is known. A company spokesman said: "It is an FMS agreement, so we are supporting the US Government in Saudi with the pacing of the deliveries."

Saudi also operates six A330 MRTTs (multirole tanker transports) that have been in service since 2013.

Shift to special operations

Lockheed Martin has seen a shift from airlift and humanitarian-type Hercules sorties to special operations, which led Kuwait and Saudi Arabia to acquire KC-130Js in the region.

A Lockheed Martin spokesman at the 2017 Dubai Airshow said: "Interoperability is a key issue, particularly between foreign operators flying together overseas in places like Yemen and against Islamic State [over Iraq and Syria]."

"On air-to-air refuelling you can't take any receiver and plug into a tanker; it has to be qualified. And, because there are so many nations operating the C-130, Lockheed Martin has qualified several platforms to refuel from it."

The UAE Air Force and Air Defence (UAEAF&AD) also had a requirement for 12 C-130Js, but these discussions seem to have stalled.

The UAE is the biggest operator of the civilian-certified L-100 Hercules; three currently serve the military and three are with the Dubai Air Wing.

Mixed fleet: Morocco operates the Airbus CN235M (seen here), Leonardo C-27J and Lockheed Martin C-130H Hercules.



After years of marketing the C-27J in the UAE, Leonardo lost out to the C295 in November 2017, when the UAEAF&AD announced at the Dubai Airshow that it was to buy five. They were ordered as Airbus was showing off its weaponised C295 version in the static display.

Many of the Hercules are supported by local companies in the Middle East.

Saudi's Alsalam, for example, partners with Boeing and is soon to be part of the Saudi Arabian military industries carrying out maintenance on the RSAF examples.

The Riyadh-based company has also upgraded three VIP Hercules since 2008 – one civilian L-100 and two RSAF C-130s – with new cockpits and elegant new interiors, that include bedrooms and suites, as well as state-of-the-art entertainment and communications systems.

Egyptian C-130s are believed to be overhauled by the air force at Cairo-West, although some work in the past has been carried out at Helwan.

In the UAE, C-130 work is carried out by AMMROC at Abu Dhabi, but will shortly be transferred to the new complex at Al Ain, currently under construction. The company has modernised cockpits of six C-130H/L100-30s to date.

AMMROC is a joint venture between the Emirates Defense Industries Company (EDIC) and Lockheed Martin, and is being primed to overhaul all Hercules, including the C-130Js.

Singapore Technologies Aerospace, Hellenic Aerospace Industries, and Marshalls of Cambridge are all known Middle-East C-130 maintenance companies.

Iraq is currently looking to the latter to overhaul its six C-130Js, which have put in a good turn, supporting operations against Islamic State since being delivered in 2012/13. Several have been hit by mortar fire while supporting military and civilian operations.

Algeria's 14 C-130 Hercules were delivered in

the early 1980s to shuttle cargo and personnel all over the vast state. Unfortunately, the fleet has not fared well and two have been lost in recent years.

On February 11, 2014, a C-130H-30 – serial 7T-WHM – crashed, reportedly due to poor weather conditions, claiming the lives of 77 people on board, including the four flight crew. Then, a C-130H – 7T-WHT – skidded off the runway at Biskra Airport, 450kms south of Algiers, on June 3, 2018, resulting in the seven crew being injured.

That came two months after Algeria's worst ever aviation crash on April 11 2018, when an Il-76 – 7T-WIV – crashed on take-off from its Boufarik base killing 257 people. Three days of national mourning followed.

The Algerian Air Force flies 17 of the lumbering Il-76/78 transport jets, with the bulk of the Il-78 air-to-air refuellers acquired from 2002 onwards.

Tragedy struck

Six Airbus C295Ms were delivered between November 2005 and February 2007, but tragedy struck on November 9, 2012, when one of them crashed into mountains in France, killing all six on board.

The Presidential Transport Squadron at Boufarik has operated two glass-cockpit-configured ATR 72-600s since 2015.

Egypt's air force has the biggest transport fleet in Africa, which is not too surprising given the size of the country and the vastness of the Sinai Desert, where a large scale anti-terrorism operation is ongoing.

It has been operating 24 ageing C-130Hs since 1976 and Lockheed Martin displayed a model of a C-130J in Egyptian Air Force markings at the EDEX show in Cairo in December.

The US giant has been pursuing the Egyptian market for several years and, according to one

source, "is closer to sealing a deal than ever before".

While Lockheed Martin has been pressing for a C-130J deal, Airbus Defence and Space has gone a step further by selling 24 C295s in several batches to Egypt between 2010 and 2016. The C295s are taking some of the workload off of the old Hercules fleet, and utilising its favourable short take-off and landing capabilities compared to the C-130.

After Colonel Gaddafi fell in 2011, the ensuing civil war saw the Libyan Air Force (LAF) splinter and the bulk of the massive transport fleet has all but gone. One of the two huge An-124s was seized in Ukraine in 2011 after the military never settled the maintenance bill, while the whereabouts of the other is unclear.

In early 2011, there were approximately 12 C-130H/L100-30s in the LAF inventory, and several original equipment manufacturers (OEMs) were keen to get them operational. Portugal's OGMA was doing the bulk of the work, but today only a handful are still intact.

A Libyan Dawn Air Force C-130H was shot down by a Libyan National Army MiG-21MF on January 3, 2017, while a L100-30, chartered by Akakus Oil, crashed and exploded after take-off from El Shahrara oilfield on April 29, 2018. Three crew members were killed.

Morocco boasts one of the most modern transport fleets. Four C-27Js fly alongside seven CN235Ms, delivered in 1990. Five Bombardier 415s also double-up as fire-fighting assets, while there are 14 surviving C-130Hs.

Two are air-to-air refuellers, working with Mirage F1Cs and F-5E/Fs, and another is used for electronic warfare work, fitted with a sideways-looking-radar.

The only African-owned C-130Js are operated by the Tunisian Air Force (TAF). They were delivered in 2013 and 2014. As well as the new generation C-130Js, the TAF also flies four ex-USAF C-130Bs and a C-130H. ■

Working towards certification:
The A400M's helicopter air-to-air refuelling capabilities would make it a useful addition to the RSAF inventory.

PICTURE: DGA.



Saudi light transport plans still in the dark

The Royal Saudi Air Force (RSAF) plans for a new light transport aircraft are still very much up in the air. Jon Lake looks at the issues.

There are growing signs that Saudi Arabia may be reconsidering its commitments to the indigenously produced Taqnia An-132D light transport aircraft and may, instead, turn its attention to the larger Airbus A400M.

However, German sanctions, imposed in October 2018 after the killing of journalist Jamal Khashoggi, formalised in March 2019, and recently extended to March 2020, may prevent any near-term procurement. Germany makes components for other countries' export contracts.

The re-capitalisation of Saudi Arabia's transport aircraft fleet was originally thrown into disarray by the ending of Boeing C-17A Globemaster production. Although Saudi Arabia did not order the C-17A before the opportunity to do so disappeared, such an order had been planned, and the aircraft did feature in RSAF future planning documents.

Uncertainty surrounding the C-17A plan had a knock-on effect on the RSAF's efforts to modernise its Hercules fleet. Though the RSAF (which has the largest C-130 fleet outside the United States) operated 52 C-130H/KC-130L-100s (reduced from a peak strength of 65 aircraft), it requested only a possible sale of 20 C-130J-30 aircraft and five KC-130J air refuelling aircraft in 2012 and has, so far, ordered just two KC-130Js.

Many were surprised

When the Antonov/Taqnia An-132 programme was launched in May 2015, many were surprised. The RSAF's most pressing transport aircraft requirement was for a replacement for the Hercules, which carries a 20 tonne payload, and for a larger heavy-lift transport. Yet the An-132D, which is an improved and westernised version of the Antonov An-32, is designed to carry only a 10 tonne payload.

There were criticisms that the An-132D was being pursued for political and industrial reasons rather than to meet an urgent military requirement. With Taqnia and the King Abdulaziz City for Science and Technology (KACST), driving the project, it promised to be the first major indigenous aircraft programme.

The acquisition of elements of Taqnia and KACST by Saudi Arabia Military Industries (SAMI) led to a suspension of the An-132D programme. SAMI CEO, Dr Andreas

Schwer, explained: "The focus of the RSAF (and other local customers) has changed from a 10 tonne payload platform to higher capacity platforms."

The An-132D prototype was rolled out on December 20 2016, and made its first flight on March 31 2017. But plans to build a Taqnia Aeronautics assembly line at Taif have been put on hold, and the An-132D's future is uncertain.

In September 2013, Boeing announced that it was to end C-17 production, and Saudi Arabia was unable to place an order before the close-down of the Long Beach plant was made final. This may, in part, have been because Saudi Arabia favoured the unbuilt C-17B, which featured an extra centre-truck landing gear unit with self-deflating tyres to allow operation from soft and austere runways, as well as double-slotted flaps to allow shorter take offs and landings.

Boeing hoped that the C-17B would be ordered by the US Air Force, allowing the company to extend production. But, when no USAF order was forthcoming, the project was cancelled, and Saudi interest alone was insufficient to save the C-17B.

Boeing did build 13 extra initially unsold C-17As at the end of production, but this number was too small to meet the Saudi requirement, and other customers soon stepped in, further reducing the number available. The RSAF lost its chance to operate the C-17A, with its 77 tonne payload.

In recent years, the RSAF has reportedly turned to the Airbus A400M, which offers tactical capabilities similar to those of the C-130, with a significantly larger 37 tonne payload.

Delays and early development difficulties, including a propeller gear box issue, have now been overcome, and the performance of the A400M in service has been revelatory. The aircraft has demonstrated impressive soft/unprepared/unpaved runway capabilities, and can be quickly configured as a tanker.

The A400M carries up to 50.8 tonnes (111,600lb) of fuel in its wings and centre wing box, and two additional 5.7 tonne cargo hold tanks can also be installed.

The A400M has already demonstrated its ability to refuel tactical and other large aircraft. The type has now successfully completed its first helicopter air-to-air refuelling contacts and final certification of a helicopter air-to-air refuelling capability is expected in 2021. ■

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Major ideology differences with Iran, simmering tension with Turkey in Libya, ongoing war in Yemen, disagreements between Qatar and other GCC members, and the ongoing fight against terrorism, means tension is never far away in the MENA region. Now a new private consortium is stepping into the pilot combat training arena. Alan Warnes reports.

DAWN OF THE RED SKY



The real deal:
The Red Sky consortium has acquired nine Brazilian Air Force Mirage 2000C/Ds.

PICTURE: CHRIS LOFTING.

With so many air forces in the region purchasing new fighters, it is not surprising that a consortium of businessmen, based in the UAE, is set to field a new adversary training service aimed primarily at GCC countries.

Known as Red Sky, the consortium will teach students the skills to fight in today's aerial environment.

The ultimate aim is a specialised, local and independent electronic warfare capability that matches evolving, real-world air-to-air threats.

Xavier Janny, of UAE-based Main Arrow, is working alongside E-Systems Solutions CEO, Habib Boukharouba, in conjunction with South Africa's Council for Scientific and Industrial Research (CSIR).

The latter will provide the scientific electronic warfare knowledge, as well as its vast test facilities.

France's Diginext will also be part of the set-up, to provide the live virtual constructive (LVC) distributed training mission, by connecting tactical data-linked platforms and computer-generated forces. The Aix en Provence-based company is already working with the French armed services.

The consortium's goal has meant a major outlay in capital to buy a set of aircraft that will provide the required air combat training.

A fleet of nine ex-Brazilian Air Force Mirage 2000C/D RDIs has been purchased, which the company will bring to Europe for overhaul before getting them in the air within the next 18 months. They are expected to be working alongside 12 BAE Systems Hawks that are believed to be coming from Jordan.

The Royal Jordanian Air Force recently put its former UAE jets up for sale after they were deemed too expensive to operate. They have been replaced by a fleet of Grob G 120TPs.

To top it all off, Red Sky is set to acquire 12 transonic

drones as it sets up a new ground-breaking manned-unmanned air combat training business.

E-Systems Solutions and CSIR worked together in 2017 to develop the Inundo electronic warfare (EW) pod and fifth-generation net-centric digital radio frequency memory (DRFM) jammer.

The Inundo EW system can be used as a modern platform for test, evaluation and training applications – in air-to-air and air-to-surface environments. It has proven its compatibility on the Hawk, Cheetah and Hawker Hunter, and will feature in Red Sky's concept of operations.

The pod's similarity to the BL-755 store makes Inundo usable to many air operators around the world. The functionality of its various systems, including its electronic warfare payload, has been tested rigorously in various operational flight profiles, including simulating anti-ship missile detection at high speeds and very low altitudes.

By utilising the pod with a CSIR-developed ram air turbine, operating with power from the aircraft's air stream, it is not drawing on the power supply of the host aircraft.

Warfare pods

E-System Solutions' contribution to Red Air has evolved through modern day air-to-air threats, such as instrumented operational electronic warfare pods, as well as operational captive missiles, which will form part of the capability.

Boukharouba said: "Our training solution will cover the full spectrum of combat operations up to the anti-access aerial-denial (A2AD) arena. As part of a phased training approach, we will also introduce highly manoeuvrable transonic drones."

His company is responsible for the payload and mission integration of air-launched transonic drones (ALTD), and the DRFM jammer.

While Boukharouba would disclose few details of the drones, he did say they are in the process of being modified in South Africa, allowing them to be air-launched from the Hawks.

The 1980s-built jet trainers will carry two drones that can manoeuvre like a fighter up to 9G when released.

Bhoukarouba continued: "They are much cheaper to operate than aircraft and, when you put a number in the air, will make a good surrogate. We will be placing a bigger emphasis on the use of manned fighter and unmanned drones combined to LVC in the different complex training scenarios. It should work well."

Red Sky expects most of the Mirage 2000s will be airworthy by the end of 2020 and Boukharouba is very excited by the project: "With their fourth-generation pulse Doppler RDI radars and new tactical data link they will make phenomenal aggressor aircraft." ■



KC-390

READY FOR THE MISSION

EMBRAER DELIVERS THE FIRST KC-390 TO THE BRAZILIAN AIR FORCE

Embraer celebrates the first of 28 deliveries of the KC-390 to the Brazilian Air Force. At the same time, the Portuguese Government signed a contract for the acquisition of five airlifters to be operated by the Portuguese Air Force. This is a significant moment in the KC-390 program, marking, not only its Entry Into Service, but also the confirmation of the aircraft's export potential and operational effectiveness within NATO. This follows an exceptionally thorough campaign in which the aircraft accumulated more than 2,200 hours of flight testing in the most demanding environments, reinforced by thousands of engineering simulation hours. In the coming months the Brazilian Air Force will continue to incorporate additional KC-390 into service. Embraer also looks forward to seeing the aircraft recognized and accepted by other Armed Forces around the world as the natural choice in its field. The combination of 21st century, state-of-the-art advanced systems and proven engines, in conjunction with a worldwide sustainment alliance of reputable suppliers, makes the KC-390 the most reliable, easy to operate and efficient aircraft in its class.

The war in Libya has international backers on opposing sides supporting their own interests. In the first conflict where unmanned aerial systems (UAS) are making up the bulk of the air operations, both sides have successfully attacked opposition aircraft.

Alan Warnes reports.

LIBYA'S DEADLY GAME OF DRONES

Turkey has been propping up the Tripoli-based Government of National Accord (GNA), recognised by the United Nations as Libya's Government.

The GNA is trying to stem the advances of Benghazi's Libyan National Army (LNA), led by Khalifa Haftar and backed by the United Arab Emirates, Egypt and Saudi Arabia, and supported by the USA.

Turkey's President Recep Tayyip Erdogan is a supporter of the Muslim Brotherhood factions within GNA. Along with Qatar, he helped the rise of the organisation in Egypt during 2011, before it was crushed.

This saw both Turkey and Qatar ostracised by former Arab allies Saudi Arabia and the UAE. The latter, alongside Egypt, do not want Erdogan, funded by the Qataris, doing the same in Libya.

Ukraine has joined the Turkey and Qatar side and, according to one source, is now a huge source for weapons.

Against a backdrop of unserviceable old helicopters and combat aircraft, both the GNA and LNA have resorted to fighting each other with armed unmanned air vehicles (UAVs).

The Bayraktar TB2, operated by Turkey but purchased by Qatar, is the GNA's UAV of choice. The drones are thought to have been delivered aboard a ship in May and subsequently split between Misurata and Tripoli-Metiga, with Turkish personnel operating them.

As recently as June 21, the *Libyan Address Journal* reported that eight GNA pilots went to Turkey to learn how to operate the Bayraktar

UAS, although another 12 refused.

The Israeli Orbiter-3 UAS, manufactured by Aeronautics Defense Systems, has also been operated by the GNA, with two of three allegedly delivered to the GNA being shot down at the end of July. The Orbiter-3 can stay airborne for up to seven hours and is used in the intelligence, surveillance, target acquisition and reconnaissance (ISTAR) missions. The drone was probably supplied by another supporting country.

On the opposite side, the LNA troops are being supported by the Wing Loong II, acquired from China by the UAE and Saudi Arabia. The aircraft has been heavily modified with a Thales data-link system and Israeli optics.

Significant attacks

Since April, when Haftar started his march on Tripoli, both the Bayraktar and Wing Loong II have been involved in some significant attacks.

On July 25, several Bayraktars were used to attack and subsequently destroy two Ilyushin Il-76 military transport aircraft operated by Ukraine's Air Europe airfreight company, at Al Jufra Air Base. A hangar was also destroyed at the base, which was being used as a key staging post for supporters of General Haftar's LNA.

Haftar is also believed to have lost many of his top officers in the attack.

The LNA exacted revenge on August 6, when at least one Wing Loong II fired at and destroyed another Ukraine registered Il-76, operated by Cargo Alfa Air. The aircraft had landed at

Misrata Air Base from Ankara, at around 10.30pm, with ammunition and UAVs, when it was hit.

The LNA attacked Misrata twice on August 15 and 16 because, it says, the Turkish have a large presence where the drones are thought to be operating from. A warehouse there, housing Turkish unmanned combat aerial vehicles, was completely destroyed, according to the LNA.

Meanwhile, the attack was condemned by the United Nations Support Mission in Libya (UNSMIL) because of the destruction to the airport and the possible loss of civilian lives.

In a significant milestone in the drone war, a Wing Loong II, operated by the UAE, was taken down by an anti-drone system on August 4.

While flying an armed mission over Misrata, it suddenly plummeted and crashed into the desert, having been targeted by an anti-drone system.

I understand that the Turkish Air Force has been operating Boeing E-7Ts off the coast of Libya to provide signal intelligence (SIGINT) capabilities to Turkish forces on the ground. These aircraft are tracking the Wing Loongs, allowing the Turkish anti-drone systems to be deployed to jam and bring them down.

It is unclear which system was used, although Aselsan, one of Turkey's premier defence companies, has among its range of products, the cost-effective HASAVAR system handheld-backpack anti-drone jammer.

With the proliferation of these armed drones, the race to acquire anti-drone weapons is now on. While the UAE Wing Loongs are being



PICTURE: ALAN WARNES

Winging in: The Chinese-built Wing Loong II is being used by the UAE and its allies to support Haftar's LNA. They have been significantly modified but still use Chinese weapons.

Right: The Bayraktar TB-2 is being operated by Turkish personnel to support the GNA. Several are known to have been destroyed in attacks by the LNA at both Metiga and Misurata.



launched in Libya, they are actually being controlled by operators in ground control stations in the UAE.

The Bayraktar TB2 is the most successful indigenous armed unmanned aerial system built in Turkey. Having earlier produced the prototype Tactical Block 1 (TB-1) in 2005, the Istanbul-based Bayraktar company opted to develop a TB-2 variant for the army, which made its first flight in June 2009.

The first 12 were delivered in two batches – six by November 2014 and another six by June 2015. Initially they were used for the intelligence surveillance reconnaissance (ISR) role with the army, which started testing an armed version in December 2015, with the first firing in June 2016.

Bayraktar company general manager, Lufti Bayraktar, said: "Since the army first fired weapons in combat there has never been any collateral damage. High-quality imaging by the L3 Wescam MX-15D easily distinguishes armed militia from civilians. And the weapon is small, so the impact area is small."

With weight being a critical factor, Roketsan designed the mini smart munition (MAM) with the laser version (MAM-L) now being mounted underneath the UAS. The drone was fitted initially with two pylons, but two more have since been added.

Without weapons it can fly 24 hours; with a full weapons payload for 14 hours. "But that's still a lot," Bayraktar said.

On July 16/17 this year, a Bayraktar TB2

achieved a significant milestone when it flew for 27 hours and three minutes during a demonstration in Kuwait.

There are thought to be 86 armed Bayraktar TB2s operated by Turkey's Gendarmerie General Command, the General Directorate of Security Forces and the National Intelligence Organisation (MIT).

Both Ukraine and Qatar have also bought the Bayraktar TB2, with the latter probably sending them to Libya. Qatar is investing a lot of money into the Turkish systems and Turkey is operating them.

The Bayraktar company was developing a 5-6 ton UAS but has remained tight-lipped about its work since entering the Libyan theatre of operations.

Service in Syria

The Bayraktar UAS saw service in Syria against Daesh, and its MX-15D electro-optical/infrared (EO/IR) turret can 'lase' for attack platforms. However, in Libya it is believed to be doing all the work itself.

China has made a lot of progress with customers in the Middle East and north Africa. The AVIC Wing Loong (Pterodactyl) II is highly sought after.

To date, the China National Aero-Technology Import & Export Corporation (CATIC) has two customers for the unmanned combat air vehicle, Saudi Arabia and the UAE.

The WL II has a total armed payload of 480kg covering three hard points under each wing. Up

to 100kg of weapons can be loaded on the two inside ones, and up to 50kg on the outside.

The 50kg anti-armour Blue Arrow-7 (BA-7) has, until recently, been the weapon of choice and played a massive part in customer campaigns, destroying pick-up trucks etc.

But CATIC is believed to have started replacing them with the smaller 16kg TL-2 bombs, and the two inside weapons pylons can carry three munitions each. A CATIC spokesman said: "You don't need such big weapons as the 50kg BA-7 to hit vehicles, and with TL-2s on board, the Wing Loong II can fly more than 20 hours."

CATIC is also planning to integrate the TY-90 air-to-air missile on to the WLII's outside hard points, which will give the UAV the ability to shoot down helicopters. These attributes should be ringing alarm bells for the GNA.

Another option could be the 50kg laser-guided AG300/M bomb, packed with a 26kg warhead with a longer range than the BA-7, which only has a 8-9kg warhead.

CATIC added: "When firing the BA-7, the WLII has to decrease its height, whereas the AG300/M doesn't because of its longer range. So, the WLII does not need to drop down into the range of the weapons that are being fired at it."

The UAE has significantly altered the Wing Loong IIs for its operations. The datalink has been enhanced with a Thales system, and the electro-opticals have been improved by the Israelis. They are being flown by controllers back in the UAE.

Saudi Arabia's northern oil refinery in Abqaiq and the Khurais oil field were the subject of a dramatic drone attack on September 14. Alan Warnes reports.

Saudi refines security after drone attacks



More back-up: Patriot missile batteries, along with Sentinel ground-based radars, are being rushed to Saudi Arabia in a bid to detect any future UAV and cruise missile attacks.

PICTURE: ALAN WARNES.

Yemen's Iranian-aligned Houthi (Ansar Allah) rebels claim to be behind the attack and Iran has denied any involvement, but both the US and Saudi Arabia believe the missiles were fired from Iran. The Houthis have repeatedly fired rockets, drones and missiles into Saudi Arabia, which is leading an allied strike force to oust them from Yemen.

At the same time, Iran is the subject of crippling US and western sanctions, and the attacks are thought to be part of a strategy to bring down the Saudi economy, along with those of its allies. For several days the price of fuel rose, spreading alarm in the markets, but it has now been pegged back.

Four days after the attack, the Saudi Defence Ministry said 18 'Delta Wave' unmanned air vehicles (UAVs) and seven Quds-1 cruise missiles had been fired from the

north. But intriguingly, the Saudis have not proved that they were fired from Iran.

Iran has never claimed to operate the Quds-1, which is powered by a Czech PBS TJ-100 jet engine. However, the Houthi/Ansar Allah did showcase one in a weapons display on July 7.

One key question is how did these attacks break through without being shot down by the umbrella of US-built Raytheon Patriot PAC-2 surface-to-air (SAM) missile batteries?

Drones and cruise missiles generally have small radar signatures and are easier to manoeuvre close to the ground, thus reducing the detection range of the longer range SAMs.

Although the Abqaiq oil facility is protected by several Shahine short-range missile systems and radar-guided air defence cannons, they are old, not designed to protect against attack from drones or missiles.

Exploit any weakness

Not surprisingly, Russia's President, Vladimir Putin, was keen to exploit any weaknesses in the Patriot system, by inviting the Saudis to Russia to buy the S-400 Triumf system. Turkey has already started taking delivery of the Russian system, which has angered Washington and seen the deterioration in military ties. Iran already operates the S-300.

Alternatively, the Saudis could look at trying to acquire systems that jam the link between the drone and the operator. This recently happened in Libya, when a Turkish system brought down a Chinese Wing Loong II armed drone.

The US undersecretary for policy, John Rood, speaking after the attack said: "NATO has not reworked its missile defence and radar systems to keep up with detecting small fast-moving objects."

The US announced, on September 26, that one Patriot missile defence battery, along with four ground-based Sentinel radars, was being sent to Saudi to improve defences. Personnel specialising in two additional Patriot batteries and one terminal high-altitude area defence system (THAAD) were also given orders to prepare for an imminent deployment. ■

BAHRAIN TO GET ITS OWN PATRIOTS

Bahrain has signed an agreement to purchase its first Patriot surface-to-air missile battery, writes Jon Lake. Crown Prince Salman bin Hamad al-Khalifa made the announcement following a meeting with US President Donald Trump at the White House in September.

