



ARABIAN AEROSPACE

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

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From little acorns a mighty oak has grown...

For the past 30 years the Middle East's aerospace industry has had a clear biennial opportunity to reflect on its successes and make plans for its short- and medium-term futures.

That occasion is the Dubai Air Show, which takes place at its own purpose-built showground at the huge Dubai South complex – still better known as Dubai World Central.

I am old enough to remember when the early shows made the move from a tent beside the Creek to the International

Airport's cargo area in the early 1990s.

In those days, an Arab company exhibiting was a rarity. Emirates Airline was still a fresh-faced hopeful challenging the might of Gulf Air and other regional carriers.

The show grew alongside the Dubai carrier and then, as the other Gulf carriers began their phenomenal rise and the business jet community flocked to the expanding airport, so the show welcomed the industry's big hitters... and a local support industry began to grow.

The show outgrew its Cargo Village home and moved to a new exhibition centre at the eastern end of the airport; four years ago it moved to Dubai



World Central.

While the Gulf's main carriers have put a halt on their spending sprees for now, the big suppliers are still there. This year we will see a much greater focus from local companies, which have made Dubai a regional hub for the whole aerospace industry.

We will see manufacturers and MRO specialists; we will see finance and defence contractors, training providers and airport services.

Dubai is now the third largest aerospace show in the world, behind

the historic greats of Paris and Farnborough, demonstrating so clearly how much importance is now attached to the region and the greater area.

We will see delegates from around the world, and particularly from Asia and Africa. We will see Arab firms selling their products and services for export and should reflect on how much the commitment to the event has boosted the reputation for the MENA region's aerospace industry.

I hope we can all support the show. The *Arabian Aerospace* team will be there in great numbers and we look forward to seeing you there.

Safe landings.

Alan Peaford, Editor-in-chief

COVER: Saudi Arabian Airlines' director-general Saleh bin Nasser Al-Jasser Picture: Mohamed Alhusseiny

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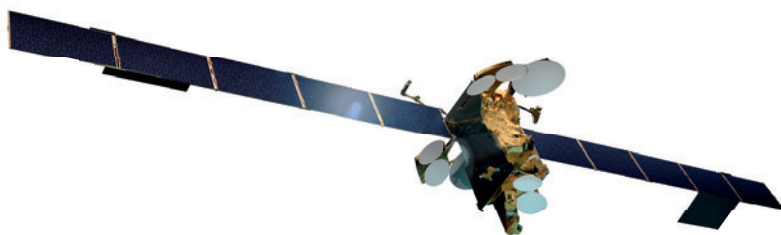
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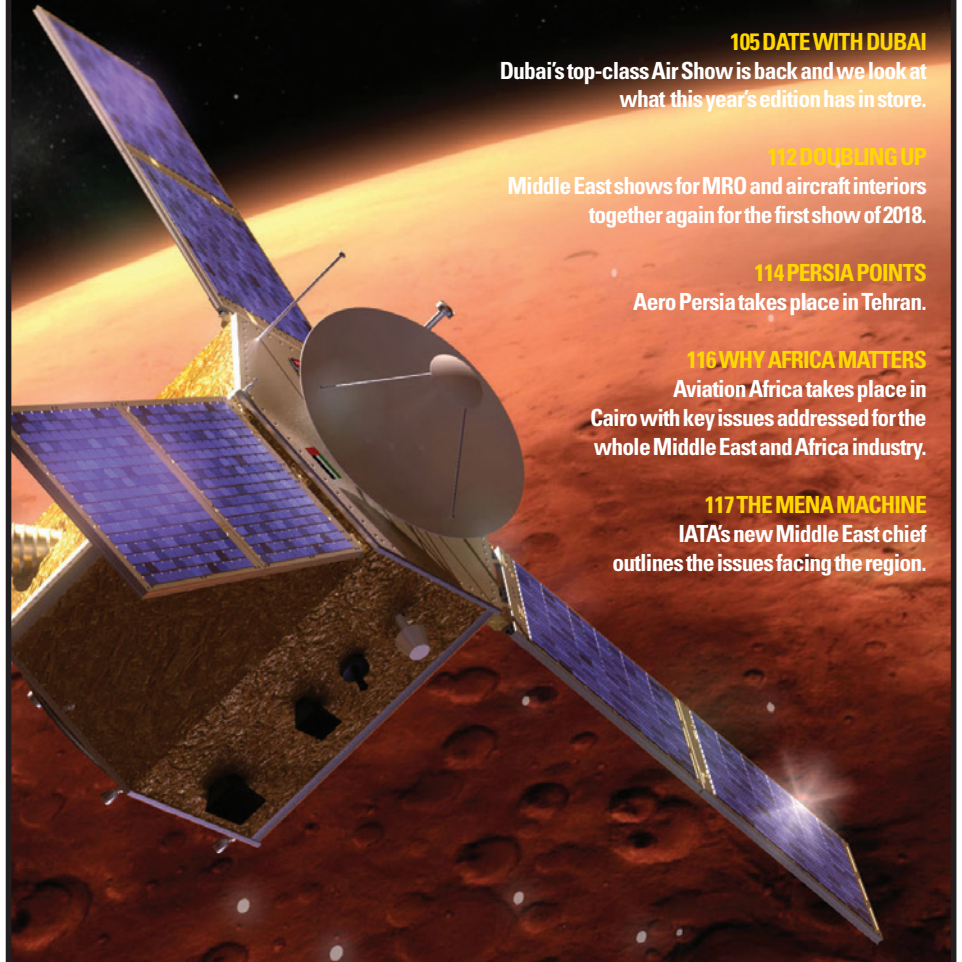
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Hailing the first air taxi over Dubai

Dubai's much-feted unmanned aerial taxi made its first flight in September.

Expected to become the world's first self-flying taxi service, the autonomous air taxi (AAT) took to the skies over Jumeirah Beach Park, watched by the Crown Prince, Sheikh Hamdan bin Mohammed Al Maktoum.

Dubai announced its plans to trial the German-engineered Volocopter back in June. The emirate has plans to have autonomous vehicles handle a quarter of all passenger journeys in the city by 2030.

With low noise levels and utilising 'clean' electricity, the Volocopter will have a maximum flight time of 30 minutes between charges. It will cruise at around 50km/h, although it has a maximum speed of double that.

"The AAT has a variety of unique features that include top security and safety standards, and multiple redundancies in all critical components, such as propellers, motors, power source, electronics and flight controls," said HE Mattar Al Tayer, director-general and chairman of Dubai's Road and Transport Authority. "It is also fitted with optional emergency parachutes, nine independent battery systems, and a battery quick-charge and plug-in system, which takes two hours to reach full charge in the prototype version, a time that will be significantly reduced in the production version."



Qatar Airways buys stake in Meridiana

Qatar Airways has acquired a 49% stake of AQA Holding – the new parent company of Meridiana Fly, Italy's second largest carrier.

Qatar Airways