The US Army's Patriot system provides defence against ballistic missiles, cruise missiles and aircraft. It has also been supplied to 16 allied nations, including Saudi Arabia, Kuwait, the UAE, and Qatar.

Bahrain had previously been defended by Patriot PAC-3 batteries deployed by the US, but these were removed (along with batteries in Jordan and Kuwait) last year. In May, the US Defense Security Cooperation Agency (DSCA) notified Congress that the State Department had approved a possible foreign

military sale to Bahrain of "various Patriot missile systems and related support and equipment for an estimated cost of \$2.478 billion".

The package requested by Bahrain included two AN/MSQ-132 engagement control stations (ECS), two AN/MPQ-65 radar sets, nine M903 launching stations, five antenna mast groups, 60 Patriot advanced capability-3 (PAC-3) missile segment enhancement (MSE) missiles, and 36 Patriot MIM-104E guidance-enhanced missiles (GEM-T).

On August 13, Raytheon confirmed that Bahrain had signed an agreement to purchase the system from the US Army and that the US Government would now begin contract negotiations with the company for the production of an undisclosed quantity of systems and missiles for Bahrain. ■



Outpacing the evolving threat: Raytheon's Patriot missile system will provide air defence against ballistic and cruise missiles, as well as aircraft.



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Ready for take-off: The first aircraft prepares for its debut flight.



Locally assembled BAE Hawks have become the first new Saudi-built fast jet aircraft to fly in home skies, marking a significant step forward for the kingdom's aerospace industry. Jon Lake reports.

PILLAR HAWK

Under its ambitious 'vision 2030' programme, Saudi Arabia plans to grow and diversify its economy, increasing employment and broadening the economic base, while reducing the country's present heavy reliance on oil.

Creating a sustainable defence industry is a key pillar of the 'thriving economy' which the strategy aims to create.

Saudi Arabia is aiming to manufacture half of its military needs within the kingdom.

The license manufacture or final assembly of aircraft is often emblematic of a maturing indigenous defence/aerospace industry, and Saudi Arabia has had ambitions to assemble military aircraft in the kingdom for many years.

Development and growth

When Saudi Arabia ordered 72 Eurofighter Typhoons in 2007, the programme was seen as a means of stimulating the development and growth of an indigenous Saudi aerospace and defence industry, by ensuring a high level of local industrial participation.

For speed, the first 24 Typhoons ordered for the Royal Saudi Air Force (RSAF) were diverted from a UK RAF order, and were delivered from BAE Systems' Warton final assembly line. But the remaining 48 aircraft were to be completed on a new Typhoon

assembly line at Taif and operated by the Alsalam Aircraft Company.

These plans were changed because Alsalam had been formed as a joint venture between Saudi Arabian Airways, the Saudi Advanced Industries Company, and BAE's great rival, Boeing, which still had a majority stake in the company.

Accordingly, the decision was taken to establish a new BAE-operated final assembly facility (known as the Typhoon technical zone) within a new BAE Systems-built, RSAF-owned maintenance facility at King Abdulaziz Air Base, Dhahran in the eastern sector.

Local assembly of Saudi Typhoons was scheduled to begin in the 'second quarter' of 2010, with deliveries beginning in 2011.

But, despite an August 2010 announcement by BAE Systems that a military aircraft assembling plant would shortly be established in the kingdom, plans for local assembly were abandoned.

Instead, the Saudis were persuaded that local participation in Typhoon through-life support would be more realistic, and more beneficial, than final assembly. Accordingly, a maintenance and upgrade facility replaced the planned final assembly line.

The RSAF is a long-standing Hawk operator, having taken delivery of 30 Hawk Mk 65s from August 1987 and 20 Hawk Mk 65As from March

1997. The RSAF ordered 22 Hawk Mk 165 Advanced Jet Trainer (AJT) aircraft in May 2012 as part of the Saudi British defence cooperation programme. These aircraft were delivered from the BAE Systems factory at Warton between 2016-2018.

The RSAF ordered 22 more Hawk Mk 165s in February 2015.

It specified that final assembly of these aircraft would be carried out in the kingdom, using a new Hawk aircraft final assembly line established in the former Tornado programme depth maintenance upgrade (TPDMU) facility.

These are believed to represent the first manned aircraft to be assembled in the kingdom.

Major sub-assemblies

The aircraft are delivered as major sub-assemblies, consisting of the fuselage, wing, tail plane and fin.

These 'kits' are airfreighted from Warton to Dhahran, where they are then assembled for the first time to become a complete aircraft.

The new Hawk In-Kingdom Final Assembly (IKFA) facility performs final assembly, testing, flight-testing, painting, acceptance and delivery to the RSAF.

The flight-testing work is undertaken by BAE Systems aircrew, led by BAE Systems Saudi



Sign here: Crown Prince Mohammed bin Salman signs the forward fuselage.

Arabia chief test pilot, Andy Blythe. Once each aircraft is declared off-test, a RSAF pilot performs a customer acceptance flight.

More than 70% of personnel in the IKFA facility are Saudi nationals, while some 25 Saudi companies helped establish the facility, and support the Hawk supply and logistics chain. The aircraft, reportedly, incorporate some local content.

The first delivery of Hawk 165 parts to Dhahran took place in October 2017. Blythe made the initial flight of the Saudi-assembled Hawk 165 in November 2018.

First deliveries from the new Saudi Hawk production line had originally been expected to begin in the third quarter of 2018, but the first of the 22 domestically manufactured Hawk Mk 165s (coincidentally the 1,000th Hawk built) was ceremonially rolled out on April 1 2019 at Dhahran.

This marked the official inauguration of the first Saudi-assembled Hawk 165.

The roll-out was attended by Crown Prince Mohammed bin Salman, deputy prime minister and minister of defence, and the driving force behind the 'vision 2030' programme.

The crown prince was briefed and met many of the Saudi assembly line workers before formally unveiling the aircraft and signing the forward fuselage. ■

He later gave permission for the new aircraft to take off. Straying slightly from strict R/T procedure, he said: "In the name of Allah and His blessings, Soar high over the most beloved land."

Following this ceremony, the first delivery to the RSAF was made in June 2019. Seven aircraft had flown by October 2019, and the final kits for assembly by the Hawk IKFA were delivered later in October.

The final aircraft is scheduled to be delivered to the customer before the end of 2020.

On March 9 2018, a memorandum of intent for an additional 48 Typhoons was signed during the crown prince's visit to the UK, and most of these are expected to be assembled locally.

Skills transferred

"The skills transferred and experience gained in establishing a Hawk assembly capability in the kingdom puts Saudi Arabia in a good place for whatever follow-on contracts are awarded," said a senior BAE Systems source.

With the assembly and license manufacture of Sikorsky S-70s, Antonov/Taqnia An-132Ds, and the conversion of Boeing F-15S strike fighters to F-15SR standard, Saudi Arabia's aerospace industry is rapidly building up the experience and expertise necessary to move on to its next goal – to produce an indigenously developed aircraft in the mid-2030s. ■

TURKISH ACQUISITION OF F-35 IS SUSPENDED

The US Government suspended Turkey from the F-35 programme in July 2019 following Turkey's acceptance of the Russian-made S-400 air surface-to-air missile system, writes Jon Lake.

The White House issued a statement explaining: "Turkey's decision to purchase Russian S-400 air defence systems renders its continued involvement with the F-35 impossible. The F-35 cannot coexist with a Russian intelligence collection platform that will be used to learn about its advanced capabilities.

"Turkey has been a longstanding and trusted partner and NATO ally for more than 65 years, but accepting the S-400 undermines the commitments all NATO allies made to each other to move away from Russian systems."

The suspension means cancelling Turkish orders for 100 F-35As, stopping an ongoing training programme, and preventing the transfer to Turkey of the first four aircraft that had been completed and accepted and that were in use for training in the USA.

Though Turkey formally owns these aircraft, the US has effectively confiscated them in order to prevent them being delivered. Turkish F-35 personnel were informed that they must leave the US by the end of July, including 20 officers assigned to the Joint Program Office.

□□□□□

Turkey will lose its F-35 production work by March 2020, and a planned engine overhaul centre will now not be built.

With eight Turkish defence companies producing 937 parts for the F-35 – 400 of them being sole-sourced – it was estimated that this will lead to a \$9 billion loss to the Turkish economy over the life of the programme.

A number of senior US personnel, including Secretary of Defense, Mark Esper, and US Under Secretary of Defense for Acquisition and Sustainment, Ellen M Lord, have suggested that Turkey could re-join the programme if the S-400 was removed from Turkish soil.

The US has reportedly offered to sell the Patriot missile defence system to Turkey in its place, while also promising lower tariffs on steel and aluminium as part of a new economic package intended to boost bilateral trade from the current \$19-20 billion to \$100 billion.

But Turkey does have other options and, since July, Russia has strongly promoted its own fighters.

On August 27 2019, at the Russian MAKS Air Show, President Vladimir Putin and Turkey's President Recep Tayyip Erdogan agreed to cooperate in the aviation, space technology, and the defence industry sectors, and Erdogan was briefed on the Sukhoi Su-35 and Su-57 fighters, and the Kamov Ka-62 and Mil Mi-38 helicopters. ■



Effectively confiscated: The four F-35As handed over to the Turkish Air Force for training in the US will not be delivered to Turkey.

Jordan is holding something of a super sale of military aircraft that are surplus to its current requirements. David Oliver reports.

Jordan aims to balance books with aircraft sale



Top: Two RJAF AC235 gunships, converted by ATK and KADDB, are for sale.

Above: The RJAF is disposing of its Chinese armed CH-4B MALE UAVs.

PICTURES: DAVID OLIVER

The Hashemite Kingdom of Jordan has been in the front line of Middle East conflicts for decades. More recently it has played a pivotal role in coalition operations against ISIL militants in neighbouring Syria and Iraq.

With no oil and limited resources, Jordan has had to face the challenge of maintaining its defence spending.

Although it has been bolstered by the United States and the hosting of coalition fighter aircraft, this year Jordan has had to reappraise the size and strength of its air force.

In order to balance the defence budget and sustain its large fleet of F-16 fighter aircraft, in June this year Jordan's armed forces posted its intention to sell 23 fixed-wing aircraft.

The sale includes two Airbus C295 medium transport aircraft and one Lockheed C-130B, operated by 3 Squadron at Amman-Marka; two CASA AC235 gunships, modified by ATK in conjunction with the King Abdullah II Design and Development Bureau (KADDB) and operated by 32 Squadron; and 12 former UAE Air Force BAe Hawk Mk.63s that have been replaced by the Pilatus P-21 in the advanced and tactical training roles with 11 Squadron, based at Mafrq.

Jordan has also sold two Ilyushin Il-76MF heavy transports, operated by Jordan International Air Cargo, which was founded in 2004 and owned and operated by the Royal Jordanian Air Force (RJAF).

Earlier this year, the Russian arms trade agency, Rosoboronexport, confirmed that it had approved the resale

of two Ilyushin Il-76MF military transports from Jordan to Egypt.

The Egyptian Air Force will become the only operator of the Il-76MF, a stretched version of the Soviet-era Il-76MD transport.

Six RJAF CH-4B armed unmanned aerial vehicles (UAVs), which are in service with No 9 Squadron at Prince Hassan Air Base, have also been offered for sale by Jordan. The aircraft operate alongside Schiebel S-100 Camcopter vertical take-off and landing (VTOL) UAVs, which will be retained.

Designed by the China Aerospace Science and Technology Corporation (CASC), the medium-altitude long-range (MALE) CH-4B is in service with the armed force of neighbouring Saudi Arabia. Eight UH-60L Black Hawk helicopters are also up for sale as new UH-60Ms have been delivered for service with the RJAF's 8 Squadron.

The UH-60Ls were operated by Joint Special Operation Command (JSOC) on special forces duties alongside six armed MD 530 Little Bird helicopters that are also for sale. In 2018, Jordan had offered 17 of its fleet of 48 AH-1F/S Cobra attack helicopters for sale, along with spare parts. The fleet includes 16 former Israel Defence Forces/Air Force AH-1 Tzefas that were donated by Israel to Jordan in 2015 to help fight Islamic State militants in Syria.

Modernisation programme

A sign of the RJAF's wide-ranging modernisation programme is the comprehensive upgrade of 12 of its extant Cobra fleet carried out by Science & Engineering Services (SES) at its Huntsville facility in Alabama.

The upgrade includes a new glass cockpit based on the Northrop Grumman Integrated Avionics System; an L3 Wescam MD-15D multi-sensor multispectral targeting system replacing the laser rangefinder and tracker; and a passive self-defence suite, comprising the Orbital ATK AAR-47 missile approach warning (MAW) system and active countermeasures, including the Extant Aerospace ALE-47 chaff/flare dispensers.

Automatic stabilisation equipment (ASE) and Rockwell Collins ARC programmable digital communication systems will also be installed.

The SES upgrade includes Lockheed Martin M310 AGM 114R Hellfire launchers, in addition to 70mm unguided rocket launchers.

The RJAF plans to install software for the use of the BAE Systems advanced precision kill weapon system (APKWS) when the last of the upgraded Cobras are delivered to 10 Squadron at King Abdullah II Air Base.

Following a state visit to Kenya by Jordan's King Abdullah, there was the signing of a military training and cooperation pact between the two countries and the acquisition of two (although some reports claim up to six) AH-1F Cobra attack helicopters from the RJAF.

The Philippines and Jordan have had a long diplomatic relationship and, after President Rodrigo Duterte's visit to Jordan in 2018, both sides placed attention on the shared threat of terrorism. A new memorandum of understanding (MoU) on defence cooperation was signed between the Philippines Department of National Defense (DND) and the Jordan Armed Forces, which means that two ex-RJAF AH-1Fs will be delivered to the Philippine Air Force. ■



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The Qatar Emiri Air Force has now received three batches of Dassault Rafales, totalling 15 aircraft, and the first squadron is working up at the new Tamim Air Base at Dukhan in western Qatar. Jon Lake reports.

NEW SQUADRON IS RAFALE PRIZE FOR QATAR

Qatar originally signed a €6.3 billion (\$6.92bn) memorandum of understanding covering the supply of 24 Rafales (six of them two-seat trainers) in May 2015, on the opening day of the Doha International Maritime Defence Exhibition and Conference (DIMDEX).

Its purchase of the Rafale follows earlier acquisitions of the Dassault Mirage F1, the Alpha Jet and Mirage 2000.

Qatar paid a deposit for the Rafales on December 16 2015, reportedly funded by Japanese banks.

Twelve more Rafales were added to the original order in December 2017 and Qatar retains an option to buy up to 36 more.

The first Qatari Rafale, a two-seater, made its maiden flight from Bordeaux-Merignac, in France, on June 28 2016, and the country's initial single-seat Rafale EQ took off for the first time on March 27 2017. These early aircraft were quickly transferred to the French Air Force flight-test centre at Istres Airbase for testing.

Laserdesignatorpod

Qatar's Rafales differ in detail from those delivered to France and Egypt, and incorporate a Lockheed Martin Sniper laser designator pod instead of the French Thales Damocles or the new Thales Talios pod (now under development). Sniper is already flying on an Armée de l'Air Rafale test aircraft.

The Qatari Rafales also have provision for an Elbit Systems TARGO-II helmet-mounted target designation system.

The aircraft are being supplied with MBDA MICA infrared, MICA EM, and Meteor air-to-air missiles, and with MBDA SCALP-EG cruise missiles, as well as a range of air-to-ground weapons, including laser- and GPS-guided Safran AASM Hammer missiles.

Under its mission of support for exports (soutex) programme, the French Armée de l'Air is training 250 personnel, who will make up the first Qatari Rafale squadron, including 36 pilots and 100 engineers and technicians.

The Armée de l'Air stood up a Qatari Rafale training unit as Escadron de Chasse 4/30 at Base Aérienne 118 Mont-de-Marsan in the Landes department of the Nouvelle-Aquitaine region in south-western France on October 1 2017. The unit was initially led by a French officer, before command transferred to a Qatari officer in 2019.

Some Qatar Emiri Air Force personnel were also trained at Rochefort and at the Joint Intelligence Training Institute in Strasbourg.



Flying high: The new Qatar Emiri Air Force Rafales.

The new Qatari Rafale squadron was named 'Al Adiyat' (after a surah in the Koran) during a ceremonial handover ceremony at Dassault's Merignac facility on February 6 2019, when the unit's squadron badge (a stylised Arab stallion's head) was also unveiled.

Qatar received its first batch of five Rafale fighters on May 5, with four EQ single-seaters and a single DQ dual-control trainer flying directly to the island nation from BA125 Istres/Le Tubé, supported by an Armée de l'Air A330MRTT Phénix and a KC-135 Stratotanker.

The Rafales each carried three external fuel tanks and their arrival was timed to coincide with a ceremony commemorating the opening of the new Tamim Air Base at Dukhan. That ceremony was attended by Amir Sheikh Tamim bin Hamad al-Thani and HE the Deputy Prime Minister and Minister of State for Defence Affairs, Dr Khalid bin Mohamed al-Attiyah, who welcomed the aircraft and pilots home.

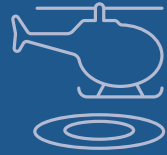
A second batch of Rafales (consisting of two Rafale DQ two-seat trainer versions and three Rafale EQ single-seaters) was delivered on July 3 2019, flying from Bordeaux/Merignac.

A third batch of Rafales, all single-seaters, flew from Bordeaux/Merignac to Qatar on September 3 2019.

The Al Adiyat is due to fully transfer to Qatar in the summer of 2020. ■

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Bang on schedule: Typhoon's new Captor-E development continues apace.



THE SMART PHOON...

Eurofighter Typhoon aircraft for Kuwait and Qatar will incorporate an advanced active electronically scanned array (AESA) radar that is claimed to be the most advanced in the world.

Jon Lake reports.

In April 2016, Eurofighter and Finmeccanica (now Leonardo) signed an \$8.7 billion contract with Kuwait for the delivery of 28 aircraft, including six two-seat trainers, from 2019.

Qatar then signed a contract with the UK for 24 aircraft in December 2017, with deliveries due to start in 2022.

The aircraft now being built for delivery will be more advanced than those for the British RAF, the German Luftwaffe, the Italian AMI, and Spain's Ejército del Aire.

The Kuwaiti and Qatari Typhoons will have sensors and weapons that are not in service with the partner nation air forces, including the Lockheed Martin Sniper advanced targeting pod (ATP).

While the four "core nations" have conspicuously failed to sign up to acquire an AESA radar, Kuwait and Qatar have insisted that their aircraft will incorporate this vital technology.

Eurofighter GmbH and the partner companies have worked to ensure that the phase 3B enhancement (P3EB) package is compatible with the new electronically scanned (E-scan) Captor-E radar in its initial radar one plus baseline production standard.

The Euroradar consortium (Leonardo, Hensoldt and Indra) has secured production build contracts for 28 E-scan radars from Eurofighter/Leonardo Aircraft, as the prime contractor for Kuwait, and for 24 radars from BAE Systems, as the prime contractor for Qatar.

Less vulnerable

Captor-E is something of a hybrid, having a conventional E-scan array mounted on a rotating mechanical swashplate repositioner.

This increases its angle of regard from about +/-60° on each side of the centreline to greater than 90°, meaning that a fighter can 'crank' or turn away harder after launching a beyond-visual-range (BVR) missile, making it less vulnerable to a return missile shot, while still using its radar to provide mid-course updates for the missile fired.

The Captor-E radar has flown on test aircraft at BAE Systems Warton and Airbus Defence and Space in Manching, using production-standard software. It passed

its critical design review (CDR) exactly on schedule and the design has been frozen, while software is still being developed and matured through flight-testing.

Leonardo sources are confident that deliveries to the prime contractors will allow the radar to be fully integrated with the Eurofighter weapons system in plenty of time to ensure that the Kuwaiti and Qatari Typhoons will have an E-scan radar fitted from day one.

The full operational capability of the Captor-E will be delivered as part of the next stage of enhancements for the Typhoon, known as P4E, from about 2021.

Best possible protection

■ Meanwhile, Mark Hewer, Leonardo's vice president for the integrated mission solutions business area, has said that the company's rapidly reprogrammable electronic warfare (EW) systems provide tactical aircraft with the best possible protection in a dynamic and changing threat environment.

Hewer believes that agile, evolving EW systems, typified by Leonardo's open/reprogrammable EW suite for the Typhoon, represent a kind of 'digital stealth', and that they confer a hitherto unknown degree of survivability.

The Typhoon's EW system is undergoing a continuous evolution, with regular upgrades to the hardware and a spiral software development process.

Having open/reprogrammable mission data makes the integration of new EW system elements easier and more effective, allowing Typhoon to better exploit the capabilities offered by the new BriteCloud decoy, for example.

Mission data allows the right threat intelligence (including threat vulnerabilities) to be loaded into the system. It is used to interpret the information that the sensors receive, predicting a threat system's behaviours and vulnerabilities.

Hewer believes that reprogrammable mission data represents a major competitive advantage for Leonardo, and for the Typhoon.

"There's no point in directing your electronic countermeasure (ECM) if it is going to be ineffective against that threat because you're not exploiting its vulnerabilities," he pointed out. ■

QATAR BUILDS UP FOR NH90 WITH TRAINING FACILITY



Gun carriage: A RAFO NH90 TTH lifting a 105mm gun underslung load during SS3.

PICTURE: DAVID OLIVER.

A new training centre facility is being designed and built in Qatar after it became the second Middle East country to order the European twin-engine NH90 medium helicopter, writes *David Oliver*.

The new NH90 training centre facility is being designed and built by CAE.

It will include CAE 3000 Series NH90 TTH and NFH full-mission simulators (FMSs), a NFH rear-crew trainer for training tactical coordinators (TACCO) and sensor operators, capable of networking with the FMSs to provide full-crew mission training.

It will also have Simfinity NH90 integrated procedures trainers for both TTH and NFH configurations, plus a winch and door gunner trainer and a NH90 virtual maintenance training system (VMT) classroom.

Following delivery of the training centre facility and NH90 training devices in 2021/2022, CAE will provide training support services, including classroom and simulator instructors.

CAE will also design and develop a tactical control centre to be used for managing networked mission training exercises.



When Qatar became the second Middle East country (after Oman) to order 28 NH90 helicopters, it took the total order book for the type to 543 aircraft.

Combat-proven in many theatres of operation worldwide, The Royal Air Force of Oman (RAFO) had also proved that the NH90 was well suited for operations in the most demanding climatic and terrain conditions.

Qatar signed a contract for the purchase of 28 NH90 helicopters – 16 Tactical Transport Helicopters (TTHs) and 12 Naval Frigate Helicopter (NFH) variants – last year to replace the Qatar Emiri Air Force 9 Squadron's Westland Commando Mk.3 Sea Kings.

Leonardo is prime contractor for the programme management and Airbus is responsible for the final assembly and delivery of the NH90 TTHs from its facility in Marignane, France.

Leonardo will be responsible for final assembly and delivery of the NFH variants from its Venice – Tessera facility in Italy. ■

\$1.5BN APACHE DEAL FOR MOROCCO

Morocco has requested the supply of 24 Boeing AH-64E Apache Guardian attack helicopters from the United States at a reported cost of \$1.5 billion, writes *Jon Lake*.

The deal was revealed in the US Government's country commercial guide listings.

This was the first official confirmation that Morocco has requested Apaches, and the first time that the quantity of aircraft has been specified.

The helicopters are reportedly due to be delivered within the next two years.



Acquisition of the Apache will form one element in a wider defence modernisation and re-equipment programme for Morocco, which is looking to expand its defence budget to \$3.9 billion by 2022. The budget totalled \$3.5 billion in 2018, having increased from \$3.2 billion in 2012.

Morocco reportedly began negotiating for the Apaches in April 2018. Royal Moroccan Armed Forces Chief of Staff, General Abdelfattah Louarak, was briefed on the helicopter when he visited the United States that month.

Morocco finally selected the Apache after rejecting the TAI T129, which authorities considered



Coming soon: The AH-64 Apache will bring new capabilities to the Royal Moroccan Air Force and Army Aviation.

had "not satisfied expectations" during a Syrian deployment.

Morocco will become the second African country to operate the Apache, after Egypt, and is expected to use the aircraft for border protection and to stop illegal migration, smuggling and drug trafficking. They will replace ageing Aerospatiale Gazelles, currently being flown by the Royal Moroccan Air Force and Army Aviation.

Egypt has a fleet of 46 AH-64Ds in service, with 10 more AH-64Es on order.

Across the wider MENA region, the Apache is also used by Saudi Arabia, which took delivery of 12

aircraft in 1992, and 12 more in 2008, before ordering 36 AH-64Es in 2010. The AH-64 is also operated by Kuwait, which purchased 16 AH-64D Longbow Apache helicopters in 2005, and by Qatar, which requested the sale of 24 AH-64Es in 2012, concluding the sale in March 2014 with deliveries beginning this year.

The type is also operated by the UAE, which purchased 30 AH-64As in 1991 and 1994, upgrading these to AH-64D standards in 2008.

The UAE is buying nine new-build AH-64E helicopters and will re-manufacture 28 D-models to the new standard. ■



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Airbus Corporate Jets (ACJ) is looking for an upsurge in sales, especially the Middle East, as its new engine option (neo) aircraft – particularly the ACJ320neo family – start to enter into service. Dave Calderwood reports.

Airbus targets corporate jets neo boost in the region



Making its debut: The first ACJ320neo was delivered in 'green' out-of-the-factory condition to the UK's Acropolis Aviation in January 2019.

New aircraft, such as the ACJ319neo and ACJ320neo, feature the new engines and wingtip-mounted sharklets, enabling even longer intercontinental flights, as well as a 15% saving in fuel and reduced operating costs.

The improvements mean that the ACJ319neo can fly eight passengers 6,750nm/12,500km or more than 15 hours, while the ACJ320neo can transport 25 passengers 6,000nm/11,100km or more than 13 hours.

The ACJ320 family also delivers features promised by the latest business jets, such as enhanced fly-by-wire controls with envelope protection, cost-saving centralised maintenance, and weight-saving carbon fibre composite materials.

"Our continued investment in creating the best in-flight experience means that we are now delivering a great cabin that has the even better range and economy of the ACJ319neo and ACJ320neo," said ACJ president, Benoit Defforge.

The Middle East is a vital market for ACJ – it's where Airbus sold its first corporate jet in the mid-1980s.

There are around 60 ACJs currently flying in the Middle East, mostly ACJ320 family aircraft – around 40 – and 20 VIP wide-bodies. Many of these aircraft, particularly in Saudi Arabia, are coming up for renewal and, thus, open up opportunities for the latest ACJs, not only the A320neo but also the ACJ330neo and ACJ350 XWB wide-bodies.

The first ACJ320neo was delivered in 'green' out-of-the-factory condition to the UK's Acropolis Aviation in January 2019, and went straight into cabin outfitting with experienced completion centre, AMAC Aerospace, at

Basel, Switzerland. It will receive a VIP cabin designed by Alberto Pinto in Acropolis Aviation colours.

The first flying ACJ319neo – likely to be ACJ's best-selling type – successfully completed its first flight in April and then, two days later, completed a 16hr and 10min test-flight, a new record for the longest A320 family flight by an Airbus crew.

The aircraft flew from Toulouse to northern Greenland and back, in an endurance flight that included a simulated diversion under 180-minute extended range twin operations (ETOPS) rules, for which the A320 airliner family is already certificated.

This aircraft is due to be delivered to K5 Aviation of Germany this year, after ACJ319neo flight-trials are completed.

K5 Aviation's ACJ319neo is fitted with five additional centre tanks in its cargo hold, and includes improvements, such as a lower cabin-altitude for greater passenger comfort. It will be outfitted with a VVIP cabin by Fokker Technik in the Netherlands.

ACJ is well aware of the issues of outfitting an aircraft with a composite fuselage, so prepared for the introduction of the twin-engine long-range ACJ350 with the introduction of an 'EasyFit' package. The carbon fibre fuselage of the ACJ350 comes pre-equipped with hundreds of attachment points, simplifying the work of cabin outfitters at completion centres.

The company has also worked extensively with several cabin outfitters to ensure smooth completions for customers.

The package was developed with the assistance of ACJ's advisory board, which is headed by Konstantin Essler, chief operating officer of MJet, a busy ACJ operator.

The ACJ350 XWB is enormous with 270sqm/910sqft of cabin space in the -900 version. It can fly 25 passengers up to 10,800nm/20,000km or for 22 hours, making it one of the most capable corporate jets.

The first government customer is Germany, which has ordered three for a mix of government, troop transport and medical evacuation roles. Delivery of the first aircraft is planned for 2020, and the other two in 2022.

ACJ is also in discussion with potential Middle East customers. "We have several discussions ongoing, both on the private side and the government side for the Middle East," said Defforge earlier this year.

"It's new technology compared to the [Boeing] 777, which is an old-fashioned aircraft, so the A350 is the most modern twin-aisle aircraft in the market and will be a big success."



Benoit Defforge: "We are now delivering a great cabin that has even better range and economy."



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Dubai's aerospace hub starts to make some noise

A change of thinking on the future development of Dubai World Central, the intended world hub for aviation, has stepped up interest in the aviation district – now renamed the Mohammad bin Rashid Aerospace Hub.

Dave Calderwood reports.

The aerospace hub is a 6.7sqkm corner of the total 145sqkm Dubai South, the flagship project for the UAE. However, the hub, opened by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Ruler of Dubai, in January, has the aim of creating a value chain for the aerospace sector and increasing the contribution of advanced industries to the Emirate's economic growth.

It is home to a VIP terminal for leading fixed-base operators (FBOs) for business and private aviation, including Falcon Aviation, Jetex, and Jet Aviation, and has a dedicated education and research and development (R&D) cluster aimed at building a comprehensive aviation campus. It is also home to the E2 Event and Exhibition Centre, a dedicated exhibition zone and permanent home of the Dubai Airshow and the Emirates Flight Academy.

So far AED 17 billion (\$4.63bn) has been invested by government and the private sector.

Aerospace capital

At the hub opening, HE Khalifa Al Zaffin, executive chairman of Dubai Aviation City Corporation (DACC) and Dubai South, said: "The Mohammed Bin Rashid Aerospace Hub remains committed to elevating Dubai as the region's aerospace capital by ensuring that we advance through excellence and deliver value that will benefit millions."

The opening was followed in May by the first step towards the launch of the Dubai Air Navigation Services (DANS) training facility, the signing of a lease.

The DANS facility will offer a range of training courses that address technical, operational and theoretical subjects in air traffic management (ATM) for both newcomers to the industry and those moving up.

DWC has been hit by a number of factors recently including trade spats, stock market falls, changes in the way people are flying – and even the type of aircraft being operated.

The end of Airbus A380 production requires a rethink of a mega-hub at DWC, as the facility is known, according to Tim Clark, chief executive of Emirates. The carrier would have had 200 Airbus A380s at DWC by 2035 but now its requirements have changed.

"Without them, the airport design changes completely," said Clark. "So we have to stop there and rethink."

The Dubai Government plan to build DWC to an eventual capacity of 250 million passengers annually has been placed on the backburner, with completion of the next phase pushed back five years to 2030.

Long-term masterplan

"Dubai Airports is currently reviewing its long-term masterplan to ensure infrastructure development takes full advantage of emerging technologies, responds to consumer trends and preferences and optimises investment to grow its already significant contributions to Dubai's economy. The exact timelines and details of next steps are not as yet finalised," said a government statement.

So, while DWC as a project takes a step back, the aerospace hub is gaining momentum.

Tahnoon Saif, CEO, Dubai South, said: "We are focusing on MRO for commercial airlines. We have partners like Lufthansa Technik.

"They started with us less than three years ago and they have expanded to twice the size in the last year and are in discussions to expand further.

"We are expecting by 2030 to have the hub completed. So far we have 30% of the infrastructure developed – we're ahead by four years so far."

Oh, and let's not forget Expo2020, the first time this world expo event will have come to the Middle East. The expo celebrates culture, collaboration and innovation, and will be staged over 173 days from October 20 2020 to April 10 2021 at Dubai South. ■

Industry leaders converged on Morocco for the Middle East and North Africa Business Aviation Association (MEBAA) conference and show at Marrakech Menara Airport in late September. Vincent Chappard was there.

Talent supply chain the key to future sustainability

This third edition of MEBAA Morocco offered an ideal platform for business aviation suppliers, service providers and buyers to network and tap new opportunities in the region.

According to an International Air Transport Association (IATA) source, there will be 175,000 business aircraft movements in the MENA region by 2020.

Meanwhile, Bombardier anticipates 200 jets to be delivered to Africa by 2025.

Flight hour activity within the African region went up during two consecutive quarters in 2018, taking flight activity to the highest level since 2008.

Morocco sits strategically between the European, Middle Eastern and African markets as a pivotal destination, both in terms of geography and capability. The Moroccan Airports Authority (ONDA) reports that the country's airports manage 50% of north Africa's business jet movements.

The country recorded a growth of 6% in business aviation passengers and 9% in business aviation movements between 2016 and 2018. There are currently 70 business and private aviation operators in Morocco.

Mohammed Sajid, Minister of Tourism, Air Transport, Crafts and Social Economy, reiterated

Morocco's support to business aviation during the opening ceremony. "Today, many new companies are operating in this sector. The aviation industry in Morocco has been witnessing considerable growth since it signed 'open sky' agreements with both Europe and the United States. This has enabled a certain number of major companies to operate in Morocco and serve our main tourist destinations," he said.

Ali Ahmed Alnaqbi, founding and executive chairman of MEBAA, addressed the main challenges facing business aviation.

Fresh blood

"One important issue is sustainability of business aviation. In future, there will be people retiring. There is no injection of fresh blood in our industry and that is why we are specifically targeting universities and colleges to highlight one of the main challenges in business aviation and aviation in general."

Nouredine Mouaddib, president of Rabat International University, made an appeal to tackle challenges regarding human resources development in aviation. The number of commercial flights and passengers (4.1 billion) should double by 2030. Over the next two

decades, the high demand for a qualified aeronautical workforce, such as pilots, air traffic controllers, maintenance technicians and cabin crew, will need to be correlated with aircraft delivery plans.

According to the International Civil Aviation Organization (ICAO) the latest studies show that, by 2037, air transport in Africa will require more than 23,000 additional pilots, 4,200 air traffic controllers, 28,000 MRO technicians and 37,000 new cabin crews.

For Mouaddib, growth in the number of people trained is not happening at the same pace as increases in air transport. Consequently, many sectors will know huge tension.

There's a need to identify ways to attract and train budding talents to feed the aviation industry so that it can perform efficiently, he argued, adding that people were turning to competing high-tech roles, which looked more exciting and had interesting salaries.

The university cannot work alone; it needs the support of professionals of our industry, he concluded.

The MEBAA event highlighted innovation opportunities such as big data and blockchain.

For Ghita Mezzour, associate director of the

NEW FBO SET FOR MARRAKECH LAUNCH

A new experience awaits business aviation passengers by the end of the year at Marrakech Airport.

The Jetex and Swissport Executive fixed-base operation (FBO) is nearing completion. Marrakech represents 50% of business aviation traffic in Morocco.

Christophe de Figueiredo, CEO of Swissport Morocco, said the new FBO services would bring a clear improvement in the quality.

For Julian Pitaresi, Jetex Morocco stations manager, the new facility be the highlight of three years of existence in Morocco.

"We needed a structure to absorb the demand (8,000 flights per year in Morocco, including nearly half for Marrakech) and to satisfy the customers," he explained.

Marrakech will be the first independent terminal (out of the flow of commercial passengers) in Morocco. It is also the first time that private aviation companies in the sector will have invested 100% in an FBO. ■



Julian Pitaresi: New facility will be highlight for Jetex.

Regional operators

MEBAA Morocco showcased new operators in the region like Sarah Airways, Amac Aerospace, Carthage Sky Services and Firas Aero.

Air Ocean Morocco and Heliconia Aero Solutions were also present, as well as Dassault Aviation, with a Falcon 900XL on the static.

Sarah Airways specialises in VIP private transport and medical evacuation. The company recently added a third aircraft to its fleet and preparations for a fourth one are being finalised. Khalid Serghat, its founder and CEO, sees opportunities, not only in Morocco but also in Africa, Europe and, in the coming years, in the Middle East and for transatlantic flights.



Amac Aerospace was making its debut at the show. According to its executive group chairman and CEO, Kadri Muhaddin, this event is a testimony that business aviation is accessible. "We want to showcase AMAC's capabilities and services," he said.

Air Ocean Morocco has developed its activities during the past two years by adding a Hawker 800 XPI to its fleet and converting one of its aircraft for



It's a snip: Moroccan minister, Mohammed Sajid, opens the show.

ITC Research Laboratory at Rabat International University, big data has a huge impact on improving revenue and reducing cost, customer experience, luggage tracking and predictive maintenance, repair and overhaul (MRO). Business aviation is starting to use big data and the sector can do so much more, he said.

Big data can bring a better knowledge and a completely personalised experience for the business aviation customer (preferences, tastes, trips). For example, United Airlines collects more than 150 variables about a customer to devise a tailored offer. The refined approach led to an increase of more than 15% in the year-over-year ancillary revenue.

According to Jorge Montes del Pino, president and CEO of Montesy Asociados Consulting, more than 85% of aerospace and defence companies will be using blockchain in their businesses by 2021.

It offers many advantages – a distributed network of computers, a permissioned access to parts lifecycle records for all involved parties (original equipment manufacturer, lessor, auditor/regulator, MRO, airlines, parts brokers), and a secure, transparent and auditable interaction between stakeholders. ■

continue to emerge

evacuation missions. Its CEO, Mohammed El Masaoudi, recently received a helicopter air operator's certificate (AOC) in Casablanca with a Bell 412. He plans to extend this activity to Marrakech.

Gulf Helicopters Company has also become a shareholder and partner of Air Ocean Morocco to develop helicopter activities in Morocco and west Africa, particularly for oil and gas companies.



Carthage SKY Services has been growing fast since its launch in 2014.

Based in Tunis, it offers a wide range of services (trip planning and supervision, VIP and VVIP flights, catering and fuelling) at Tunisian airports.

According to Montasser Channoufi, founder and CEO, Carthage SKY Services is going to launch its own fixed-base operation (FBO) in Tunis, which will encompass all activities related to this type of installation.

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

ONDA TO HIT THE ROAD

The Moroccan Airports Authority (ONDA) will soon start a roadshow to promote Tit Mellil Airport.

This is the major business aviation project identified by ONDA for Morocco, north Africa and the entire region.

It will be a way to present services offered to various players in the sector and also to attract investors. This project represents an investment of around €20 million (\$21.95m).

"We have already conducted assessments, identified development opportunities and worked on the masterplan for the next 20 years," said Zouhair Mohammed El Aoufir, ONDA CEO.

The project will be implemented in three phases. The airport and the main infrastructure necessary for its development and attractiveness will be ready in 2025; more investment will be required to strengthen the existing infrastructure in 2030; many services and activities will need to be implemented in 2035. ■



Zouhair Mohammed El Aoufir: Conducted assessments.



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The international airports in the Middle East are some of the busiest in the world. They are equipped with the most sophisticated navigation aids that have to remain operational 24/7 – but they also need to be totally accurate. David Oliver finds out more.

CHECK MATES

For many countries in the region, the maintenance of sophisticated international airport systems is the responsibility of the UK-based Flight Calibration Services Ltd (FCSL).

Headquartered at Shoreham Airport, it is Europe's only privately owned and fully independent flight calibration service.

FCSL provides flight calibration/inspection/validation/checking for the full range of aircraft radio navigation aids, including instrument landing systems (ILS) to Cat III and primary/secondary radar systems, with minimum disruptions to airfield and aircraft operations.

It is both a flight inspection service provider and a flight inspection system (FIS) manufacturer.

Significant cost-savings have been achieved by using its small, lightweight airborne equipment with a high level of automation, which reduces manpower and enables the use of smaller aircraft with lower operating and modification costs.

Largest fleet

In November 2018, FCSL took delivery of its fifth DA 62 Diamond aircraft, in addition to two Piper Chieftain aircraft, with sufficient aircrew and equipment to operate the aircraft simultaneously. This is the largest fleet of twin-engine flight calibration aircraft in private ownership.

The twin-engine 5/7-seat DA 62 is powered by two standard 134kW (180hp) AE330 diesel engines, manufactured by Diamond Aircraft's subsidiary, Austro Engines, with dual-channel full authority digital engine control (FADEC) and a single lever operation electronic engine controller unit (EECU).

Flown at 80% power with an average ground speed of 315km/h (170kt), the DA 62 burns only 15 US gal/hr. Holding station at 185km/hr (100kt) this reduces to less than nine US gal/hr.

With a maximum speed of 352km/h (190kt) and service ceiling of 6,100 metres (20,000ft) it has exceptional range and endurance and is capable of flying up to 10-hour non-stop missions.

The DA 62 has excellent low-speed handling and is stable flying at 85kts, making it ideal for low-and-slow calibration check flights.

The FCSL aircraft are normally crewed by two pilots, a calibration engineer and an observer.

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on Page 67



Comprehensive: The avionics suite fitted in the Diamond DA 62 aircraft.

PICTURE: DAVID OLIVER.

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طيران أبو ظبي
ABU DHABI AVIATION

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The aircraft has a payload of up to 710kg (1,565lb) for crew, mission equipment and fuel, while the field-proven composite construction technology allows corrosion-free unlimited airframe lifetime.

The production DA 62 is equipped with Garmin G1000Nxi avionics, with fully integrated three-axis GFC700 autopilot. With 10-inch primary flight and multifunction displays, G1000Nxi incorporates features such as wireless cockpit connectivity, including wireless database updates using Garmin Flight Stream, enhanced situational awareness with SurfaceWatch, visual approaches, and map overlay on the horizontal situation indicator (HIS).

FCSL's Diamond DA 62 aircraft are fitted with 28 antennas to provide flight inspection services.

Unfortunately, one of the company's DA 62 aircraft was lost on May 16 this year while carrying out aerodrome ground lighting calibration checks at Dubai International Airport. The cause is still under investigation, although the initial indications point toward wake turbulence being a factor in the accident.

Navigation aid receivers

FCSL's automatic flight inspection system (AFIS) comprises a small lightweight unit housing the specialist navigation aid receivers, GPS receiver, data collection computer, telemetry transceiver and an operator laptop. It also includes a separate pilot's head-up display (HUD) to assist with guidance and awareness.

The AFIS equipment uses its own satellite-based augmentation system (SBAS) to determine the aircraft's position in space within 20mm accuracy, and to ensure accurate and repeatable results. The head-up guidance display provides the pilots with situational awareness and accurate guidance during the inspection runs.

Each profile run is preprogrammed into the system and can be selected by either the flight inspector or the pilot using the touchscreen interface. The laptop computer provides the flight inspector with all the real-time inspection and positioning data. The flight inspection software runs in a user-friendly Windows environment, using multifunction facilities, with the data presented in a clear and precise graphical format.

FCSL also provides a mobile AFIS that is capable of easy installation on locally based light or medium-size aircraft. This is a flexible solution for commissioning and maintaining navigation aids at airports in remote locations, where the cost of deploying a dedicated flight-check aircraft is not economical.

The compact lightweight design enables the equipment and crew to be deployed worldwide at short notice by commercial airlines. The mobile AFIS does not require any structural changes to the aircraft's airframe or any additional antennas to be fitted.

A compact, lightweight, automated precision



Exceptional range and endurance: One of Diamond DA 62 aircraft operated by FCSL.

PICTURE: DIAMOND AIRCRAFT.

reference system (PRS) unit provides differential global positioning system (DGPS) corrections to the aircraft to enable the AFIS airborne equipment to fix its position in space (within plus-or-minus 20mm). DGPS correction data is sent to the airborne flight inspection system via a dedicated telemetry link. Guidance information and inspection analysis is then provided to the pilot in real-time.

Two Diamond DA 62s are permanently based at Dubai International Airport to eliminate the time and cost of positioning aircraft to and from Europe. This strategic decision has enabled FCSL to provide improved service availability with a full back-up capability for the Middle East region.

Long-term contract

In December 2016 the UAE's Sharjah Airport Authority signed a long-term contract with FCSL to provide periodic instrument landing system/ distance measuring equipment (ILS/DME), Doppler VHF omni directional range/DME (DVOR/DME) and airfield ground lighting (AGL) flight inspection services.

This is in addition to ILS/DME and DVOR/DME scheduled inspections at eight other UAE airports, including Abu Dhabi, Dubai, Al Ain, and Fujairah International.

FCSL has service contracts for periodic inspection of six ILS/DME and two DVOR/DME at Qatar's Hamad and Doha International Airports. In addition, it provides area navigation/global navigation satellite systems (RNAV/GNSS) procedure validation and obstacle assessment for Hamad International Airport.

The company has a two-year contract for three airports in Oman, including Muscat International and Sallalah Airports, and en-route aids. Plus it has a three-year service contract for ILS, DVOR, precision approach path indicators (PAPI) and runway lighting at

Jordan's Queen Alia International, Amman Marka and Aqaba Airports.

En-route aids and navigation aids are serviced at 14 Egyptian airports, including Cairo, Alexandria and Sharm El Sheikh Airports, while FCSL has a service contract with Morocco to provide commissioning flight checks on five VOR systems and a three-year contract with Kuwait for the periodic flight check of four ILS and two DVOR/DME equipment systems.

In June 2017, FCSL signed a contract in Morocco to provide commissioning flight checks on five DVOR systems, and a long-term contract with Kuwait International Airport for the periodic flight check of four ILS and two DVOR/DME systems. In September 2017, it signed contracts for the commissioning of a new ILS at Shabitah and Zaabaloten Airports for the Saudi Border Guard.

Scheduled inspections

The company also has a five-year contract for ILS/DME&DVOR/DME scheduled inspections at Malta International Airport and Gozo.

FCSL has had a contract with Libya to check en-route aids and 11 airports, including recent ILS Cat II commissioned at Tripoli and Benghazi Airports. However, due to the recent escalation in Libya's civil war, many of its airports have been closed to civilian air travel, making it difficult for FCSL to service these contracts at the present time.

In May 2019, FCSL was awarded the UK's prestigious 'Queen's Award for Enterprise: International Trade 2019' in recognition of the significant growth in export orders achieved over the last three years.

This was its second Queen's award in three years, which reflects its success overseas, having been built on the back of experience gained in the UK, where FCSL is established as the main flight inspection service provider. ■

As the world of aviation gears up to descend on the Dubai Airshow, Marcelle Nethersole, Alan Dron and Jon Lake look forward to the event.

WATCH THIS SPACE AS GROWTH ROCKETS AGAIN



The Dubai Airshow began life in 1986 as Arab Air. Since then, the event has grown every year across its more than 30-year history to reflect the innovations and opportunities in the Middle East and global aerospace industry.

According to its organiser, Tarsus F&E LLC Middle East, the 2019 edition, which takes place between November 17-21 at the DWC Dubai Airshow site, will be even bigger and more innovative.

Building on the success of the last event, which drew 79,380 trade visitors from around the world, 1,200 exhibitors from 63 countries, 1,603 international and regional media, and an order book in excess of \$113.8 billion, this year's edition promises new exhibitors, the return of popular feature areas, and conferences.

The show is expecting 1,300 exhibitors, representing all aspects of the industry, including engineering, engine manufacturing, business aviation, defence, and aircraft maintenance.

So, what makes the Dubai Airshow such a success?

“The growth in exhibitors is a testament to the burgeoning aerospace industry in the region and beyond, as our new exhibitors are coming from Asia, Europe and the US, as well as the Middle East region,” explained Michele van Akelijen, managing director of organiser, Tarsus F&E LLC Middle East

The biggest names in the global aerospace industry will be at this year's event, including Rolls-Royce, Boeing, Emirates, Airbus and Gulfstream, plus military representation including the Aerospace Industries Association (AIA) and, of course, the UAE Armed Forces.

Industry platform

“The Dubai Airshow truly does provide the platform for anyone in the industry to achieve their own specific goals and I think that all contributes to the show's success,” said van Akelijen.

New exhibitors to the event this year include technology and solutions-focused companies ready to drive the industry forward. Among them are Italian technology providers, Hexagon



Michele van Akelijen:
“The growth in exhibitors is a testament to the burgeoning aerospace industry in the region and beyond.”

Manufacturing Intelligence, and aviation services provider, Airports World Company, which has recently expanded across the Middle East with the launch of its UAE base.

Other new exhibitors hail from around the globe, including DEPO from Pakistan, INETEC from Croatia, and Pattonair from the UK.

Saudi Arabia continues to demonstrate its growing strength in the aerospace industry with participation of its biggest players: Saudi Arabian Military Industries (SAMI) and the General Authority of Civil Aviation (GACA), who will be attending the event for the first time.

Visitors will be able to see up to 165 aircraft on the static park and a large number in the flying display.

“It's too early to know details of the aircraft that will be on the static (and flying) and we are still awaiting confirmation from some exhibitors as to what aircraft they will be bringing, but, historically, we have seen some game-changers and we are sure that will continue this year,” said van Akelijen.



The full list of aircraft confirmed for the static display will be posted on the Dubai Airshow website as the show approaches.

This year's event will also have a huge focus on the space sector, with an exhibition area and two dedicated conferences produced in collaboration with the UAE Space Agency: Women in Space, which will bring top female experts together to explore the latest R&D, case studies and advancements in space; and Tech Talks.

Moon landing

To celebrate the 50th anniversary of the Moon landing, the show also welcomes back Colonel Al Worden, command module pilot of Apollo 15.

The Middle East aviation industry is growing at a rapid rate, creating airspace management challenges for air navigation service providers.

Dubai air traffic is growing at between 5 and 7% annually, higher than the global average of 3.5%, and the UAE's airspace currently handles approximately 600,000 movements a year. By 2025 this figure will

rise to about 1.2 million movements, increasing to 1.62 million by 2030.

This vast growth in air traffic across the region, plus the airlines' need to constantly streamline expenses, means air traffic management (ATM) is an issue that urgently needs addressing.

Global Air Traffic Management 2019 (GATM 2019), taking place at the airshow on November 19-20, will bring senior airspace policy experts together to address these issues and develop workable solutions for the region.

Influential speakers already confirmed for the event include Ibrahim Ali, deputy CEO of Dubai Air Navigation (DANS), and Damian Ellacott, vice president airport operations control centre for Dubai Airports.

Key challenges to be discussed during the two-day event will include utilising airspace, enhancing capabilities, diminishing drone responsibility, and regulating air traffic control (ATC) technology.

Another co-located event, taking place on November 18, is Cargo Connect.

Electric atmosphere: The Dubai Airshow has a vast array of aircraft on the static.

Left: Big business takes place at the show as well as amazing aerial acrobatics.

Next year it is estimated that cargo will create revenue in excess of \$116 billion, more than 13% of airline returns.

Key challenges and opportunities to be discussed during the conference include cargo transformation strategies, digital cargo evolution, cargo tech, and automation, drones and AI.

There is also a host of international speakers at the event, including Henk Mulder, head of digital cargo at the International Air Transport Association (IATA).

"Businesses in the Middle East region have always placed a premium on face-to-face networking, which is another reason the Dubai Airshow is a must-attend event for all aerospace industry players – it provides concentrated access to the key decision-makers in a focused environment," said van Akelijen.

"Exhibitors and visitors tell us, year-after-year, that they get more business done in one week at the Dubai Airshow due to the myriad of networking opportunities."

Big airliners and sleek business jets will dominate the outdoor static aircraft park, while the show's five 'feature areas' cover airline chief officers, cargo, global air traffic management, space, and smart manufacturing. However whatever you do, don't under-estimate the importance of the defence sector at the event.

Organiser, Tarsus F&E LLC Middle East, believes that at least 40% of the exhibitors at the show will be 'defence-related' – with many more part of the associated supply chain.

The organiser expects 1,300 exhibitors (100 more than two years ago) and 87,000 trade visitors (up by more than 7,000 people) to attend this year.

Defence will account for much of this expected growth.

Major General Abdulla Al Hashmi, assistant undersecretary for support services at the UAE Ministry of Defence, described the importance of the show to the UAE's own armed forces. "Every two years, when the event takes place, the UAE Armed Forces has the opportunity to interact with potential and existing suppliers, discover new technology and equipment, and network with the key industry players from around the world," he said.

Exchange information

For the UAE, the show represents an opportunity to exchange information and learn from other air forces. "We use the Dubai Airshow as a platform to bring together military delegations from around the world to demonstrate what the UAE is capable of and to learn from each other," Hashmi emphasised.

The Dubai Airshow delegations programme is coordinated by the show organiser, in conjunction with the UAE Ministry of Defence, the Dubai Civil Aviation Authority and the Government of Dubai.

In 2017, 279 delegations from 76 countries were hosted, including 127



Spectacular: One obvious manifestation of the importance of defence to the Dubai Airshow is provided within the world-class flying display.

BIG SPENDERS? THE MILITARY MIGHT...

military delegations. These totalled 485 delegates, including 32 commanders/chiefs of staff, 31 deputy commanders and 13 ministers of defence. These numbers are expected to increase in 2019. "We are aiming to significantly increase the number of inbound military delegations," Hashmi said. Networking between very senior officers will be further facilitated via the Air Chiefs' Conference, being held at the Marriott Marquis Hotel on November 16, immediately before the show.

The Dubai Airshow has also frequently served as an important platform for the announcement of orders placed by the UAE Ministry of Defence, which signed contracts worth \$4 billion for new equipment, services and technologies at the 2017 edition.

That figure could be exceeded this year, with the UAE's defence budget growing at a 6.5% annually. Between now and 2021 the UAE plans to spend \$140.8 billion on defence, \$53.1 billion of it on asset acquisition.

Hashmi has already hinted that major new contracts could be signed at the show. "The Dubai Airshow is, strategically, the most important aerospace exhibition for the UAE Armed Forces and one of the most important events of our calendar," he explained.

"The UAE's military is growing and, with that, comes requirements for increased resources. Of course, I cannot be more specific at this point but we are very seriously considering some commitments by the end of 2019 – which happens to coincide with the Dubai Airshow.

"The UAE Armed Forces will once again take the opportunity to use the show as a platform for product and technology research, negotiations and, potentially, to finalise military procurement."

6 We use the Dubai Airshow as a platform to bring together military delegations from around the world to demonstrate what the UAE is capable of and to learn from each other.

MAJOR GENERAL
ABDULLA AL HASHMI

Outstanding requirements

There are a number of outstanding UAE Air Force and Air Defence requirements, some of which have remained unfulfilled for many years.

Foremost among these is the need to replace the current fleet of Dassault Mirage 2000-9 and Lockheed Martin F-16E frontline fighters.

At various times, the UAE has seemed close to signing contracts for the Dassault Rafale and the Eurofighter Typhoon, and some kind of split buy would still seem likely, probably with one of the selected types being a US fighter.

Many believe that the overall requirement will not be addressed until the UAE knows whether it will be allowed to

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procure the F-35 Joint Strike Fighter, and in what quantity.

Another outstanding requirement is for an advanced jet trainer to replace the BAE Hawk.

The UAE announced its selection of the Aermacchi M-346 at IDEX 2009, with deliveries then scheduled to begin in 2012. Detailed negotiations then began for the supply of 48 aircraft, at a cost of about €1 billion (\$1.37 billion), including some aircraft in a light-attack configuration, plus flight simulators and other ground-based training devices.

The aircraft were to have undergone final assembly on a new local assembly line that was to have been established by Mubadala Developments. Negotiations were abandoned in 2011, and the requirement remains unfulfilled.

Government budgets

The Dubai Airshow has a regional reach, extending beyond the UAE, and is a vital platform for other regional air forces to liaise and interact with defence suppliers and manufacturers. The Gulf and wider Middle East region is a vital market, with regional defence spending projected to reach an annual total of \$100 billion in 2019, an increase compared to previous years, as oil prices have stabilised at higher levels.

Five of the world's 10 highest defence spending nations are in the Middle East, as are nine of the top 15 defence spenders measured as a proportion of gross domestic product (GDP).

On average, Middle Eastern countries spend 13% of their government budgets on defence, with Oman spending close to 20% and Saudi Arabia an astonishing 30%.

Saudi Arabia is expected to spend \$51 billion on defence in 2019, representing the third largest defence budget in the world.

One obvious manifestation of the importance of defence to the Dubai Airshow is provided within the world-class flying display.

The UAE Air Force and Air Defence has always supported the flying display,



A world-class show: The UAE Air Force and Air Defence AermacchiMB-339NAT-equipped Al Fursan formation aerobatic team has been a regular Dubai Airshow favourite since it formed in 2010. UK Royal Air Force Typhoons, French Armée de l'Air Rafales, and a variety of US Air Force and US Navy fast jets have also taken part in the flying displays.



usually providing daily Dassault Mirage 2000-9 and Lockheed Martin F-16E Desert Falcon displays. The air force's Aermacchi MB-339NAT-equipped Al Fursan formation aerobatic team has also been a regular Dubai Airshow favourite since it formed in 2010.

Air forces deployed to the region have also displayed at the show – including Royal Air Force Typhoons, French Armée de l'Air Rafales, and a variety of US Air Force and US Navy fast jets.

The aircraft static park has also provided a platform for a wide variety of military exhibits, often providing a first public glimpse of new UAE Air Force and Air Defence aircraft, including the Iomax BPA and Archangel, the Calidus B-250, the NorthStar Bell MRH-407, the Boeing C-17 and the Airbus A330 MRTT.

There have been suggestions that the UAE's new Saab GlobalEye airborne early warning and control (AEW&C) aircraft could make an appearance at Dubai this year. All three aircraft are now flying, though no delivery dates have been released. If the aircraft itself does not make an appearance, it is widely expected that new details about the programme will be revealed. ■



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Against a backdrop of a slowing global economy and mixed results from Middle East airlines, what can we expect to see on the commercial aviation front at this year's show?

A good possibility: Although not confirmed at press time, Boeing is understood to be bringing a 787-9 to the show.



LOW-COST ON A HIGH?

WHY LCCs COULD BE THE ONES TO WATCH THIS YEAR

The Middle East airline sector has experienced such growth over the past two decades that it feels distinctly odd to be reporting a more subdued sentiment today.

That may mean a relatively quiet Dubai show, although Le Bourget in June was similarly anticipated to be modest and ended up with a battery of new orders after Airbus unveiled its A321neoXLR long-range variant and Boeing pulled off the surprise of the show with International Airlines Group (IAG) offering a stunning vote of confidence in the troubled 737 MAX.

IAG CEO, Willie Walsh, declared that Boeing was “a brand I trust” and slapped in a provisional order for 200 MAX 8 and 10s.

Airliner manufacturers typically only decide on which aircraft they will dispatch to an air show three to four weeks before the gates open at the showground. So, the shape of Boeing and Airbus’ participation in Dubai remains to be seen, although Boeing is thought likely to have a 787-9 on the static line.

Embraer will have its E195 E2 regional jet on the apron.

Russia’s United Aircraft Corporation was still mulling over the size of its presence at the time of writing, although it may use Dubai for the first international outing of its Airbus A320/Boeing 737 rival, the MC-21-300, which made its public debut at the MAKS show outside Moscow in August.

It would be surprising if the Dubai show passed without some substantial aircraft orders, although these are less likely than usual to come from Middle East carriers.

Tougher time

The region’s major full-service carriers are having a tougher time than they have experienced for many years. Both Etihad and Qatar Airways have reported significant annual losses (\$1.28 billion and \$639 million respectively) and Emirates saw its annual profits drop by almost 70% to \$237 million because of a combination of higher fuel prices, tougher competition and unfavourable exchange rates.

Emirates is about to undergo major

change. Its February decision to slash its outstanding orders for the Airbus A380 – a move that forced the European manufacturer to announce the closure of the giant airliner’s production line in 2021 – means that it will be undertaking a major fleet review, with more, smaller aircraft entering the fleet in future years.

However, that fleet review has been paused, following Emirates’ president, Sir Tim Clark, running out of patience with both airframers and engine manufacturers. He told a briefing in London in September that Airbus, Boeing, General Electric and Rolls-Royce had to produce aircraft and engines that worked from day one of their service with the airline. Until he had that assurance, committing to new aircraft was not an option, he said.

Abu Dhabi-based Etihad Airways is working its way through a transformation programme. Group CEO, Tony Douglas, said in March that the last year had been used for “streamlining our cost base, improving our cash-flow and strengthening our balance sheet”.

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DUBAI AIRSHOW

CONTINUED FROM PAGE 74

While maintaining Abu Dhabi as a major hub, it is placing more emphasis on point-to-point and regional services. The latter taps into its cooperation agreement with Gulf Air, which has an extensive regional network.

Like Emirates, Etihad is reining back on aircraft orders, having announced earlier this year plans for significant cuts in plans for Airbus A350s and Boeing 777Xs. It has also been wary of stating how many of its commitment for Boeing 787s it will actually take.

Diplomatic row

Qatar Airways, meanwhile, continues to labour under the diplomatic row between Qatar and neighbours Bahrain, Saudi Arabia and the UAE, as well as Egypt, which has closed much of the surrounding airspace to its aircraft, thereby lengthening flight times and increasing its costs.

Group CEO, Akbar Al Baker, was characteristically pugnacious when announcing the airline's annual results in September, noting that, despite the problems faced by the company, overall



Old wine in new bottles: De Havilland Aircraft of Canada is expected to have a presence at the event, having bought the Dash 8 product line from Bombardier, as the latter left the commercial airliner business.

revenue had grown by 14%, the route network was expanding aggressively and that the company's cargo business was booming; he announced an order for a further five Boeing 777F freighters at the Paris Air Show.

Saudia, meanwhile, is quietly but determinedly elbowing its way towards the front of the pack. One of the airline's senior executives told *Arabian Aerospace* earlier this year that the national carrier was determined to be in the front rank of Middle East airlines and planned to be

much more outgoing in telling its story. The latest chapter of that story will see its fleet rapidly grow from around 150 aircraft at the start of this year to more than 200 in 2020.

Prospects for some of the region's smaller, state-owned national carriers can be difficult to gauge, as they are not obliged to issue annual profit and loss figures.

Gulf Air has declared itself a 'boutique carrier', emphasising the passenger experience as a way of standing out against bigger rivals. It is introducing new aircraft, a new business-class cabin and aims to make maximum use of facilities at the new terminal at Bahrain International Airport.

Oman Air has already started to benefit from new facilities at Muscat International Airport and believes codeshares with more international partners – including, possibly, in the US – is the way forward. It plans to announce replacements for its long-haul Airbus A330s shortly.

Kuwait Airways continues to order new aircraft, including the A330-800. There are apparent plans for yet another attempt to privatise the carrier. Previous efforts paralysed decision-making at the airline



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for several years, as privatisation decisions rest with the country's government and parliament, not the company.

Elsewhere in Kuwait, however, low-cost carrier (LCC) Jazeera Airways is in positive mood, steadily expanding its fleet and profitability, increasing its load factors and opening its first long-haul service, to London. It enjoys the benefit of its own (self-funded) terminal at Kuwait International Airport.

Passenger experience

This, the carrier says, not only improves the passenger experience by moving its customers out of the crowded main airport, but gives it new revenue sources through selling shopping concessions and, in future, renting space there to other airlines.

Other regional LCCs are also expanding. Air Arabia, SalamAir, Flydubai, Flynas and Flyadeal are all growing their route networks.

Flydubai is acting as a 'pathfinder' for Emirates under the two airlines' cooperation agreement, opening up routes too thin for the long-haul carrier's wide-bodies, then passing them over once



they have developed sufficient traffic.

Not only are the LCCs growing, the new generation of longer-range, single-aisle aircraft from Airbus – the A321neoLR and XLR – are destined to fuel their expansion.

The LR and XLR now give LCCs the possibility of operating routes of eight to nine hours, bringing many more cities within range.

Install the maximum 244 seats in an XLR and an airline suddenly has unit costs equivalent to those of a wide-body,

Out for a profit: Brazilian manufacturer Embraer – about to become part of the Boeing empire – will have one of its E195 E2 'Profit Hunter' models on the static.

but without the costs of actually operating a twin-aisle design.

Airbus has stolen a march on Boeing with the launch of the XLR and is intent on occupying as much of the territory Boeing had staked out for its New Midsize Aircraft (NMA) as possible before the US design gets off the ground.

The NMA's development has been pushed into the background by Boeing's continuing travails over the 737MAX, whose two crashes in five months has kept the US manufacturer in an uncomfortable spotlight for much of this year.

At least as serious as the technical problems of the design have been the questions asked by worldwide airworthiness authorities over the certification process of the MAX and the suspicion that the Federal Aviation Administration (FAA) and Boeing may have become too close in their relationship.

The two US organisations deny this, but it is notable that several airworthiness bodies have made it clear that they intend to conduct their own checks when the FAA clears the aircraft for commercial services again. ■

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Abdul Wahab Teffaha:
 “The airlines of the region have learned through other hard times – that are unfortunately quite frequent – to persevere and to focus on what is right.”



As airlines prepared for the Arab Air Carriers Organization annual meeting in Kuwait City in early November, AACO secretary-general, Abdul Wahab Teffaha, discussed the current state of the regional market and prospects for the year ahead with Alan Dron.

OUR INDUSTRY HAS LOADS TO THINK ABOUT

For much of the world, the airline operating environment has deteriorated in 2019.

Fuel price volatility, strikes in Europe, major Chinese carriers running into liquidity problems, and airlines having their new Boeing 737MAXs grounded for much of the year, have all played their part.

Only the US majors have seemingly sailed on, reaping vast profits – mainly at the expense of their economy-class passengers, who have found themselves increasingly rammed into ‘densified’ cabins that make journeys a trial rather than a pleasure.

In the Middle East, the picture has also been less than rosy. All of the region’s big three – Emirates, Etihad and Qatar – (ME3) carriers have reported further losses or, at best, significantly reduced profits.

The continuing diplomatic stand-off between Qatar, on the one hand, and Saudi Arabia, Bahrain, the UAE and Egypt on the other, shows no sign of being resolved, with Qatar Airways facing continuing airspace restrictions that have added substantially to its operating costs. (The other airlines have also lost lucrative routes to and from Doha.)

“One of the biggest impacts of hard economic times in aviation is that competition starts to erode yield and erosion of yield is a by-product of overcapacity.”

ABDUL WAHAB TEFFAHA

It was against this backdrop that the airlines of the Middle East and North Africa (MENA) were scheduled to gather in Kuwait to talk through some of their mutual problems.

AACO’s long-serving secretary-general, Abdul Wahab Teffaha, has seen many of their problems before. “The airlines of the region have learned through other hard times – unfortunately quite frequent – to persevere and to focus on what is right, which is to place a high value on quality of service, on delivering choices to customers and on maintaining a network that addresses global customers’ needs. That is the number one priority for airlines and, hence, for AACO.”

Main themes

Teffaha did not attempt to downplay the problems facing the industry, which are expected to be one of the main themes of the annual meeting. He predicted that 2020 would be “difficult”. The world economy was heading into negative territory, with several major countries facing recession, he noted.

“At least, what will cushion the impact a little is that airlines of the region are quite focused on

Continued
on Page 81



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Upgrading: Middle East facilities, such as Jeddah's King Abdulaziz International Airport, are being modernised, but flights are still being delayed by lack of investment in infrastructure in Europe.

CONTINUED FROM PAGE 79

measuring capacity against demand. You see capacity really being tailored to meet demand. One of the biggest impacts of hard economic times in aviation is that competition starts to erode yield and erosion of yield is a by-product of overcapacity.”

In Europe, he said, airlines were merging and consolidating. Carriers had not disappeared in the Middle East, but the cold winds generated by cooling economies had seen the rescheduling of some aircraft deliveries and airlines opting for smaller aircraft than during periods of strong expansion.

“Airlines are doing the right thing in the region,” he said. “In times that are not very generous we need to be very careful on the amount of capacity we deploy.”

Significant factor

A second significant factor likely to be prominent at the annual meeting, he said, would be the environmental movement, which was becoming increasingly vocal about the adverse effects of air travel.

The airline industry had actually been “quite avant-garde” in its response to the problem of carbon emissions, said Teffaha, delivering on its commitments to limit these as much as possible. The region’s carriers were particularly strong in this field, given the fact that many of their fleets were young, equipped with the latest models of aircraft whose fuel consumption – and thus emissions – were lower than many other carriers.

However, the public wanted airlines to do more and the airlines would take that message on board.

The solution was not to limit aviation, but to provide the necessary infrastructure that would limit aviation’s footprint on the environment, he said.

The environmental problem had three focal

points – infrastructure, air traffic control, and sustainability, said Teffaha.

On the first two points, he said that the Middle East was doing more than its share to keep up with growing demand.

On the infrastructure front, the Arab world was fortunate that its airports were the subject of substantial government investment and were expanding to keep pace with the growth of air travel.

However, modernising and expanding Arab airports did not solve the problem: “If you modernise the airport in Jeddah, for example, but the flights are being delayed by infrastructure in Europe, is it enough?”

Similarly, improvements in air traffic management (ATM) in the region had not been matched by comparable advancements elsewhere.

Saudi Arabia, the UAE, Oman and Iraq had all made advances in their handling of air traffic, but this had not been replicated in other regions, such as Europe, while recent tensions between India and Pakistan had resulted in routes to and from Asia being squeezed.

Ultimately, said Teffaha, unless improvements in ATM were reflected in other regions, the bottlenecks only moved their location, rather than being eliminated. “Air traffic management is only as strong as its weakest link.”

A third subject likely to rear its head at the meeting was the region’s geopolitical problems, over which its airlines had no control, but which continued to affect carriers throughout the region, from Libya to Yemen.

Looking at the Middle East marketplace, low-cost carriers (LCCs) have increasingly made their presence felt in recent years, with Air Arabia, Flydubai, SalamAir, Flyadeal and Jazeera Airways all providing a type of service that would have been unthinkable a decade ago in a region long accustomed to full-service carriers.

LCCs have had a major effect, said Teffaha, but their impact was likely to be less than in Europe.

A major reason for this was that “Europe is a single market and, therefore, the freedom of operations across Europe without any consideration of nationality or bilateral agreements has opened the door to structural change.”

This had resulted in market consolidation among legacy carriers that were unable to compete with the fares offered by LCCs.

By contrast in the Arab world, such widespread changes had not occurred “because of the fundamental difference that the Arab world is not a single market. It is still governed by bilaterals. I don’t think we can see structural changes unless we see a single market and the removal of ownership and control restrictions.”

However, he said, there was no doubt that LCCs and full-service carriers in the MENA region had learned from each other and, in some ways, the two models were moving towards each other.

Non-stop routes

New technology, in the form of ultra-long-haul airliners capable of operating non-stop routes between the UK and Australia, for example, would have only a marginal effect on the hub and spoke model so successfully developed in the region, believed Teffaha.

“Of course, it’s a noticeable change, but the effect is not going to be high. You can never cover all the destinations that customers want to go to by operating directly. This is a given. Because of that, hub-and-spoke operations will continue to exist.

“Look at Europe to south-east Asia, for example. Today, aircraft can fly those routes [non-stop], and they do. Still, that doesn’t prevent Turkish, Emirates, Qatar Airways and Etihad from growing demand in those markets.”

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A new event, putting the whole of the MENA aviation industry under the spotlight, will take place next year. Mohammed Ali Ahli reports.

Cairo summit focuses on MENA's aviation growth



Planning: EgyptAir group chairman and CEO, Ahmed Adel, and Aviation MENA Summit chairman, Alan Peaford, kick off the preparation of themes for next year's regional event highlight.

The Middle East's aviation market has many faces. There's the mature geographic segment in the Gulf with the 'big three' – Emirates, Qatar and Etihad – who have the latest models featuring the latest technologies, both for operations and for passenger experience.

Then there is the re-emerging into the public spotlight of the former greats, Saudia, Gulf Air and the region's first airline, EgyptAir.

But there are also faces not that regularly seen.

It is often said that this is the region of the "haves" and the "have nots". But now a new event is focusing on pulling the whole geographic region together under one single roof in the historic capital of Arab aviation.

On June 9-10, 2020, Aviation MENA will take place at the Hilton Cairo Heliopolis, close to the point where, on June 7, 1932, Misr Airlines – the forerunner of EgyptAir – was formed.

Like many of the airlines across the whole MENA region, EgyptAir has been affected by the post-Arab Spring era, as well as by the side-effects of other conflicts in the region. But it is fighting back with a restructuring, which is creating a platform for growth and identifying opportunities for the supply chain to support that growth.

And EgyptAir is not alone in this.

Aviation MENA will be exploring the wider opportunities that exist with a growing industry in Saudi Arabia, Egypt and Jordan; a rebuilding of fortunes in Libya, Iraq and Syria; and manufacturing development across the whole of north Africa.

Aviation and related-tourism already supports some 2.4 million jobs and contributes \$130 billion to the MENA

region's gross domestic product (GDP). With passenger demand expected to double by 2037, these benefits could reach 4.3 million jobs and \$345 billion respectively, according to figures issued by the International Air Transport Association (IATA) earlier this year.

According to Mark Brown, managing director of Times Aerospace, the event organiser, Aviation MENA will bring together the international aviation industry with regional operators and suppliers to discuss the ways the industry can help the region deliver this growth, looking at safety, the environment, regulations and commercial opportunities.

"Delegates can expect to meet the C-suite leadership of business right across the region, from Muscat to Marrakech, in a top-level summit, looking at the issues affecting the region, and enjoy the networking events and busy exhibition that surrounds the conference," he said.

Airlines from the re-emerging countries such as Iraq, Syria, Lebanon and Libya, will join the established players from Jordan, Morocco and Saudi Arabia, to share thoughts and strategies and meet with the international audience and supply chain, who want to work alongside them.

At the centre of the debate will be Egypt – the historic heart of the industry across the whole Arab world. Its national carrier, EgyptAir, will be the summit host and partner in the event.

Future strategy

EgyptAir group chairman and chief executive, Ahmed Adel, will be the subject of a one-on-one discussion with summit chairman, Alan Peaford, on the airline's future strategy and latest developments. Other airline CEOs will take part in round-tables.

"I appreciate there has been a mood of too many conferences and shows as the Middle Eastern market has matured," said Peaford. "But this is different. What is happening in Iraq, Libya, Tunisia and Syria, is vital knowledge for the whole of the aviation industry."

"How Jordan has revived its industry – from the airline to its MRO providers; how Saudi Arabia is opening the doors for tourism and increasing opportunities to reach beyond the traditional points of Jeddah, Riyadh and Dammam; how manufacturing can be part of indigenous industry growth; and how training academies and methodologies are being developed to meet the demands of the airlines for pilots, engineers and crew – they are all on the agenda."

"For me, a look at how low-cost carriers and the smaller regional carriers can up their game with in-flight entertainment and connectivity is also a highlight. Passenger experience must expand from the 'haves' into the broader airline market and we will be looking at how that can happen."

Further details of the two-day summit and co-located exhibition, featuring more than 100 global aviation companies, can be found at www.aviationmena.aero. ■

KUWAIT'S DISPLAY OF CONFIDENCE

As the aviation scene in Kuwait goes from strength-to-strength, it is no surprise that the inaugural Kuwait Aviation Show last year, while small, was considered a success, writes *Ella Nethersole*.

Off the back of that inaugural show, organisers are now looking forward to welcoming visitors back for the second edition from January 15-18.

Held at Kuwait International Airport under the patronage of HH Sheikh Sabah Al-Ahmed Al-Jaber Al-Sabah – the Amir of Kuwait – more than 300 exhibitors are expected at the event, with 15,000 trade visitors and at least 60 aircraft (commercial, defence and business jets) on display, as well as an air display.



Show organisers said the expected and continued success of the show is due to Kuwait becoming a bigger player within the aviation industry, thanks to new investment.

In the last few years, Kuwait has seen massive industry expansion, growing private enthusiasts, and extensive opportunity for growth.

Between 2017-2022 the country's government is investing \$30 billion on aviation. Visitor numbers to Kuwait have increased in just two years by 26%. By



Small but successful: Last year's show looks set to expand. Left: Important milestone: In September Kuwait Airways took delivery of its first A320neo aircraft.

2023, the country expects to transport up to 25 million passengers.

The international airport of Kuwait is currently being extended with a new, ultra-modern terminal building, which will facilitate travel for some 13 million passengers under an initial phase.

This throughput will then increase to 25 million and 50 million passengers respectively under follow-on phases, in an attempt to place Kuwait as a hub for air transport in the Middle East. The new terminal is slated to be complete by 2022.

The country's national airline, Kuwait Airways, is

also expanding, with an order for eight Airbus A330-800neos, which started delivery in 2019.

In September, it also took delivery of its first A320neo aircraft, marking an important step in the airline's ambitious fleet renewal and growth plans, which will phase-in 15 A320neos over the coming years.

The country's defence industry is also growing, with 28 Eurofighter Typhoons – the most advanced of the type produced so far – expected to start delivery in 2020 and be completed in 2023.

Huge business like this is making key suppliers to Kuwait – and general Middle Eastern markets – want to show off their wares and reaffirm their commitment to the region at the show. ■

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Updating: Although opened in the past few years, Hamad International Airport is already putting new systems in place to aid passenger flow.



HAMAD'S SMART WAY TO BECOME THE AIRPORT OF THE FUTURE

Doha's Hamad International Airport is pressing ahead with initiatives to improve its services – including a project that transforms a passenger's face into their identity card through the facility.

Alan Dron
reports.

There is a constant struggle at airports to keep passengers flowing smoothly through the terminal. The need to handle travellers efficiently becomes increasingly important as passenger numbers steadily increase.

Airports are turning to automation to maintain, or improve, that flow of people. Middle East nations generally have young populations and, fortunately, younger travellers tend to cope naturally with such automation.

Hamad International Airport (HIA) only opened in 2014, but new systems are already being installed to enable an increased throughput of passengers – especially those departing on flights.

The initiative is known as the HIA smart airport programme. “HIA is one of the most advanced airports in the world,” said a spokesman “and is accelerating its digital transformation, moved by the ambition to become the ‘airport of the future’ with a very user-centric approach.”

A first phase in 2018 included the commissioning, in partnership with global IT provider SITA and airport interiors specialist CCM, of 62 self-check-in and 12 self-bag-drop kiosks that included biometric technology capability. The kiosks are spread across the departures check-in hall and enable passengers to check-in, print boarding passes and bag tags; tag their bags; then drop them at the bag drop before proceeding to border control.

Completion of first phase

The completion of the first phase in October 2018 saw 40% of home carrier, Qatar Airways’, passengers opting for self-check-in, while a further 20% used the self-bag-drop.

A memorandum of understanding (MoU) with SITA had, as its main focus, the installation of seamless identity management across all the airport’s key passenger service points using biometrics. A key benefit of SITA’s ‘smart path’ technology is that it is designed to integrate into existing common-use airport infrastructure and airline systems.

In what HIA believes is a world first in a major airport, a mobile automated visa document check was also implemented. This allows ground services agents to check a passenger’s visa documentation before they continue through the airport.

HIA’s management supports investment in technology

that delivers business outcomes, said the spokesman: “All HIA systems are common-use, and all airlines operating out of HIA can benefit, contingent on necessary configuration and integration. Although the self-service kiosks and bag drop facilities are currently exclusive to Qatar Airways passengers, the plan is to extend these services to foreign airline passengers in the future.”

Early this year, the second phase of the smart airport project started to roll out. A cornerstone of this is a biometric facial recognition system, by which a passenger’s face is scanned, with that digital scan acting as their ‘identity card’ as they move through various stages of the airport process.

Facial biometric information

The system, currently under trial, combines passengers’ flight, passport, and facial biometric information in a single electronic record at the self-check-in kiosk or on a mobile app. Subsequently, only the passenger’s face is required for verification at the self-service bag-drop, automated security gate, and the automated boarding gate, thus speeding up transit through the terminal.

This ‘biometric identity management’ aims to improve the customer experience, terminal capacity and security, say the airport authorities.

“HIA is actively working on adopting biometric identity technologies within the airport to facilitate passengers and verify their entitlement at non-mandatory touch-points, such as lounges.

“Knowledge of exactly where passengers are at the airport will help Qatar Airways further improve its on-time departure performance at the hub.”

In collaboration with HIA, Qatar Airways is developing the concept for off-airport passenger registration with biometrics using a mobile check-in app, so that passengers can pass through airport touchpoints faster and eliminate bottlenecks and queues.

Trials will also be held to evaluate the effectiveness of robots for passenger facilitation; block-chain technology for rapid and secure sharing of data across stakeholders; and the potential use of augmented and virtual reality for operational concepts.

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Saudi Arabia's 'vision 2030' plan for the country's future development is contributing to the growth of new airports, such as Neom Bay.

Alan Dron reports.

NEOM RISES FROM THE SANDS TO TEMPT HOLIDAYMAKERS

A holiday in Saudi Arabia? Not, perhaps, the first location that would spring to mind, especially for western tourists.

However, that could be about to change, with the country pumping time, effort and money into developing its tourism sector.

Beyond religious tourism, which has been the only really major sector that the country has handled until now, the Saudi authorities believe that they can put their country firmly on the map for 'ordinary' tourists.

New resorts are springing up and, in late September, the country relaxed its visa requirements for 49 countries, as well as its strict dress code for foreign female visitors.

Previously, visas were restricted to pilgrims, business travellers and family reunions, and were extremely expensive. Travellers are now able to apply online for a visa, either before their trip or at an electronic desk on arrival, with visas costing SAR440 (just less than \$120).

The coasts of the Red Sea and Gulf of Aqaba, whose shores include the Jordanian and Egyptian resorts of Aqaba and Sharm El-Sheikh respectively, are prime sites for such developments.

Joining the Jordanian and Egyptian resorts over the next few years will be the city of Neom, which is about to start rising from the sands.

The city, however, will be much more than simply a tourist destination. It will be a fully fledged mega-city in the Sharma region, extending 460km along the coast of the Red Sea. It is a proposed cross-border metropolis linking Jordan with the Tabuk Province of north-western Saudi Arabia.

The name Neom is an abbreviation of the Latin-Arabic

term neo-mustaqbal, meaning new future, and the city will focus on advanced industries and technology, with power being generated solely from wind and solar energy and robots intended to be used for many of the city's services.

Saudi Arabia aims to complete the first section of Neom by 2025; the project has an estimated cost of \$500 billion.

Somewhere that big needs transport links. And Neom Bay Airport will be one of them. A former military facility, it has been designated as a commercial airport following the start of a Riyadh-Neom charter service operated by Saudia in January.

A significant step in development of the airport came on June 30, when the first scheduled flight, operated by national carrier, Saudia, from Riyadh, landed on the single 3,757m runway.

Light traffic

The initial months of the airport's existence will see extremely light traffic, with a couple of flights a week to and from the Saudi capital being largely devoted to flying in the staff and workers undertaking the city's development.

Saudi regulator, the General Authority of Civil Aviation (GACA), has licensed Neom Bay as a commercial airport, with the International Air Transport Association (IATA) giving the airport the designator NUM.

At present, a temporary terminal and associated buildings are in place, but these will be replaced and grow as the city is developed.

Initially, facilities are modest, with six check-in counters and the same number of aircraft parking bays, but these will expand as the airport is developed.

The establishment of the airport fits into the strategic objectives of Saudi Arabia's vision 2030, aimed at diversifying the nation's economy away from oil and gas. As part of this plan, GACA is involved in the creation of a network of modern airports that will contribute to the development of the country's economy by creating a modern and global logistics platform for organisations and individuals involved in import and export.

Meanwhile, national carrier, Saudia, entered a strategic partnership with Neom Co at the end of September in a wide-ranging agreement to work together on promoting the city as a tourism location.

Under the terms of the memorandum of understanding (MoU), Saudia said it would work with Neom to create worldwide awareness of the vast project. In addition, it was agreed that Saudia Holidays would develop products and packaged experiences for visitors. ■

Check out the check-in: The first counters have been completed at the new Neom Bay Airport, although their staff will have to deal with extremely light traffic for some months.



Moroccan airports on course to hit new heights

As part of its strategy to increase international and regional capacity, The Moroccan Airports Authority (ONDA) has carried out major infrastructure projects, including the extension of Terminal 1 at Casablanca International Airport and a new terminal at Guelmim, Vincent Chappard reports.

Air transport indicators are looking good for Morocco's airports. The country registered record traffic in 2018 with more than 22.5 million passengers and 10.43% growth. The trend is continuing, with commercial traffic growth of 14.24% at the end of July this year.

Casablanca Mohammed V International Airport welcomed 45.11% of total passenger traffic – 1,080,399 passengers – in July 2019, as opposed to 984,718 passengers for the same period last year. This represented an increase of 9.72%.

Marrakech-Menara Airport recorded a growth of 30.58%.

For years, ONDA has been working on several projects to build capacity and support this growth. The extension, renovation and modernisation of Terminal 1 at the Casablanca hub was one of the major schemes. It was inaugurated in January by King Mohammed VI.

“The extension of Mohammed V brings an additional capacity of seven million passengers to the airport, which now has an overall capacity of 14 million passengers per year,” said Zouhair Mohammed El Aoufir, ONDA's director general. “Terminal 1 has the best systems and new generation equipment.”

This new airport infrastructure is in line with

Morocco's ambition for its airport network and responds to the sustained growth in air traffic.

Terminal 1 covers a surface area of 76,000sqm. It has eight new aircraft parking areas, including three for long-haul aircraft, such as the A380, and nine telescopic bridges.

The commercial ‘walk-through’, which is an innovative concept of duty-free shops located in the passenger circuit, offers a diversified choice of national and international brands.

Quality of service

All functions and links between Terminal 1 and Terminal 2 have been studied in order to enhance the quality of service and to respond to the significant growth in air traffic in the country.

Among the innovations, the airport has an automatic baggage-handling system. The common user terminal equipment (CUTE) system manages 5,000 bags per hour from two check-in areas with a total of 84 counters. There's also the baggage reconciliation system (BRS),



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explosive trace and narcotics detection equipment, and a body scan system.

The new terminal is dedicated to Royal Air Maroc and its partners. According to ONDA, this will provide the hub with the required capacity for the smooth running of the entire process by providing more comfort, quality of service, and enhanced passenger experience.

“We will also work towards making Casablanca the main hub of the African continent,” said Abdelhamid Addou, chairman and CEO of Royal Air Maroc.

During the inauguration ceremony, El Aoufir also presented other completed airport projects – the new air terminals at Zagora and Errachidia airports – as well as the second national air navigation safety control centre, located near Agadir Al Massira Airport.

ONDA had also commissioned a new terminal at Guelmim Airport. The existing terminal had an area of 210sqm and a capacity of three-aircraft parking.

“The construction of this new terminal is part of ONDA’s strategy to increase the capacity of regional airports,” added El Aoufir.

The new Guelmim terminal covers a surface area of 7,000sqm, with a capacity of 700,000 passengers per year. It includes the extension and upgrade of the aircraft movement area to accommodate long-haul carriers.

Like Casablanca, the new terminal will be equipped to meet international standards in terms of safety, security and quality of service. According to ONDA, it will accommodate passengers in the best conditions, in a good ambiance and with maximum comfort.

Royal Air Maroc operates Guelmim-Casablanca connections.

ONDA has also launched several other projects; the new Nador Airport terminal, to be delivered at the end of the year, and a new terminal in the city of lights, Rabat, which will accommodate up to 4 million passengers.

A study has also been commissioned for the setting up of an airport dedicated to business aviation in the city of Tit Mellil as part of a public-private partnership. ■

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Highly experienced: RWAA general manager Willem Marais.



Wings in full swing

Saudi Arabia's first aviation academy – Rabigh Wings – sees a bright future for aviation in the kingdom from both private and professional pilots, and is upgrading its fleet. Dave Calderwood found out more from general manager, Willem Marais.

Rabigh Wings Aviation Academy (RWAA) is in the middle of upgrading its fleet as the Saudi Arabian flight schools steps up its training of commercial pilots – and it is considering going all-Italian with Tecnam aircraft.

The latest to join the fleet, based at Rabigh Airport on Saudi Arabia's west coast, just north of Jeddah, is the school's second Tecnam P2006T twin-engine trainer.

"We firmly believe that, with a Tecnam fleet, we can reduce training costs dramatically and our aim is to complete a 240-hour multi-engine commercial pilot's licence (ME-CPL) in 14-16 months, which is in line with the worldwide market," said RWAA general manager, Willem Marais.

"The RWAA training programme will benefit greatly from our second Tecnam P2006T Twin. Our pilots like flying it, our instructors enjoy training in it, and our student pilots love everything about it.

"Worldwide, avgas is becoming problematic to obtain and extremely expensive," continued Maris. "That was one of my main considerations when we opted for the Tecnam P2006T as a multi-engine platform.

"We have reduced operating costs by more

than 50% using the P2006T – previously we used the Piper Seneca. We now operate the P2006T on mogas (motor car gasoline), which is readily available in Saudi. Even with the recent increases in fuel price it is still a fraction of the cost of avgas.

"The very easy handling of the P2006T, coupled with the low speed, makes it an ideal training platform. The aircraft is easy to operate, with modern ergonomics, and, even in the very high temperatures, provides excellent performance. Asymmetric training is easy, and the learning curve is not as difficult as some of the competitors.

"Furthermore, the Rotax engines are very easy to maintain and the cost of a normal 100-hour major periodic inspection (MPI) is a fraction of what I am used to with the older conventional trainers.

"Because of the low training cost, we can now also offer extra hours – hour building – on our multi-engine aircraft for cadets, who would prefer to increase their multi-engine time."

RWAA's single-engine fleet consists of G1000-equipped Cessna 172 aircraft. "But we are seriously considering standardising our fleet and the Tecnam P2010 and even the

Continued
on Page 93



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CONTINUED FROM PAGE 91

P2002 are the aircraft we are considering,” revealed Marais.

The flight school was inaugurated by HRH Prince Turki bin Muqrin in 2008. It launched with a paid-up capital of 20 million Saudi Riyal (\$5.33m), as the first aviation academy in the Kingdom of Saudi Arabia regulated by the General Civil Aviation Authority (GCAA).

Marais brings a lot of flight-training experience to the party. Before RWAA, he was CEO of AVIC-International Flight Training Academy in South Africa, where they trained 350 cadets for various Chinese airlines in 60 weeks.

Rabigh Airport was built in 1980 and is, importantly for training, outside the Jeddah terminal manoeuvring area (TMA). It’s also close to major economic developments like the King Abdullah University of Science and Technology (KAUST) and the King Abdullah Economic City (KAEC).

“The airspace around Rabigh Airport is free of military operations and cross-country routes of up to 300nm are no problem,” explained Marais. “We are closely located to the instrument [flying] facilities at Jeddah Airport and we have a contract to operate in and out of Jeddah.

“Weather on the western side of Saudi is also more acceptable for ab-initio flight-training and few days are lost due to the sand storms and high winds that are the norm in the central and eastern regions.

“Currently, we teach private pilot licence (PPL), instrument rating (IR), multi-engine (ME) and commercial pilot’s licence (CPL), as well as flight instructor rating.

“Facilities at Rabigh Airport include three classrooms, a fully operational flight dispatch room (ops room), seven instructor cubicles, a crew resting facility, as well as adequate office space.

Flight simulator

“RWAA also operates a Redbird MCX flight simulator, ideal for any flight school, providing enhanced training from student pilot to professional crew. The dual controls of the MCX allow an instructor, instructor-in-training, or co-pilot, to perform manoeuvres from the right seat. During initial pilot training, an instructor can demonstrate manoeuvres from the right seat before the student tries their hand, just like you would do in the real aircraft.

“For advanced training, the MCX provides a platform where crew training can be perfected. In addition, it includes a dual, control-loading yoke system and dual rudder pedals for simultaneous pilot and co-pilot control. When you add this dual control system to the MCX’s wrap-around visuals, quick-change cockpit configurations, and extensive government approvals, it becomes a truly powerful training tool for any organisation.

“In Jeddah, RWAA has a fully operational fixed-base operation (FBO), which includes two classrooms, a marketing office, as well as



Outstanding aircraft: The Tecnam P2006T pictured at the 2019 Saudi Airshow.

administration and financial offices. As most of our clients are from Jeddah, the first six-to-eight weeks of PPL ground-school is presented in Jeddah.

“All classrooms can seat 20 cadets. RWAA makes use of Jeppesen training material and all theoretical training is done by Powerpoint presentations – and we’re proud to have a 95% pass rate for GACA examinations.

“We currently have a little more than 100 full-time students, mainly self-sponsored, and we also train the Royal Saudi Air Force (regional force). We recently completed the training of Somali pilots, issuing them with a PPL, and some instrument and ME experience.”

Most of the major airfields in the kingdom are controlled, either by the RSAF or owned by ARAMCO. “HRH, Prince Turki Bin Muqrin Al Saud, was the founding member of RWAA and obviously played a huge part in establishing the school,” said Marais. “As a pilot of both fixed and rotary-wing, he understood the challenges and immediately negotiated a contract for a long-term lease of the airport with GACA.

“RWAA also established a fuel facility and set up its own maintenance facility. The school developed quickly and soon began training pilots for Saudi Arabian Airlines under P141. The approved maintenance organisation (AMO) maintains the fleet of aircraft and will soon be fully P145-approved.”

Major challenges include the very harsh weather conditions where, in summer, temperatures will go as high as 55°C.

“We have recently appointed a strong marketing team and we would like to at least treble our capacity over the next 24 months,” said Marais. “This will include an upgrade of our facilities as well.

“Early in 2020, we will also present ATPL ground-school to offer a frozen ATPL, although the latest trend is that the smaller regional airlines will take our trainees directly after completing the approved 240-hour ME-CPL

course, which is aligned for the Saudi Arabian airline requirements.

“At least 85% of our clients are Saudi nationals but we also have cadets from Kuwait (we have a full-time agent in Kuwait City), Jordan and Somalia. Our market is aimed at the MENA region, as obtaining a Saudi visa is becoming very easy and our pricing is very competitive.

“I believe that private flying in the kingdom will boom over the next five years. Already, we see a lot of non-type certified aircraft (NTCA) entering the kingdom and RWAA currently assists a private owner with maintenance on his Flight Design CTSL aircraft, which is hangared with us in Rabigh.

Aggressive marketing campaign

“We have launched an aggressive marketing campaign to promote recreational flying as a sport in the kingdom and we will soon present training on non type-certified aircraft (NTCA).”

That’s an ambitious plan for any flight school – to train pilots from light sport aircraft right up to airline standard – and it’s not all for this going-places company.

RWAA is part of Asyad Aviation Holdings, the aviation arm of Asyad Holding Group, which has significant investments in numerous aviation services companies.

“Asyad Aviation’s diverse but integrated portfolio reflects the group’s desire to build a rational and efficient aviation industry,” continued Marais. “Asyad’s investments in international aviation concerns, including charter company PrivatAir Saudi Arabia (PASA), have established a firm foothold in the GCC’s growing business aviation market.

“This approach has led to positions in Beirut-based Lebanese Air Transport (LAT), a charter carrier and ground services company, as well as Beirut Wings Aviation Academy (BWAA), a pilot training academy and ancillary services outfit in Beirut.”

One of Saudi Arabia's biggest aviation training establishments has taken a significant step forward in its development by becoming an IATA regional training partner. Alan Dron reports.

PARTNERSHIP MOVES PSAA INTO A DIFFERENT CLASS

Saudi Arabia's rapidly growing presence in the aviation sector has expanded further, as one of the country's largest training facilities seeks to increase the breadth of skills it offers.

In July, the Prince Sultan Aviation Academy (PSAA) signed an agreement with the International Air Transport Association (IATA) to become a regional training partner (RTP) with the airline industry's representative organisation.

The academy aims to attract a broader range of students and already-qualified personnel from across the Arab world and beyond, by significantly increasing the scope of training it offers.

The academy is a strategic business unit of Saudi Arabian Airlines Corporation (Saudia) and provides training for flightcrew and groundcrew, and to upgrade skills.

Based at Saudia's Jeddah HQ, the academy already provides training for around 9,000 airline employees annually and hopes to increase this number following the signing of the agreement.

The document for the academy to become an RTP was signed under the auspices of Saudi Arabian Airlines director general, Engineer Saleh bin Nasser Al-Jasser, by the academy's managing director, Captain Ismael AlKoshy, and IATA's regional vice-president, Africa and Middle East, Muhammad Albakri.

"We typically look for institutes – universities, or airline or airport training centres, for example – that are strongly invested in the realm of aviation training," said an IATA spokesman.

IATA's regional offices provide the organisation with recommendations on an applicant's standing in the local market and its level of competence in aviation training.

The authorisation to become an IATA RTP is granted once a facility can demonstrate its ability to understand its region's training needs and determine the appropriate training offering, as well as the ability to develop promotional campaigns and access key stakeholders with clients' training departments.

"PSAA has a mandate and mission to provide access to state-of-the-art facilities and excellence in the field of aviation training," AlKoshy said. "We are proud to become an IATA RTP and look forward to connecting with new partners in the region and beyond."

Albakri added: "The aviation industry is geared to continue its growth in demand for air transport in

“The reason we chose to become an IATA RTP is to really double down on being the knowledge centre in this region. We will be able to provide a full range of courses, not currently available, that will allow us to broaden our scope.”

CAPTAIN
ISMAEL ALKOSHY

the years to come and meeting this demand will require a skilled workforce to sustain the growth and provide consistently safe and secure services to travellers.

"This strategic partnership will support PSAA in responding to the ever-growing training demand in the Kingdom of Saudi Arabia and will augment the existing knowledge transfer capabilities of the academy.

"Already this year, more than 1,500 aviation professionals have benefitted from IATA training in Africa and the Middle East and we look forward to growing these numbers to meet the demand for a safe, secure and sustainable air transport industry."

Around 2,000 Saudia pilots pass through the academy each year for proficiency checks and recurrent training, AlKoshy said, with another 500 pilots – mainly from other Saudi Arabian carriers – also taking courses there each year.

The academy's customers also include Flynas, Saudi Gulf Airlines and the Bahraini Royal Flight.

The increasing proportion of Saudi pilots in the Saudia and Flyadeal workforces (Saudia anticipates all of its co-pilots being Saudi nationals within the next few years) means that this source of business is likely to increase.

Previously, said AlKoshy, the academy focused on offering flying training (apart from the ab initio stage), other flight-related training for groups such as cabin crew, as well as specialist subjects, such as cockpit resource

management and dangerous goods handling.

In the past year, however, the academy had broadened its vision and mission. As an IATA RTP, it now has the aim of becoming what he described as "the preferred aviation training academy and knowledge centre" in the MENA region.

"The reason we chose to become an IATA RTP is to really double down on being the knowledge centre in this region," said AlKoshy. "We will be able to provide a full range of courses, not currently available, that will allow us to broaden our scope."

Those will include subjects such as IT systems, management development, emergency planning response, ground-handling and cargo security. "We want to benefit from IATA's experts. I think there is excellent potential there that will benefit both parties." ■



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Aziz Ul-Quayum,
Aircraft Maintenance Engineering Student

A fast-growing Saudi aerospace company has teamed up with a German maintenance specialist to create a school for aviation technicians. **Alan Dron reports.**

Teching a step forward



Going for growth: As part of the Saudi National Center of Aviation's growth, Anthony Miller (left), OxfordSaudia Flight Academy's director of business development and David Ward, Lufthansa Technik Shannon Aviation Training Academy's business development manager, sign the deal to train pilots at Dammam.

Saudi Arabia has taken another step towards building an aerospace sector with the signing of a memorandum of understanding (MoU) to create a school for aviation technicians.

The agreement, between the Saudi National Center of Aviation (SNCA) and Lufthansa Technik Shannon (LTSL) Aviation Training Academy, will explore the viability of establishing what the partners plan to be a world-class maintenance training organisation.

The aim is to locate the new facility at SNCA's new aviation training centre at King Fahd International Airport at Dammam.

If it comes to fruition, the new maintenance school will be the largest of its type in Saudi Arabia.

High demand

"Our vision is to establish a top-class aviation centre that will match the high demand and need in the aviation industry, especially in the Middle East," said a SNCA spokesperson. "We are committed to providing the highest quality of services to become a landmark for Saudi Arabia and the Middle East region."

Anthony Miller, SNCA's business development director, told an audience at the signing: "We're delighted to collaborate with another leader in aviation training. It gives us the opportunity to bring global excellence in aviation technician training to our training centre."

This, he said, would continue SNCA's vision of meeting both the needs of airlines and also the ambitions of anyone wishing to pursue a career in the aviation sector.

For LTSL, previously better-known as Ireland-based Shannon Aerospace, the Saudi Arabian deal represents another chapter in a long history of providing airlines with technical support.

"For the last 29 years we have trained aviation technicians to support the world's airlines," said LTSL Aviation Training Academy business development specialist, David Ward. "Through this relationship with SNCA we're looking forward to exploring new opportunities to support the growing needs of the Kingdom of Saudi Arabia's aviation sector with our standards and experience."

The intention is that the new facility will have Part 147 certification and provide training, both for new technicians and for those wishing to upgrade their existing skills: "Our goal is for our technicians to be licensed, type-rated and ready for the market," the company said.

The signing of the MoU was the latest move by the Lufthansa Technik group into the Saudi market. Earlier this year, the company won the approval of the Saudi regulator, the General Authority of Civil Aviation, to conduct maintenance on Saudi-registered aircraft.

First A-check

In January, Lufthansa Technik Middle East carried out the first A-check on a Saudi-registered Airbus A320 in Dubai. The 400 man-hours procedure included a check of all flight safety-related equipment, the exchange of several components and the completion of service bulletins.

Meanwhile, SNCA is steadily building up its facility at Dammam. Its aviation academy now consists of three sections; as well as the maintenance academy that is the subject of the Lufthansa Technik Shannon agreement, there is a flight academy and a simulator facility. All three sections will create a synergy, the SNCA hopes, and become a hub for aviation training.

The scale of the kingdom's ambitions for the aviation training centre – and the speed with which it is being set up – can be seen in the announcement at the end of 2018 to acquire no fewer than 60 aircraft from Austria's Diamond Aircraft company for the flight-training part of the centre. This was the largest-ever purchase agreement for a Middle East training school.

These will consist of a mix of single-engine Diamond DA40NGs and the twin-engined DA42-V1s. The first aircraft were delivered earlier this year and deliveries will continue over five years.

The purchase agreement "marks a new era of aviation training in the kingdom, which is well-aligned with the kingdom's 2030 vision", said Miller at the time. The OxfordSaudia Flight Academy, as it is known, will train ab initio pilots for both fixed- and rotary-wing types.

"SNCA is determined to provide the aviation industry with highly qualified male and female pilots, who will be part of the development of our aviation industry and serve as an integral tool for development in the region," he added. ■

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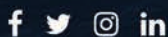


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*Joramco is going places. Its transformation from a regional maintenance, repair and overhaul operation to a global player with world-class standards – a work in progress – shows what’s possible with the right vision, strategy and approach. Chief executive, Jeff Wilkinson, talked to **Chuck Grieve**.*

Joramco maintains its drive into Europe

Two years into its transformation journey, Joramco is taking the MRO world by surprise.

The Amman, Jordan-based company boosted revenue by an impressive 29% in 2018 and a forecast 14% in 2019. It is within touching distance of crossing the \$100 million threshold next year.

It has gained four new European Aviation Safety Agency (EASA) accreditations, including the important Part-145 approval for the Boeing 777, and has just signed its biggest client to date: Ryanair, operator of the world’s largest 737 fleet.

The overhaul of Joramco is led by chief executive, Jeff Wilkinson, who arrived in October 2017 and has taken the company to places – notably Europe – that would have been inconceivable a short time ago. He maintains that’s just the start.

“Two years in on a five-year journey, I’m exactly where Dubai Aerospace expects me to be but behind where my internal clock wants to be. I thought I’d be further advanced,” he said.

Wilkinson is a young chief executive – just 45 – and exudes an air of restless energy. He joined Joramco after 11 years with Etihad Airline Engineering, where he’d risen to become chief executive. The challenge of giving Joramco a new lease of life was impossible to resist. “I love change management,” he said.

He came on board shortly after Dubai Aerospace Enterprise (DAE) had acquired its 80% holding in Joramco. He liked DAE’s vision.



“Two years in on a five-year journey, I’m exactly where Dubai Aerospace expects me to be but behind where my internal clock wants to be. I thought I’d be further advanced...”

JEFF WILKINSON

“Basically, they were going to start off small, grow the business to support their aircraft and the wider airline community, and potentially buy more MROs globally if the revitalised Joramco model was successful.

“I came and had a look. It just screamed ‘untapped potential’.”

The set-up at Queen Alia International Airport (QAIA), near Amman, “was behind the times, needed a review of strategy and an implementation plan. It was too good an opportunity to miss.”

He compares the company to a football team languishing in the lower half of the table, despite having the talent to be among the top four. As he puts it: “I thought, ‘Let’s go for it’.”

Wilkinson says turning a business like

Joramco around “is not rocket science... but it is hard work”. He drew up a strategic roadmap and an implementation plan in his first weeks, and then set about achieving the goals.

Joramco’s strengths are its location and a relatively low cost of labour. Its QAIA base is 3-5 hours from all its main markets. Its staff, of about 1,000, are all Jordanians who “get things done”.

But years of stagnation under the previous owners had left the staff “wounded and lost”. His job, Wilkinson said, was “just” getting rid of old habits and putting a more disciplined structure in place.

With the support of DAE and a clear direction of growth mandated, he approached his task with enthusiasm and energy.

Typical of the challenges was restructuring the



Upgraded: No more "back street garage" as hangars have been refurbished to the delight of customers.

supply chain organisation. "That was one of the most split-up areas of the business," he said. "Part of it reported to finance, part to operations, part to engineering. It was all decentralised. That made it [restructuring] easy – there were so many obvious things to do."

Less obvious, and not as easy, was winning acceptance of his plans. "Everything had been constant," explained Wilkinson. "Everyone knew where Joramco fitted into the marketplace.

"When I came in with the big views, the big vision, most staff thought I'd be gone by Christmas."

His hearts and minds campaign started with internal improvements. The month Wilkinson was appointed saw the introduction of weekly staff communications and a suggestion box procedure: two new staff cafeterias swiftly followed.

Additionally, training programmes such as the technical English course, level 3 type ratings, and staff competency reviews, were put in place.

The monthly staff magazine, *Leading Edge*, made its appearance in March 2018; new colour-coded staff uniforms arrived that May, and the staff lounge opened in September – ahead of the customer lounge.

During his tenure, Wilkinson also brought in Fraser Currie, Matt Stewart and Sakher Haddadin, all experienced aerospace professionals, as advisors to the chief executive. Currie is now chief commercial officer; Stewart is director of transformation; Haddadin is the head of supply chain.

Communication was an early win. Out went

the glass-fronted notice boards and sheets of A4 taped to the wall; in came digital screens, bright and engaging posters, a weekly bilingual communication, a staff magazine, a new website, and more.

"It's all 'in your face' – the vision, the values – to let people know what's going on. You have to get it out there so they understand what the point of this is: why do we want EASA approvals, why do we need European customers when we're fine serving the Middle East?"

Move to the next level

Because, Wilkinson answers, that's how Joramco will move to the next level. The drive to win European customers has been "extremely successful", the Ryanair coup capping a good half-year that brought Swiss International, Air Belgium, Air Malta and Brussels Airlines on board – to name but a few.

Ryanair is a big win. Joramco has an initial one-year contract for heavy maintenance on its fleet of Boeing 737s. "It's a good one for us; it's a good one for anybody," said Wilkinson.

The European low-cost giant has nearly 400 heavy checks due this winter, he said, and most of it has to be outsourced. "We bid and we won two lines from October."

The new contract fits Wilkinson's long-term goal of developing strategic relationships with national flag-carriers and large tier-1 fleets, of which Ryanair is the largest fleet in Europe.

Its aircraft, said Wilkinson, "are all the same,

so you don't have to hold a lot of different cabin parts and one-time items. With two lines, you can buy bulk. Both parties win."

European customers come with different expectations, plans and strategies, he said. A challenge is balancing their requirements with those of his existing Middle East clients.

Here, Joramco's size and agility are advantages. "We're able to offer a more bespoke product and give different guarantees," he said.

In the last two years, as well as the B777 approval, Joramco has obtained EASA approvals for Boeing 737 MAX, Airbus A320neo and Boeing 787 aircraft. It also holds 12 EASA type approvals covering Airbus, Boeing and Embraer types.

Wilkinson said Joramco is "exceptionally good" in areas such as structures, composites and avionics, and getting better in others, such as cabins, under the influence of European customers.

"Swiss is an obvious one," said Wilkinson. "They have a cabin standard no different to the likes of Etihad, Emirates or Qatar, and they're very demanding."

As an independent MRO, Joramco had to build its capability almost from scratch, learning to work with Swiss-supplied parts and spares. "They've helped drive us forward," he said.

And staff started to get it. "They no longer questioned why we needed nice offices, for example;

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why we needed the hangars repainted; why we needed new lights in the ceiling.

“It’s all about standards. A Lufthansa Group customer gave us a beautiful testimonial. She said, ‘I used to feel that Joramco was a back-street garage; now it feels like I’m taking [the aircraft] to the dealer’.”

Wilkinson brought a customer-centred approach with him from Etihad Airways. “It was embedded in me a long time ago,” he said, as was the importance of marketing and branding.

Understanding customers’ needs is key. Most of Joramco’s customer airlines do not fly revenue services to Amman, so their crews make a special journey to accept aircraft and depart straight from the hangar. Wilkinson saw a comfortable customer area, with facilities mirroring those of corporate and charter fixed-base operations (FBOs), as a necessity.

The resulting customer centre – “a basic design” – incorporates sofas, televisions, a coffee bar, signage and branding. He described it as “the first big win” of his new strategy. “At that point I knew we could do this.”

Wilkinson said the transformation journey is an education for him as well – “and that’s got to be good”.

And it’s going well. The number of national flag-carriers booking heavy maintenance at Joramco is well into double figures “and they just keep coming”.

Learning from customers

It’s not all been a bed of roses. Every unsuccessful tender teaches the MRO a lesson on some aspect of its business. The key is learning from customers. “They have experience,” he said. Some “have been all over the globe” for MRO.

Lufthansa, for example, “gave us some great insights” into how it does things. Flydubai helped Joramco with training on 737 MAX and 737 NG types. “Flydubai also supported us with knowledge-transfer as a very experienced operator, which was critical to our success.”

Wilkinson said Joramco is committed to developing its staff. “It’s not just a buzzword. The level 3 training has gone through the roof. I have two 737 courses going at the moment.”

Upskilling is part of the new strategic vision, supported by DAE, to add value to the team.

Some of those on Joramco’s current courses have been with the company for 15-20 years and, until recently, were single-type qualified. At the end of their course in Amman, they will go to Scotland for hands-on 737 experience with Ryanair.

“The strategy is quite simple; it’s based on people. If you have the right people, give them the right processes and deliver to the customers, the finances will come.

“On the people side, you manage the performance, have a succession plan to grow them up in the business, accelerate and bed in the next generation.”



Valued: Staff uniforms and improved communication has led to a more engaged workforce.

Customer demand led Wilkinson to seek EASA Part-145 approval on the Boeing 777, and the effort and expense looks likely to pay off.

Joramco’s approval means regional 777 operators have an alternative to flying to the Far East for their heavy maintenance. “There’s a market for it, for sure,” said Wilkinson.

He did a deal with Etihad Airways Technical Training to train his engineers at its Abu Dhabi facility. “To me, it was a no-brainer. I wanted good quality training, and Etihad has one of the best training centres in the Middle East.”

The 24 Joramco staff he sent on two courses came back more than trained – they were converts to his vision. “They couldn’t believe what Abu Dhabi and the training course had to offer, compared to us at the time,” he said.

It’s about standards, he added, and simple things like uniforms. “In Abu Dhabi, they had to wear trousers and a shirt for training – unheard of here. They came back with smiles from ear to ear.”

Family day on site

A recent highlight of the hearts-and-minds campaign was Joramco’s first-ever family day on site. Wilkinson said it was a “huge success”; staff could show their families for the first time where they worked. In all, 1,600 people were allowed airside.

“I’m told people were speechless,” he said. “It goes to show that, as a smaller MRO, you can do these things.”

The next step, Wilkinson explained, “is what we’re calling Transformation 2.0, with a focus on process”.

Using the football analogy, Joramco is now in the top four, starting to win trophies, and in contention for the No 1 spot. The differentiators are process, flexibility, local workforce, and successful business strategy and implementation.

Joramco’s procedure manual is being rewritten, rationalising and simplifying its 1,500-plus pages and incorporating industry best practices, with more visual elements to help people understand what they need to know.

A new safety system is in place with a new manager, who is introducing communications and competitions to raise awareness of health and safety issues.

Wilkinson has introduced Q-Pulse analytical software to “bring the quality department into the 21st century”. This supported Joramco’s application for EN9110 accreditation – the first in the Middle East for an independent MRO.

On top of all this, Joramco recently rolled out EmpowerMX, which he described as an MRO-driven productivity and accountability solution based on manpower.

For him, this software will be the “single biggest win” of the transformation so far. “We’re not as efficient as we could be,” he said, “but we’re getting there”.

He is looking at adding further back-shop capabilities, including a dedicated paint hangar.

An agreement with GDC Engineering has brought A319/320 modification capability on site, and he has “toyed” with freighter and VVIP conversions. “They’re all balls in the air.”

Wilkinson added: “The issue is how far we want to grow Joramco. It’s a successful business model now; we just have to keep working at it.

“For me, it’s about building something sustainable, something we can be proud of. There’s a lot still to do.

“We’re now starting to win checks off other MROs where, previously, Joramco wouldn’t have even got past first base. It’s not just on cost: it’s about quality, turnaround time and all the things that really matter.

“It’s finding the balance. To be fair, we’re not there yet but we’re making progress in the right direction.”

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Aircraft Capabilities



- B737 (Classic, NG and MAX)
- B787-800/900
- B777-200/300



- E170
- E175
- E190
- E195



- A300-600
- A310-200/300
- A320 Family
- A320neo
- A330
- A340-200/300

*Few scenarios are more time-sensitive than aircraft on the ground (AOG) situations, and it has given rise to ultra-fast delivery of spares. **Chuck Grieve** looks at how leading players meet the demand.*

Speed merchants

Seeing red: The distinctive 'must-go' bag colour and marking alerts Emirates staff to its top priority status.



If ever a modern example of the old 'time equals money' admonition were needed, AOG situations would head the list. It's sobering to learn, from Airbus China no less, that 'going technical' could cost an Airbus A380 operator as much as \$1.25 million a day in charges and lost revenue.

Little wonder, then, that logistics providers around the world reserve some of their fastest delivery options for AOG customers. In response to demand, Emirates (EK) SkyCargo launched its AOG service in April 2018 after a year of research and product development. It has reported a strong take-up of the service in its first 18 months of operation.

Dennis Lister, vice-president cargo commercial development, said the service had more than 10,000 AOG shipments last year for a total of more than 800 tonnes, and was expected to grow by 20% in 2019.

Speed of delivery, not surprisingly, was "the one key requirement" that came out of EK's research. Lister said: "Our research also indicated that the most frequent shipment (mode) weight for AOG shipments was about 4kg. Taking these into consideration, we developed a bright red Emirates AOG 'must-go' bag, which is now used for last-minute bulk loadings and immediate retrievals.

"This has proved very popular with our customers: they know their shipment is not mix-loaded in a consolidated unit or pallet and can be easily accessed and retrieved."

Adding to the time savings are more attractive cut-off times for acceptance and delivery of AOG cargo. For example, he said, for a shipment below 100kg, EK guarantees ready-for-collection (RFC) status within 2.5 hours of the aircraft's arrival at destination.

Lister said Emirates AOG offers the highest priority within the group's portfolio – "higher than even our AXA or priority product category" – ensuring that the shipment is not offloaded and reaches its destination according to the agreed parameters.

The AOG service plays to EK's key strengths: its extensive global network, good belly-hold capacity in its Airbus A380 and Boeing 777 aircraft, and experience of transporting aircraft parts for its own fleet.

Continued on Page 104



Dennis Lister: The Emirates AOG service has proven popular with customers.

TPAerospace

WHEELS AND BRAKES

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CONTINUED FROM PAGE 102

“Where a shipment is outsized or the destination is not on our scheduled network, we have an agile and responsive team, who can work with the customer for an optimal solution,” he said.

Emirates SkyCargo has a strong record for delivery as promised (DAP), he said, and cited the example of an AOG request received from a Dubai-based private jet operator, whose aircraft had ‘gone technical’ in Singapore and needed parts from its Dubai stores.

“The aircraft in question was due to leave Singapore the next day at 13.00 local time. We received the request from their agent at 17.00 and had the shipment planned and booked on to EK 432 departing DXB at 21.15 and arriving in Singapore at 08.50 local time. We managed to have the AOG bag offloaded, cleared and in the custody of the operator by 10.50.

“This was far quicker than our guaranteed service level agreement (SLA) of 2.5 hours for notification of delivery, and the aircraft could then operate as per the original plan.”

EK operates a 24/7 cargo operations control centre (COCC) in Dubai, which monitors the progress of high-priority shipments such as AOG. The COCC will rebook or reroute a shipment if there is a risk of it getting delayed.

Around the clock

“Our operators are used to dealing with AOG requests around the clock from across the world,” said Lister. “We’re geared up to respond to these enquiries over the phone, e-mail or even online through our portal skycargo.com. There is a never a dull moment when working to facilitate AOG shipments.”

Operating its own fleet of more than 600 aircraft has helped FedEx build its ‘aerospace solutions’ portfolio of customisable services, including AOG support. It offers the complete organisation of urgent air transportation, combining best available flight, collection and delivery services.

Its service brings together experts with knowledge in logistics and customs with FedEx’s own network of aircraft, trucks, and facilities, along with strategic relationships with other carriers. The service extends to on-board couriers, charters and airside deliveries, as necessary.

“FedEx is committed to developing innovative products that make full use of our connected world to deliver the best service,” said Taarek Hinedi, vice-president of FedEx Express Middle East Operations.

International logistics company, DHL, is well-versed in AOG support. It uses a system of dedicated contacts throughout its global network to expedite delivery.

DHL works to achieve close monitoring, top-priority handling and on-time delivery, whatever the size of the critical component, by keeping everyone involved informed of the status of the items being transported.



Boxing clever: FedEx has developed innovative products that make full use of its connected world. **Inset:** Operating its own fleet of more than 400 aircraft informs FedEx’s services for the aerospace industry.

ALG keeps the MRO supply chain on target

The Aerospace Logistics Group (ALG) is a global industry association, headquartered in Switzerland, made up of independent companies specialising in services tailored to the demands of the aviation and aerospace industries.

ALG received best-in-class accreditation from the Global Institute of Logistics (GIL) in 2017 in recognition of its contribution to the development of best practice in vertical-specific freight forwarding networks (VSFFN).

Research by the institute found that strategically managed collaborative networks are best placed to achieve the higher service levels demanded in a vertical market, such as aerospace.

It said the freight and logistics support needed to keep the MRO supply chain operating on target and on time was “astounding” and pushed logistics service providers to the pinnacle of performance.

Kieran Ring, GIL founder and chief executive, said the “premium placed on velocity” in aerospace AOG situations was unmatched in any other vertical market.

“No matter how optimised the spare part distribution network, the final mile still poses the greatest challenge,” he said. “Failure is not an option and to survive and thrive in this world, dependability is the key.”

Features of DHL’s AOG service include 24/7 customer service centre support, mission-critical express services, and individually agreed lead times from origin to the point of need.

Where Emirates AOG is a logistics-only service provided for the rapid transport of aircraft components by Emirates SkyCargo, EK’s freight division, others approach AOG logistics from the spares supply point of view.

One such is AJW Group, whose approach focuses as much, or more, on prevention of AOG incidents as on remediation when they happen.

End-to-end service

Christopher Whiteside, chief executive and president of AJW Group, said its integrated AOG solution is an end-to-end service designed to reduce operational disruptions.

AJW uses predictive maintenance technology to forecast and manage aircraft component failures and to plan inventory locations around the world. “These strategically located inventory hubs enable us to quickly and seamlessly serve our customers through a network of local logistical partners and a round-the-clock dedicated AOG team,” he said.

“We’re constantly innovating to ensure we’re leading the way when it comes to our AOG service.

“Earlier this year, we consulted our airline customers to see how we could improve. As a result of those discussions, we now have an even larger team running our round-the-clock, 24/7 AOG operation.”

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Why older means new

Older airliners are staying in service longer than anticipated, which, as Alan Dron reports, is good news for maintenance companies such as Sharjah-based VD Gulf.

Sharjah Airport is one of the less glamorous facilities in the Middle East but its location makes it popular for low-cost carriers, such as Air Arabia, together with airlines that do not need the facilities of Dubai or Abu Dhabi.

It is particularly popular with cargo airlines.

Its location also makes it popular with the technical support companies that form the essential back-up infrastructure to airlines.

Volga-Dnepr Gulf (VD Gulf) has been one of those support companies for several years. A subsidiary of the Russian group best-known for its cargo operations, Volga-Dnepr Airlines, AirBridgeCargo and Atran, its Volga-Dnepr Technics division provides maintenance, repair and overhaul (MRO) services both in Russia and the UAE.

In commissioning its 22,000sqm hangar in 2013, VD Gulf now has a facility capable of handling two Boeing 747s and six 737/Airbus A320-sized aircraft simultaneously and allows it to claim a place as the largest independent MRO provider in the region.

New generation marques

Established in 1996, the company now caters for the Airbus A320-family, as well as Boeing 737 classic and new generation marques, plus the 747-400 and current 747-8 models, primarily under European Aviation Safety Agency (EASA) Part 145 approval, as well as regulatory authorisations from several other countries.

Both line and base maintenance are carried out, including heavy checks and major modifications.

In February this year, the company expanded its portfolio of capabilities by gaining certification to handle the Boeing 777. The move came after several customers had asked VD Gulf to add the Boeing twin-aisle type to its roster of aircraft on which it could perform maintenance and overhauls. The company duly assembled a core maintenance team of EASA-approved engineers.

Receiving approval from Bermuda's civil aviation regulator for the work, VD Gulf's commercial director, Ayrat Gilmudinov,



New capability: VD Gulf's ability to maintain Boeing 777s was demonstrated by the arrival of the first such aircraft, an Iraqi Airways 777-200LR. Right: Different types of aircraft can be handled in the VD Gulf hangar.

described the achievement as “an historic and strategic step, a new stage in the company's life”, as several of the company's regular clients were taking the US-built wide-body into their inventories. “It was important for us to respond in a timely manner to our customers' requests,” said Gilmudinov.

The first sign of industry approval for the new capability came only three months later when Iraqi Airways dispatched its sole 777, a -200LR model, to Sharjah for base maintenance. The aircraft underwent a heavy C-Check, together with work to bring it up-to-date with several airworthiness directives and service bulletins, in a process that took 14 days.

With the Boeing 747 rapidly disappearing from its role of the flagship of passenger airlines, an increasing proportion of those still in service are freighter versions; indeed, the current variant, the 747-8, has found more success as a dedicated cargo-carrier than a passenger aircraft. Perhaps unsurprisingly in that case, VD Gulf says that the bulk of its work on 747s is for cargo aircraft operators.

One of its biggest customers is Air Atlanta Icelandic, which became the 200th visitor to the Sharjah hangar in summer 2018. The Boeing 747 operator flies around a dozen of the aircraft – both cargo and passenger – on an ACMI basis on behalf of airlines around the world, such as Saudia Cargo.

Air Atlanta stations several of its 747 fleet in Jeddah, making Sharjah a conveniently close location in which to undertake MRO tasks.

The company has also provided maintenance services for Malaysian 747-400 operator, Eagle Express, which uses the aircraft in a high-density layout for the carriage of pilgrims from south-east Asia to Saudi Arabia for the Hajj and Umrah seasons.

In 2018, VD Gulf also undertook an extensive programme of heavy maintenance checks on Russian company Rossiya's fleet of 747-400s in the UAE.

Leasing companies

Meanwhile, much of its work on narrow-bodies is undertaken for leasing companies, while it also supports Volga-Dnepr's own fleet, which consists of a mix of 747-400s, Ilyushin Il-76s, Antonov An-124s and two freighter 737 variants.

VD-Gulf is forecasting continuing strength in the MRO sector in the coming years: “We see a steady growth of the market, simply because the worldwide fleet is expanding and retirement has not been as originally predicted,” said a company spokesman.

One factor behind this may be the relatively benign fuel prices of recent years, which have seen older, less fuel-efficient aircraft retained in service longer than their operators envisaged a few years ago.

And, in the past year, the need to fill the gaps in airline fleets whose Boeing 737MAXs have been grounded, has seen older types being kept flying; sometimes, that has led to those aircraft requiring servicing, which their

business for VD Gulf



operators had hoped to avoid by disposing of them before overhauls became necessary.

“We see retired aircraft moving to different parts of the world under new registrations and requiring maintenance,” added the spokesman.

This means that lessors rarely have problems in finding new homes for their aircraft that have been flying for airlines that come to the end of their leases: “End-of-lease and entry-to-service work is also increasing due to the bankruptcy of some airlines and the fleet moving to new operators by the aircraft owners.”

Specialised capabilities

This anticipated growth in the MRO market means VD Gulf has expanded by adding more specialised capabilities to its Sharjah facility, such as precision machining, chemical coating and composites repair.

Within the wider Volga-Dnepr Technics division, there are plans to further expand capacity by building additional hangars, but the location of these has yet to be decided. ■

AIRPORT BUILDING SOLUTIONS

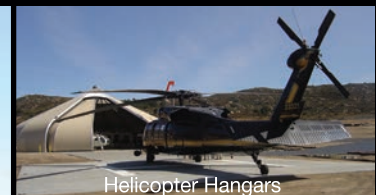
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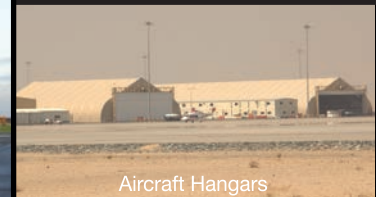
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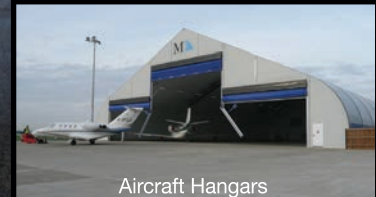
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*The way spares and replacements are located and procured has been transformed by digital technology, with online marketplaces making life easier for buyers and suppliers, writes **Chuck Grieve**.*

Spares one click away

The love-hate relationship between maintenance, repair and overhaul (MRO) and digitalisation – huge opportunities vs disruptive changes – is slowly shifting in favour of embracing the new, thanks in large part to the work of innovators tackling the challenges of parts procurement.

Digital platforms provide an inclusive shop window on parts and spares in a bid to be a universal one-stop search and procurement solution. Industry commentators suggest they are fast closing in on the target.

The venerable search tool PartsBase, in business for more than 20 years, lays claim to the title of the world's leading internet-based parts locator. In May, it released a platform upgrade that adds supply and demand graphs, plus buttons to facilitate e-commerce.

"We don't deal with actual transactions," the company's business development manager, Tyler Wilson, said. Instead application programming interfaces (APIs) take the buyer to the vendor's website to complete the transaction.

PartsBase has more than 115 million line items cross-referenced with US and NATO master cross-reference library (MCRL) and part repairs, coatings and manufacturer approval (PMA) replacement parts availability. Every search of its database brings up a picture of the parts, traceability documents, original equipment manufacturer (OEM) and part serial number.

Online marketplace

Newcomer Skeyos has also upgraded its online marketplace for aircraft components, which the company says is "transforming the procurement process across the MRO industry" with its one-stop platform.

"We aim to make the life of purchasers and suppliers of aircraft components easier by simplifying the traditional request for quotation (RFQ) process through our next-level MRO procurement solution," said Skeyos chief executive, Hans Bernd Schmidt.

The MRO community, he added, is "a great example of an industry acknowledging the advantages afforded by digitalisation, whether it be to improve efficiency or transparency in their operations."

Since it went live in January, the Lufthansa Technik subsidiary has extended its network around the world. The platform covers the functionalities for searching, price comparison, ordering, payment, transaction analysis and instant messaging between suppliers and purchasers.

It reports sales of €2 million (\$2.19m) through the platform since its launch.



“We aim to make the life of purchasers and suppliers of aircraft components easier.”

**HANS BERND
SCHMIDT**

Hundreds of new users have registered for the Skeyos digital marketplace in recent months; the number of transactions conducted on the platform last quarter is in the hundreds and rising.

Users can compare pricing from different suppliers, place orders directly online and manage payment through the platform.

Skeyos offers customers four pricing models designed to suit different needs. Most recently, the platform added the ability to connect to standard management systems such as AMOS.

Last June, Skeyos launched the first 'buy-or-repair' parts comparison, a module that it says revolutionises the way such decisions are made. A single click allows customers to view and compare new and used parts, as well as associated repair services, on more than 140,000 products.

Another option for MROs is Marc (which stands for major asset real-time components) and claims to be the world's largest stock of serviceable airframe components, including parts for the Airbus A350, A320neo, Boeing 787 and 747-8 aircraft.

Loan, sale and exchange

Part of the open digital aviation platform Aviator, Marc helps users find currently available components for loan, sale and exchange. It currently covers inlet cowls, thrust reversers, radomes, flight controls, fan cowls, flaps, slats, rudders, doors and other major structural components.

Marc claims to offer more serviceable components than any OEM. In response to an item search, it shows only components currently available with their exact location, plus any potentially interchangeable components.

Greater market transparency is the goal of SmartHub, a new online tool launched in September by the International Air Transport Association (IATA) as the industry's first single point of reference for the value of surplus parts.

IATA said SmartHub provides a real-time calculation of the fair market value (FMV) of items listed by subscribing airlines and MROs by crunching customer-provided information, external market data and historic transactions.

This data, it said, will reduce over-payments, allow better-informed procurement decisions and enhance trust in buyer/vendor relationships.

"The market really needs this," said Fabricio La-Banca, head of group purchasing surplus for Lufthansa Technik, one of the launch customers. "It will rebalance the aviation value chain and help airlines save money." ■

AMMROC'S SWEET HONEYWELL DEAL

The UAE's Advanced Military Maintenance Repair Overhaul Centre (AMMROC) has taken another step to expand its capabilities through an agreement with US avionics and mechanical systems company, Honeywell, writes *Alan Dron*.

Under the agreement, the companies will work together to improve the maintenance and overhaul of the US company's components on the UAE Air Force's extensive fleet.

"This agreement starts a long-term collaboration between Honeywell and AMMROC that will see us work closely to ensure we provide the highest standard of maintenance and repair to the UAE's key aircraft fleets," said Honeywell Aerospace's director, Middle East & Africa, Mosab Alkubaisy.



"Providing a high standard and reliable repair and maintenance service is critical to our business and to the UAE Air Force," added AMMROC's chief financial officer and acting head of supply chain management, Ahmed Odeh.

The move follows the decision earlier this year to link up with BAE Systems to set up a maintenance, repair and overhaul (MRO) facility in Al Ain.

Big deal: AMMROC's latest agreement with Honeywell is part of an expansion that includes a new facility capable of accommodating eight Lockheed Martin C-130 tactical transports.



Similar to the Honeywell relationship, the MoU with BAE Systems will see the UK-based company partnering with AMMROC to support its products, specifically on the Lockheed Martin F-16, which makes up a significant portion of the UAE air force's front-line strength.

In 2018, BAE Systems was selected by Lockheed Martin to provide flight controls to upgrade the UAE's F-16s. The company will provide the F-16s with its advanced digital flight control computer, which receives demand inputs from the pilots' control stick and rudder pedals, as well as monitoring flight conditions from on-board sensors.

The agreement with the UK company is expected to

see it transferring technology for the testing of some products and manufacture of others.

The two deals with major western companies, which have extensive interests in supporting existing equipment and providing upgrades for military aircraft, demonstrate AMMROC's determination to become a serious player in the military MRO marketplace.

The UAE company is steadily creating a major MRO facility at Al Ain, with four multi-purpose hangars, more than 30 repair shops and a climate-controlled painting facility. It will have more than 36,000sqm of hangar space with the potential to simultaneously maintain eight aircraft the size of Lockheed Martin C-130 transports.



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New beginning: A Bangladesh Air Force LET 410 at the disused airfield of Lalmonirhat, where SAMI is funding a new MRO facility.



SAMI in \$5 billion MRO venture

Saudi Arabia is to fund a new aircraft repairing and maintaining facility at an abandoned air base in Bangladesh.
Jon Lake reports.

Saudi Arabian Military Industries (SAMI) is planning to invest \$5 billion in a bid to set up an MRO facility as part of a larger Saudi investment push in Bangladesh.

This will see \$15 billion of investments being made in a range of sectors from aviation to energy and health.

SAMI was launched in May 2017 to “act as a sustainable platform to provide world-class military products and services”.

It intends to assume a leading role in the global military industrial sector by 2030, and to become one of the top 25 global defence companies. As well as aiming to localise more than 50% of Saudi Arabian military spending, SAMI is also planning to forge trusted, long-term strategic international partnerships.

Lalmonirhat Air Base was built in 1931 by the British Government, and expanded during the Second World War. It was used in the defence of Assam, and to support allied operations in Burma, becoming the second largest airfield in the region. It was abandoned after the partition of India and Pakistan in 1947.

Limited commercial operations began in 1958, but proved uneconomic, and the airfield closed again in 1965.

Gained independence

After East Pakistan gained independence as Bangladesh, there were plans for Lalmonirhat to become the headquarters of the new Bangladesh Air Force, but these were abandoned after the construction of a 4,000 metre runway, large ramp, taxiway and hangars.

Though the airfield remained unused, air force authorities did develop an agriculture project at Lalmonirhat from 1983, and the base became home to the Bangladesh Air Force (BAF) Care and Maintenance Unit. More recently, the decision was taken to reopen Lalmonirhat as a regional airport, connecting passengers from India, Bhutan and Nepal to Dhaka, initially planning to operate three flights per day by December 2019.

The BAF has been given responsibility for the project, and began take-off and landing trials in March, using two of the LET L-410UVP-E20 light turboprops used by No103 Squadron from Bashar AB Tejgaon.

Lalmonirhat is also to be home to the new Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University, founded to promote and improve aeronautical and aerospace studies in Bangladesh. The new university, which will also have a branch at Ashkona in the capital city, Dhaka, will have seven faculties, four departments, and four institutes, presided over by a vice-chancellor, who will be a serving BAF senior officer.

The university will be affiliated with the Bangladesh Air Force Academy, Flying Instructor School, Flight Safety Institute Command and Staff Training Institute, Aeronautical Institute and Officers Training Institute. Academic classes, including undergraduate and postgraduate courses, are planned to begin by January 2020.

Housed on the campus

The new aircraft maintenance and repair hangar being funded by Saudi Arabia will be housed on the campus, and there have been reports that the government hopes to also establish an aircraft manufacturing factory at the site.

Saudi Arabian relations with Bangladesh have grown steadily closer over the last four years with four official state visits to the kingdom by Sheikh Hasina, the tenth and longest serving prime minister in the history of Bangladesh.

Saudi Arabia and Bangladesh have signed a defence cooperation agreement, which will see Bangladesh assisting Saudi forces in clearing landmines along the Yemen border.

In March 2019, a Saudi business delegation, led by two Saudi ministers, visited Bangladesh as part of the Saudi investment push, and in August 2019, Air Chief Marshal Masihuzzaman Serniabat, BAF Chief of Air Staff, visited Saudi Arabia and toured the King Faisal Air Academy and Alsalam Aerospace Industries, which provided a potential model for the new Bangladeshi university and MRO.

Serniabat also met the Saudi Royal Armed Forces’ chief of the general staff, Fayyadh bin Hamed bin Raqed Al Ruwaili, and the Royal Saudi Air Force commander, Turki bin Bandar bin Abdul Aziz.

It is understood that the planned MRO at Lalmonirhat was discussed by the senior officers. ■

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L-39NG
NEXT GENERATION



Over the past decade, Tunisia has continued to build a solid, recognised and sustainable aeronautical industry. The leaders of the Tunisian Aeronautics and Space Industries Group – GITAS – have been explaining to **Vincent Chappard** some of what's behind the success story.

THE A TO Z OF TUNISIA'S RAPID RISE IN AEROSPACE



The Tunisian Aeronautics and Space Industries Group – GITAS – has two main missions as it aims to promote the development of the Tunisian aeronautical supply chain and attract new investors.

Its development plan aims to boost growth in the sector by first creating inter-industrial synergies – today, Tunisia is able to carry out research and development (R&D), design, manufacture and assembly – and then being a driving force to promote Tunisian sites internationally.

President, Thierry Haure-Mirande, and general secretary, Wassim Srarfi, said the sector is now a vital part of the country's economy. It includes more than 80 companies (90% of which are offshore); exported goods around €480 million (\$525m) in 2018; and is currently responsible for more than 17,000 direct jobs.

Large international companies and groups have a presence including Altran, Hutchinson, Latécoère, Paradigm, Precision, Sabena Technics and Stelia Aerospace, along with several companies in the Safran Group.

Many aerospace areas

These companies cover many aerospace areas including aeronautical composites; aircraft storage and dismantling; interior design; technical textiles; parts; and infrastructure manufacturing – along with general and specialist maintenance, repair and overhaul (MRO).

The aerospace industry in Tunisia is relatively young, with the arrival of the first companies in 1998. However, it is now in a 'full growth phase', exemplified by companies like Zodiac Aerospace (Safran Seats, Safran Cabin and Safran Aerosystems) that began operations in Tunisia in 2004 with around 40 employees. Today, more than 3,500 people work in the manufacture of aircraft galleys, seats, baggage containers, electronic cards, 3D wiring and electrical cabinets.

Fast-expanding: Today, more than 3,500 people work in the manufacture of aircraft galleys, seats, baggage containers, electronic cards, 3D wiring and electrical cabinets.



Tunisia is one of the most effective value-chains in the aerospace world since we can produce a product from A to Z

THIERRY HAURE-MIRANDE

According to a recent report in London's *Financial Times*, Tunisia is the most attractive site in world aerospace in terms of operating costs compared to six other competing sites: Bangalore (India); Beijing (China); Brasov (Romania); Casablanca (Morocco); Chihuahua (Mexico); and Plovdiv (Bulgaria).

GITAS is also working to promote the country's aerospace credentials throughout the global industry by encouraging new companies – and investors – to exploit the country's growing pool of expertise.

Tunisia ensures that it adheres to all global compliance standards for its engineering and design, including electrical assembly, sheet metal working, wiring, assembly of aerostructures, surface treatments, embedded software for computers and plastics.

GITAS believes its main strength is its aerospace sector's ability to manage products in their entirety, from conception to delivery, guaranteeing both build quality and performance.

"Tunisia is one of the most effective value-chains in the aerospace world since we can produce a product from A to Z," said Haure-Mirande.

Educational programmes

Tunisia is conducting a series of educational programmes aimed at ensuring technological development and enhanced competitiveness as it competes with other locations and countries in Europe and Africa.

"We cannot rely solely on our competitive costs... we must be equally efficient and competitive," said Srarfi. For example, he explained, the sector is getting into augmented reality, robotics, artificial intelligence, predictive maintenance and media digitisation, and all these areas will enhance industrial and productivity performance and also generate new partnerships that will increase skills for operators, technicians and engineers.

And, as the Tunisian working population is relatively young, it is easier to integrate new technologies in training.

For Srarfi, schools in Tunisia today offer quality training adapted to the needs of companies. This human resource has allowed companies to accelerate their projects and integrate products. Tunisia has the highest concentration of researchers among Arab and African countries.

Tunisia has four main aviation hubs located mainly around Greater Tunis, the Sahel, Soliman, and Zaghouan. Business demand is driving the rapid development of these areas.

There is a need for space to expand existing production units and allow for new entrants. Around 20 hectares are currently under development near Greater Tunis for aeronautical companies.

The GITAS objective is to double its number of aeronautical companies in the coming years.

With renewed political stability, all the indicators are looking good. ■



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An extraordinary interior, combining Italian design flair and Swiss completion, has raised the bar for VVIP aircraft and prompted **Chuck Grieve** to ask: “Is anything now possible?”

Window on infinity



Crafty design: Quality materials shaped by master craftsmen is the hallmark of the finishing on an AMAC VIP completion.

The cabin of an Airbus A350-900 offers designers a ‘blank canvas’ 51 metres long and 5.6 metres wide. The possibilities, one could say, are sky-high.

That was the thought of Italian designer, Pininfarina, and VVIP completion specialist, AMAC Aerospace, when they decided to team up on something that would turn heads in their highly competitive market.

The result, unveiled in Geneva, appears to have done just that.

More like a luxury hotel lounge than an aircraft, their cabin boasts the ultimate in on-board experiences through a combination of technology, materials, flair and finish: a “fusion of technology and nature in a unique all-embracing space”, as the partners put it.

It has not gone unnoticed: a Pininfarina spokesman said the concept has attracted interest beyond their expectations.

The two companies had “been in touch” for a long time, said the spokesman, but “something just clicked” when they met again at the last Aircraft Interiors Expo in Hamburg, Germany. “We decided to create something never seen before – absolutely disruptive, a comfortable and enjoyable concept that makes you forget you’re on a jet.”

Waleed K Muhiddin, AMAC’s director of business development and marketing, said the starting point for both companies was a desire “to push the limits of what is feasibly possible and explore what we expect clients to want.”

The concept they came up with is groundbreaking. “We’ve installed contemporary, culturally assertive, intelligently designed cabins in the past but what we see here is a whole new kind of cabin.”

He said the work that went into this concept, taking into account the use of space, new technologies and exotic materials, sets the bar for the future of aviation completions.

“Airbus has created a wonderful new wide-body platform and we’re excited to see how much attention it can create in the private aviation market,” said Muhiddin.

Acoustic sound

The cabin is designed as a “cocoon with acoustic sound absorption and thermal retention”.

Immediately aft of the cockpit and forward crew rest area, with its own galley, is a forward VVIP area. In this design, it contains a master office, bedroom and en-suite facilities, a private lounge and adjoining family or play area.

The core area extends back from the front door, which opens into a galley and a wet bar with lounge-style seating. The floor and wall design leads guests into the spacious main lounge and dining/conference hall. The main feature of the core area is a spectacular smart glass wall running the length of the cabin that can be used as a window or a projection screen.

To the rear are an interior vertical garden, planted with maintenance-free moss, and

secondary projection screens.

Aft of the core area and accessed by a middle door is a VIP seating area for 18 in a 2-2-2 configuration, and a secondary seating area for 30 guests configured 2-4-2.

There are two galleys, one – outfitted with induction cooker and dishwasher – at the front and a second at the rear.

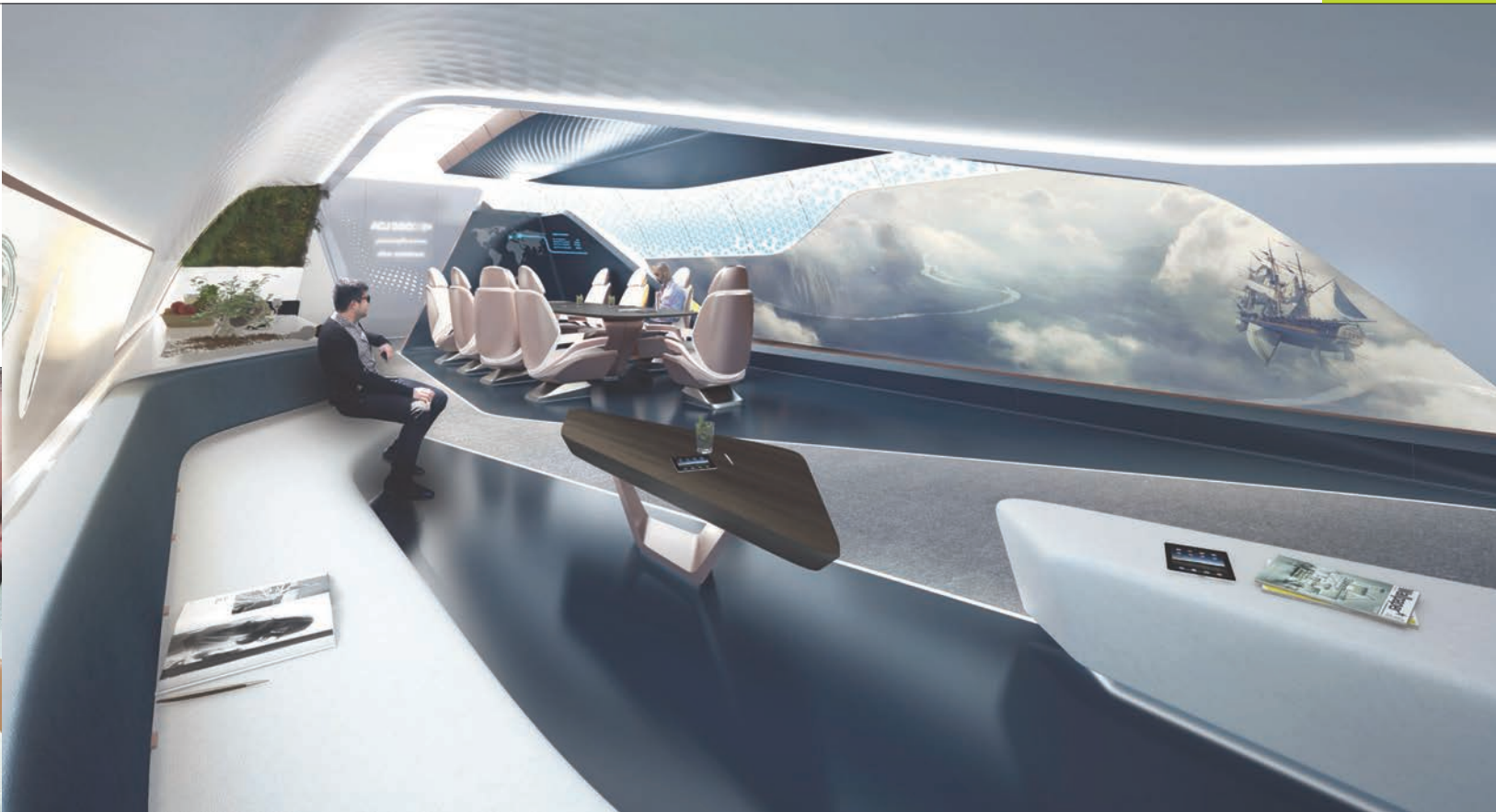
For someone boarding the aircraft, it will be like entering a luxury hotel lounge. “The first thing you see is the welcome area, furnished with a wet bar that could also be equipped for fresh cooking,” said Paulo Pininfarina.

“We then have a relaxing area with sofas facing a giant screen that can be set up either to project or to enjoy the view, creating a magical intimate atmosphere.”

Completing the lounge is an area dominated by a large table, conceived both for eating and holding meetings, and a chaise longue ‘green’ space dedicated to personal relaxing.

The designers took into consideration a modern traveller’s tastes and needs for multipurpose surroundings that would be conducive for relaxing, working, dining, entertaining and holding meetings. The result is a multifunctional space, tailored for the contemporary lifestyle, which links the various uses in a seamless flow.

Giving expression to this concept is a flowing band that runs the length of the main cabin, leading the traveller through the different



The big picture: The magic of the smart glass wall allows travellers to enjoy a wide-screen fantasy world above the clouds.

environments in a relaxing atmosphere enhanced by the shades of blue, light grey and copper, chosen for the soft fittings and the dark tones of oak and walnut used in table tops and work surfaces.

“Our 360-degree vision on the living spaces, thanks to our expertise in different sectors, allowed us to conceive something that was able to let the traveller enjoy the time on board as if he or she were in a living room or office,” said Pininfarina.

The giant ‘tile screen’ provides a dramatic focal point for the main lounge area. Described as a “giant virtual glass wall”, it has been conceived to respond to several different needs: relaxation, diversion and working.

Vast picture window

On-board controls would allow the aircraft’s users to project an extraordinary external view to create the sensation of a vast picture window; to view movies or other entertainment options; or to display business presentations and important documents.

Muhiddin said the giant screen would need certification before it could be implemented. “Once a client is ready to move with us, we would present the tile screen solution to the authorities for approval.” AMAC is currently working with the screen’s provider on feasibility.

Apart from the giant screen, the cabin has other design features you would not expect to

find on an aircraft. Natural green elements, for example, are able to recreate a domestic atmosphere, thanks to a process of stabilisation. Another is the AMAC-patented certified induction cooking surface that enables hot food to be prepared in flight.

It took all the Pininfarina expertise in eclectic design, ranging from the nautical to the architectural, to find the right balance between creativity and feasibility. The secret, the company says, is to use the technical constraints to ‘exalt the aesthetics’. “Leveraging our experience from designing yachts, penthouses and villas, we were able to recreate the same warm and pleasant atmosphere, but on board an aircraft.”

Pininfarina’s origins, from 1930, are in designing bespoke one-off cars. The company says its “natural vocation to realise the dreams of our customers” has expanded to include design for the high-end aviation, nautical and architecture markets.

The company is now known internationally for its work in the aviation sector, designing interiors for private jets and commercial aircraft. Over the years, it has developed important partnerships with clients such as AgustaWestland and Alenia (now parts of Leonardo), Airbus, Bell, Boeing, Iacobucci HF Aerospace and Piaggio Aerospace.

In AMAC Aerospace, Pininfarina recognises “the same DNA” – providing bespoke interiors to the most discerning individuals. “The client

will always be at the centre of all our projects,” the spokesman said.

AMAC Aerospace is a market leader in the conception, production and installation of bespoke cabins for discerning clients. The Swiss-based company has performed more than 20 completions in its short history. It provides a one-stop shop service with almost the whole production process carried out in-house under the scrutiny of AMAC’s quality inspectors and air authorities from around the world.

Wish list

Muhiddin said the client is always behind the interior specification. The designer and completion centre start with their wish list to make sure they get included. “What both companies have done here,” he said, “is to present a concept that people might not have thought of before. It’s a fair statement that some notions of design are stuck in the classical approaches; hence the reason to be working at the cutting-edge of what is technically possible.”

Pininfarina says the experience of working with AMAC on this project leaves the two companies in a strong position for future collaborations.

Muhiddin added that the companies “are embarking on a journey to see where these ideas can take us all. Although they’re early in development, we look forward to what the future holds.”

MEBAA membership is open to all organizations engaged in the business aviation industry. At present, MEBAA has classified the aviation companies in three categories based on their line of operations in the industry. Membership types are clearly defined on MEBAA website's membership listing and in the MEBAA Review.



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A commercial or industrial enterprise, a government entity, or a non-profit organization engaged in general, business, or private aviation as an aircraft operator that works in business, commerce, trade or industry activities and owns, manages or operates one or more aircrafts, provided that such aircraft is registered as private or on-demand commercial transportation and operates in MENA region.



Supplier

A commercial or industrial enterprise, a government entity, or a non-profit organization engaged in business, commerce, trade or industry activities and provides hardware, software, support or any services to Operators.



Affiliate

A commercial or industrial enterprise, a government entity, or a non-profit organization not meeting the requirements for either Operator or Supplier

Testing, testing: Connectivity was maintained more than 99% of the time when the aircraft was above 6,000ft.



SAUDI ARABIA PRESSES AHEAD WITH A2G CONNECTIVITY

The Kingdom of Saudi Arabia is expected to release more details about its air-to-ground (A2G) in-flight connectivity roll-out before the end of the year, following on from an initial pilot project that was announced in October 2018.

Victoria Moores reports.

A2G provides fast in-flight WiFi connectivity from the ground. This means aircraft can use smaller, lower-drag antennas, which makes it quicker and cheaper for an airline to install and operate than satellite connectivity.

However, unlike satellite-based systems, A2G does not work over large oceans.

Only two regions around the world have already rolled out A2G connectivity. It has been available for some time in North America and has just gone live in Europe.

International Airlines Group (IAG) has become the first airline group to use the newly completed European Aviation Network (EAN), which works using an integrated A2G and satellite network.

After watching EAN's progress, in October 2018 Saudi Arabian telecoms provider, STC, announced plans to introduce its own A2G network at the GITEX computer and electronics trade show in Dubai, with the system expected to go live in 2019. This is the first A2G network of its kind in the Middle East.

Commercially launched

Once the new network is commercially launched, passengers will be able to hold live in-flight video conferences, access virtual private network (VPN) connections, use social media apps like SnapChat in real time, and stream from the internet, including video services like Netflix and YouTube.

STC signed a memorandum of understanding (MoU) with telecoms firm, Nokia, to launch an A2G pilot network. Nokia played a key role in bringing together the various players for EAN.

Since that initial signing, STC and Nokia have been working on the commercial strategy for the project, with Nokia taking the lead on the network, infrastructure and

applications. Thales provided the on-board equipment for the trial.

STC has also established a specialised division called STCSC, which owns A2G activities in the region.

Sources close to the situation say that 10 ground towers are already operational, covering one complete domestic air route between the Saudi Arabian cities of Riyadh and Jeddah. This major air corridor will soon be ready for A2G launch.

Test flights

Initial circular test flights between these two cities demonstrated that the service worked as expected, with the test aircraft providing connectivity while flying a distance of 10,000km, at a maximum speed of 820km/h at altitudes of up to 8,500 metres.

During these early tests, performed on a Dassault Falcon 20 flying lab, connectivity was maintained more than 99% of the time when the aircraft was above 6,000ft. The trial also achieved 95% success when handing over across the 10 ground-based masts.

Five more routes, beyond Riyadh-Jeddah, will need to be equipped with ground towers to cover all of Saudi Arabia's domestic air corridors. The source was unable to comment on what this would involve, but taking the area covered by EAN's 300 masts as a guide, around 100 masts are likely to be needed for the Saudi Arabian network.

It takes a number of players to establish an A2G network, so work is currently under way to bring together the partners and finalise contracts. Further announcements are expected before year-end, most likely at GITEX (Oct 6-10), or the Dubai Airshow (Nov 17-21).

Saudi Arabia is seen as an influential Middle East technology leader, so it is likely that the STC A2G project could trigger interest in a wider roll-out across the Middle East region. ■



How can airlines balance economic and operational realities with the need to offer attractive fares to each customer on every service?

Harald Eisenaecher (left), chief commercial officer at Infare, explores several strategies.

How to build the perfect pricing plan

In an industry as vibrant and fast-moving as aerospace in the Middle East, airline pricing strategies need to be under constant review.

How can fares respond to market changes quickly but never rashly? How do airlines keep both the chief financial officer and the passengers happy?

Here are four innovations that certainly help:

■ PRICING INTELLIGENCE:

Pricing intelligence brings an airline not only an awareness of market-level pricing intricacies but also an understanding of how those intricacies could have an impact on the carrier's business.

For airlines across the Middle East, the key to productive pricing intelligence is to monitor the market's pricing data and then make educated airfare changes rapidly, based on that analysis. A carrier might, for example, want to consistently offer the lowest fares in the region. Armed with real-time pricing intelligence data, that airline could quickly respond with a fare reduction should a rival carrier suddenly start offering the lowest prices on a particular route.

And pricing intelligence is certainly not limited to airfares. With the rise of ancillary revenues from baggage fees and other non-ticket sources, pricing intelligence will become increasingly capable of collecting and analysing data from these vital sources of income.

As the Middle Eastern airline industry's appetite for data becomes ever-more voracious, expect to see carriers in the region building and expanding data science teams. And expect to see those teams rightly demanding information that can be used as quickly and productively as possible.

■ PERSONALISATION:

Targeted marketing is an essential part of the modern airline industry. The busy executive who flies from Dubai to London every week should enjoy a different set of offers and communications than the passenger who only ever travels domestically within Egypt.

■ MACHINE LEARNING:

Data alone is meaningless. Airlines need to know how to use information productively and, with that goal in mind, machine learning – essentially a form of artificial intelligence (AI) whereby computers learn without being explicitly programmed with new information – is a valuable asset.

Through AI-driven chatbots, machine learning brings us straight back to personalisation. Designed to learn 'on their

own', chatbots are basically messenger apps with which customers can appear to have conversations. Knowing the details of a customer's past bookings, and 'learning' more about that customer's needs and preferences with every interaction, a chatbot can offer increasingly targeted recommendations highly likely to be converted into sales.

■ NEW DISTRIBUTION CAPABILITY (NDC):

The International Air Transport Association (IATA) NDC technology standard aims to improve communications between airlines and travel agents. One goal is to display product differentiation beyond the current capability of global distribution systems (GDSs), which only allow limited details of ancillary offerings or customer service, for example.

Put simply, carriers that offer a better service than their rivals need to make the most of this NDC marketing opportunity and many of those carriers are based in the Middle East.

In fact, Emirates and Etihad Airways were named among last year's top five brands for customer experience (in first and fifth place respectively), across all sectors of business in the United Arab Emirates, by professional services giant, KPMG.

An innovative spirit helps maximise the benefits of NDC as well. SunExpress, for example – a joint venture of Turkish Airlines and Lufthansa – claimed in 2018 to be the first carrier to offer customers the option of booking flights by voice command through Amazon's Alexa virtual assistant, using NDC.

Bringing the elements above together, airlines will also be able to use dynamic pricing (responding to changing market conditions) and differential pricing (selling the same service to different customers for different prices, with broad market conditions less important than factors such as how much individual people are willing and able to pay).

A carrier's revenue management IT will be able to offer price changes from base fares depending on the airline's knowledge of the party making the enquiry.

The end result?

Middle Eastern airlines will soon be generating personalised, automated pricing offers more rapidly than ever before.

We are all working in exciting times.

The perfect pricing strategy is approaching fast. ■

■ Infare is a leading global supplier of airfare data and business intelligence tools.

As the Middle Eastern airline industry's appetite for data becomes ever-more voracious, expect to see carriers in the region building and expanding data science teams. ●

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Inmarsat is planning the expansion of its GX Aviation Ka-band in-flight connectivity service with a raft of new satellites. Steve Nichols reports.

Ka sets the pace for connectivity revolution

Inmarsat has signed a contract with Airbus Defence and Space (Airbus) to develop a new generation of satellites for its Global Xpress (GX) network.

The satellites, named GX7, 8 and 9, will be optimised for real-time mobility and feature thousands of dynamically formed beams that direct capacity with laser-like precision over high-demand areas.

With focused, ultra-high-power capacity, layered over high-demand flight routes and airport hubs during peak hours, Inmarsat says the satellites will revolutionise aviation connectivity.

Breaking from industry tradition to enable a faster response to growing customer demand, it says the next-generation GX satellites will be delivered significantly faster than traditional procurement lifecycles.

Grow capacity

It adds that the network can rapidly grow capacity for customers through in-orbit repositioning or even by launching a new satellite.

“GX is much more than just a satellite constellation, it’s a complete end-to-end solution and we have been equally ambitious in developing our ground stations, hardware, software and cybersecurity framework,” said Neale Faulkner, Inmarsat’s SVP Middle East, India and Africa.

“Our partners layer on top even more value-added capabilities and industry experience that are unmatched. This is unique to Inmarsat and positions us as a leader and innovator in this industry, allowing us to put our business aviation customer needs at the heart of our future investment decisions.”

The new satellites are scheduled to launch from 2023 and build upon the existing GX high-speed global network, which consists of four satellites already in operation and three more being launched over the next three years, starting with the GX5 satellite later this year.



Connected: a passenger uses her laptop on an Emirates flight.

PICTURE: ONAIR

The new satellites will allow for greater capacity over important flight routes.

Geostationary satellite systems, like Inmarsat GX, run out of steam at about 85 degrees north and south of the equator. One advantage that low-Earth orbiting satellite systems, like Iridium, have over GX is their ability to work in the polar regions. However, Iridium cannot deliver the high bandwidth and speeds that airlines demand and passengers enjoy.

Now, though, a new announcement from the company aims to bring high-speed connectivity to high latitudes via Inmarsat GX. The company announced a contract to introduce two new highly elliptical payloads for its GX network in partnership with Space Norway and its subsidiary, Space Norway HEOSAT.

Scheduled to launch in 2022, GX10A and 10B will be the first satellites in the GX network to be placed into highly elliptical orbit (HEO).

HEO, or so-called Molniya orbits, are a

unique solution to the problem. As the name suggests, they are highly elliptical with the satellite’s high apogee, or furthest point from the Earth, meaning it appears to stay in roughly the same point in the sky for long periods. It then descends quickly to its perigee point (closest point to Earth) before the process repeats.

This means that, while at apogee, it presents pretty much the same target as a geostationary satellite does at the equator, but over the Arctic region.

It then becomes a software issue to keep the terminal pointing at the satellite.

This agreement marks a new direction for Inmarsat, which has always owned the satellites it has in orbit.

Emirates was quick to share its excitement about how the HEO satellite development plans will enhance the in-flight broadband service it offers to passengers.

Lead the industry

“We are very pleased with this development, which will ensure Emirates continues to lead the industry in providing our customers a seamless in-flight connectivity experience across geographies, on all of our flight routes,” said Adel Al Redha, Emirates’ executive vice president and chief operations officer.

“Over the years, we have worked closely with Inmarsat and our supply partners to continually raise the bar on in-flight connectivity, and we look forward to further enhancing that experience, taking advantage of new technologies and infrastructure,” he added.

“Emirates’ passengers bound for the US will soon be able to enjoy Wi-Fi, mobile service connectivity and Live TV broadcast, even when flying 40,000 feet in higher elevations and across the Arctic.”

The new satellites will also provide Live TV broadcast on Emirates flights, allowing customers to watch live news or sports over the polar region. The airline’s Live TV is currently



Out of this world: The graphic shows the HEO satellites.

PICTURE: INMARSAT

available on 175 aircraft, including all its Boeing 777s and select Airbus 380s.

Wi-Fi connectivity is now available on all Emirates' aircraft. Customers in all cabin classes receive 20MB of free Wi-Fi data or unlimited use of messaging apps for two hours.

Emirates Skywards members enjoy special benefits, depending on their membership tier and class of travel, including free Wi-Fi when travelling in first class or business class. It says more than one million Wi-Fi connections are made on board the airline's flights in an average month.

Inmarsat Aviation president, Philip Balaam, said: "Inmarsat has an extremely successful track record of working with Emirates to ensure their in-flight connectivity requirements are met on a global basis, both in the cockpit and the cabin.

"We are delighted to continue that tradition with the rapid development of our GX satellite network.

"Our development of the GX network is a great fit for Emirates and, once again, they have played an important role in our decision for these latest expansions."

But Emirates is not the only MENA-based airline to take advantage of GX.

It is currently being rolled out on Qatar Airways' Boeing 777 and Airbus A350 aircraft. In total, GX Aviation will be fitted on 130 of the state-owned flag-carrier's aircraft.

The roll-out is the culmination of a host of behind-the-scenes activities; from the initial announcement of the award-winning airline's intention to adopt GX last June, through obtaining the supplemental type certificate for GX Aviation retrofit installations on the Boeing 777 aircraft.

Qatar Airways Group chief executive, Akbar Al Baker, said its passengers will now be able to access the same broadband service in the air as on the ground.

Rich content without restriction

"Qatar Airways passengers can now enjoy high-speed broadband connectivity, providing rich content without restriction, whether using the internet for work or relaxation during their journey. Business travellers, in particular, will be able to maximise their 'office in the sky' with seamless continuity," Al Baker said.

Babar Rahman, Qatar Airways senior manager, in-flight entertainment/connectivity, corporate sponsorships, CSR and special projects, said the airline had received an "immense outpouring of positive feedback regarding the speed of connectivity, the likes of which passengers are generally used to only on the ground".

In April this year, Thales announced that Gulf Air, the national carrier of the Kingdom of Bahrain, had chosen Inmarsat GX for its B787-9 and A321 NEO-E (LR) aircraft.

In 2016, Gulf Air selected Thales's AVANT in-flight entertainment system for its fleet renewal programme. Thales said its latest IFE innovations, combined with global Ka-band connectivity, provide unique services that transform passenger experiences wherever they fly.

Passengers can use the connectivity portal and on-board Wi-Fi network, powered by GX Aviation, to browse the internet, check social media, shop online and much more during their flights.

Inmarsat said its commitment to innovation will continue, based on a proven network strategy.

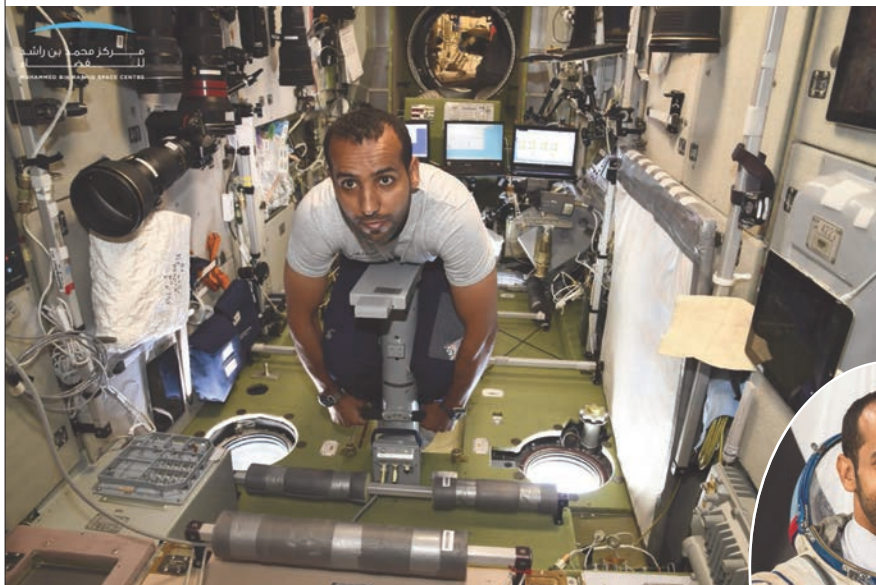
It added that the future would bring "agile, efficient, precision-engineered solutions that anticipate and fulfil customer needs".

The plan (with Inmarsat GX7, 8, 9 and beyond) is to have the capability to generate thousands of simultaneous, independent beams of differing sizes, bandwidth and power, which can be reconfigured and repositioned with pinpoint precision in real time.

The HEO satellites will allow Inmarsat to provide satellite coverage over the poles and will go some way to safeguarding its future. Companies like OneWeb are planning fast Ku-band satellite systems in low-Earth orbit that could ultimately challenge the dominance of geostationary satellite systems, which Inmarsat has enjoyed for years. ■

Hazzaa AlMansoori, the first Emirati in space, has returned to Earth after an eight-day stay on the International Space Station. Jill Stockbridge reports.

Hazzaa blasts into history



Boning up: Hazzaa AlMansoori uses the space station's equipment to conduct osteology (the study of bones) experiments.

PICTURE: NASA

The 35-year-old former F16 pilot landed safely at 6:59am EDT in Kazakhstan on Thursday October 3, alongside NASA astronaut Nick Hague and Soyuz MS-12 spacecraft commander Alexey Ovchinin, of the Russian space agency, Roscosmos.

Since launching on September 25 with NASA astronaut, Jessica Meir, and Oleg Skripochka, of Roscosmos, AlMansoori has covered 128 orbits of Earth and a journey of 3.1 million miles.

He enters the history books as the first person from the UAE to fly in space and the first Arab to visit the International Space Station. The expedition comes under an intergovernmental contract between the UAE and Roscosmos, working with the Mohammed Bin Rashid Space Centre (MBRSC) in Dubai.

Scientific experiments

While at the ISS, AlMansoori conducted scientific experiments in cooperation with international space agencies, including Roscosmos, the European Space Agency (ESA), NASA, and Japan Aerospace Exploration Agency (JAXA).

Working with Roscosmos, AlMansoori conducted an experiment to study the mechanisms of action and efficiency of different countermeasures against disturbances in the astronaut's motor activity under space flight conditions.

He also conducted experiments to study bone status indexes, body composition, DNAm-Age, time perception in microgravity, fluidics (fluid dynamics in space) and endocrine regulation in cosmonauts before and after a short-term space flight.

AlMansoori performed three daily experiments to observe the impact of microgravity on seed germination rates, the growth of aquatic organisms, and the oxidisation rates of steel.

Overall, the Expedition 60 crew that AlMansoori joined, contributed to hundreds of experiments in biology, biotechnology, physical science and Earth science, including investigations into devices that mimic the structure and function of human organs, free-flying robots, and an instrument to measure Earth's distribution of carbon dioxide.

In recognition of the historic event, MBRSC supplied AlMansoori with items of Emirati heritage, culture and history, to be given to museums, or kept as souvenirs upon his return. The 10kg bag included a UAE Flag, 30 Ghaf tree seeds, a copy of the Holy Quran, a picture of Sheikh Zayed Bin Sultan Al Nahyan with a copy of My Story, Sheikh Mohammed Bin Rashid Al Maktoum's autobiography, and

some personal items, including family photos.

The bag also included three traditional food dishes from the UAE, which were developed for the space trip. AlMansoori hosted an Emirati night for the entire ISS crew, complete with kandora, and shared these tastes of home.

AlMansoori regularly communicated with the Emirati engineers at MBRSC's ground station in Dubai and Russia's Mission Control, to brief them on his scientific experiments and daily routine, and send pictures and videos, while on board the ISS.



Arabic video tour

On his fourth day, he recorded the first-ever Arabic video tour, where he explained the components of the station and the equipment on board, in addition to a short brief about the daily life of astronauts on board the station. He also read a children's story, called Amal and Khalifa, about two children travelling to the ISS, Mars, and the Moon, before returning to their homes in the UAE.

On day six, he held a video conference with school students and media professionals, where the audience had the opportunity to ask questions.

In response he explained that the ISS is about 400 kilometres from Earth, and that he would like to return to the station a second, third and fourth time.

"Most of the lights inside the station are switched off when we are asleep, to save energy, and the adopted time at the ISS is Greenwich Mean Time. Our day starts at 6:00 am, and ends at 9:30 pm," added AlMansoori.

He explained that water is delivered to the station via cargo ships, which are similar to the Soyuz spacecraft that carry astronauts to the ISS. He added that the steam is collected from the station and converted to water.

He highlighted that astronauts train at a gravitational force of 9-G prior to travelling to space because the gravitational force in the rocket reaches 5-G during launch, and can reach 9-G at emergency situations.

"Many changes happened in my body, the size of my head grew bigger because of the rush of fluids upward, and my sense of smell also changed. However, I began to adapt and get used to it after some time," he added. ■

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As the first Emirati astronaut was orbiting the Earth – enhancing the UAE’s reputation in the science community generally, and particularly in aerospace – Jill Stockbridge spoke to one Emirati female scientist leading another crucial new research mission.

THE WONDER OF THUNDER



Ahlam Al Qasim: “This mission is a perfect example that shows the capability of Arab women to excel in STEM fields.”

Below: The RAAD CubeSat.

New York University Abu Dhabi (NYUAD) alumni, Ahlam Al Qasim, is preparing for the launch of a CubeSat mission to study terrestrial gamma-ray flashes (TGFs) – sudden bursts of gamma-ray radiation triggered by lightning or thunderstorm activity.

The research could help address the question of whether there is radiation danger to passengers on commercial aircraft flying above or in the vicinity of thunderstorms.

TGF bursts are channelled above the Earth’s atmosphere into outer space, making it very difficult to detect them from the planet. Any study requires satellites in very close orbit.

They are triggered when a cosmic ray shower penetrates Earth’s atmosphere in the vicinity of active thunderclouds and lightning events, which energise the particles and accelerate them to close to the speed of light.

Energetic types of radiation

Discovered in 1994, scientists originally believed that these very energetic types of radiation could only be generated near the Sun, or in black holes, large galaxies, or neutron stars. They are the only source of extremely energetic radiation that is produced naturally from Earth.

Now a team of scientists, led by Al Qasim, have developed a miniature satellite to study the phenomenon. The CubeSat is named RAAD after the science payload: raad means ‘thunder’ in Arabic.

Al Qasim said: “The CubeSat will use two gamma-ray detectors, which measure the light of highly energetic particles produced by TGFs that hit the detector in space.

“Studying TGFs can help us address important scientific questions, which have practical applications on Earth. The most significant is the question of whether there is radiation danger to passengers on commercial aircraft flying above or in the vicinity of thunderstorms.

“Based on science simulations from previous studies, the radiation dosage that passengers receive from these events could be equivalent to hundreds of chest X-rays, with the intensity varying depending on the energy of the flash and how far away the source is.”

It is not an inexpensive enterprise. The science payload alone costs around \$25,000 per detector array. The entire mission is fully funded by the UAE Space Agency in partnership with Kuwait University, with an award of around \$500,000, including the cost of the launch.

The engineering bus is being put together by engineers at Kuwait University, while the science instrument is being built, characterised and tested by NYUAD.

Harsh space environment

The CubeSat is rapidly approaching readiness but the launch date is not yet firm. Al Qasim said: “We are currently in the process of testing all our instruments to make sure they will survive the harsh space environment, such as large temperature fluctuations and intense vibration. The launch date is still not finalised because the team needs to pass the critical design review first and ensure everything is well tested and ready to be finalised for launch.”

The lifetime of CubeSats is usually six months to a year, but the team hopes to extend the mission lifetime well beyond its expected decay – up to two years, or longer.

Al Qasim added: “Many recent CubeSats have survived longer than one year and we hope to make ours run as long as possible to collect as much data and science as we can.”

The predominance of women in the science, technology, engineering and maths (STEM) sector in the UAE is evidenced by the number of Emirati women involved in developing the mission.

Al Qasim said: “The entire mission is not composed of women, but the core team of students, who worked on developing the science instrument at NYUAD, are all Emirati females, including myself. This was not done on purpose, but was rather a wonderful coincidence to come about as a result. It shows that in a male-dominated industry, such as the space sector and STEM fields in general, women are not just able to compete with their male colleagues, but are also able to exceed in their own right and intellect.

“This mission is a perfect example that shows the capability of Arab women to excel in STEM fields and take the lead in designing and building a science-led mission from scratch.”





Adel Al Redha



Adnan Kazim



Sheikh Majid Al Mualla

Three new appointments as Emirates reshapes top team

Emirates has announced new executive leadership appointments for its operational, commercial and international affairs functions.

Adel Al Redha is appointed chief operating officer, Adnan Kazim is chief commercial officer, and Sheikh Majid Al Mualla is divisional senior vice president, international affairs.

As chief operating officer (COO), Adel Al Redha is at the helm of all operational departments – flight operations, service delivery, airport services, Emirates engineering, crew manpower, aircraft procurement and the Emirates Flight Training Academy; as well as

worldwide network operations, including crisis response.

Al Redha will oversee operational efficiency and effectiveness across the airline, and work closely with other members of the executive leadership team to drive improved performance across the business.

Sheikh Ahmed bin Saeed Al Maktoum, chairman and chief executive Emirates Airline and Group said: “Adel, Adnan and Sheikh Majid are all experienced members of the Emirates leadership team with strong expertise in their respective areas and proven

leadership abilities. Each brings deep and diverse experiences from different areas of the airline business, and I am confident that they will continue to drive the airline’s future growth and strengthen Emirates’ presence, agility, and focus across the globe.

“These roles are strategically important to growing our customer base and developing our commercial strategies, delivering the best experiences across customer touchpoints, and progressing our business objectives through engaging with governments, regulators and key industry bodies around the world.”

BOUAOUDA MAKES MOROCCAN HISTORY

PICTURE: JAWHAR KODADI.



Zahira Bouaouda has been appointed president of MATIS Aerospace, a 50/50 joint venture between Safran Electrical & Power and Boeing, specialising in electrical wiring interconnection systems.

She is the first woman to manage an aerospace company in Morocco.

Bouaouda began her career in 1997 as an auditor with Dorlian and Associés and then MCA and Associés.

She joined KPMG Morocco in 2001 as a senior manager and moved to MATIS Aerospace in 2006 as finance director, before becoming operations director in 2017.



Mattar steps up for Gulf Air

Gulf Air has appointed Wael Mattar as senior manager cargo, based at the airline’s hub in Bahrain.

The airline operates an average of 1,000 flights on a weekly basis to approximately 50 destinations and it continues to grow its fleet and network with more passenger seats and cargo space.

With this appointment, Mattar will take on the challenge of further strengthening Gulf Air’s cargo growth globally.

“I feel proud to be assigned in charge of the cargo department as the airline has an opportunity to grow its cargo sales and operations and I am glad the management showed confidence in me to lead this,” said Mattar.

Charles Cockrell *Marcelle Nethersole speaks to a partner at international law firm HFW.*

1

■ Can you give us an insight into the world of an aviation lawyer?

I am a partner at HFW, an international law firm with one of the world's leading aviation practices.

I work from the firm's Dubai and Abu Dhabi offices and have been based in the region for more than seven years.

The purpose of my job is to solve legal and commercial problems for our aviation clients, wherever in the world they occur. Because aviation is, by its nature, an international industry, this means that I am working across many different jurisdictions at any given time. For me, this has always been both the most interesting and challenging part of the job!

In the Middle East, our team acts for clients across the aviation industry, providing a full range of legal services. I specialise in dispute resolution and advise many of the region's major airlines, airports and business jet operators. I also support our aviation regulatory practice – this work typically involves helping airlines establish operations and advising clients on compliance with complex regulations.

2

■ You were at Aviation Africa in Rwanda recently. Do you also work in Africa?

It was a privilege to attend the Aviation African summit in February – a fantastic event and a great networking opportunity!

HFW's aviation team is global. We have specialist aviation lawyers working from offices across Europe, the Middle East, Asia, Australia and the Americas. Our team in Dubai works extensively for African clients, including a number of flag-carriers, airports, tourist operators and regulators.

It is an exciting time for the aviation market in Africa and I'm looking forward to supporting the industry as it goes through a period of rapid growth.

3

■ What has been the biggest case you have handled?

I have worked on a number of high-profile major aviation accidents over the last 10 years.

One of these cases involved the loss of a passenger jet in a remote part of the Namibian jungle, resulting in the death of everyone on board.

It was a challenging case for many reasons. Supporting an airline during its darkest hours and helping to manage a coordinated response to a crisis is a key part of the job.

Other major cases I have handled include working with a Middle Eastern government to implement an extensive new aviation law and, prior to my move to Dubai, supporting the aviation industry's challenge to the EU's controversial emissions trading scheme (EMT) before the European Court of Justice.



4

■ How do you expect the legal landscape to change in Middle Eastern aviation?

We considered this question at our annual aviation conference in Dubai earlier this year.

Technology in the field of transportation, and air transport in particular, is developing extremely quickly. Autonomous vehicles and flying taxis are going to be a reality in the relatively near future.

The UAE is at the forefront here and is committed to driving forward disruptive technologies. From a legal perspective, the challenge is to make sure that regulation (particularly safety regulation) keeps pace with this new technology. Without a robust regulatory framework, none of these projects will ever get off the ground.

5

■ What does a typical day involve for you?

My job is extremely varied and each day is unpredictable. We manage a caseload of more than 200 files on a daily basis in Dubai and work has to be carefully prioritised. I am fortunate enough to work with a team of eight extremely talented aviation lawyers in Dubai, who help manage this process and maintain our high standards.

As well as casework, a key focus of my role is business development. This involves regular travel around the Middle East and Africa to meet new and existing clients.

In recent days, I have also worked closely with our consulting business (HFW Consulting) to develop a new 'Aviation Academy' product – essentially this combines legal technical training with personal development coaching and is something that we will be rolling out to our client base in the coming weeks.



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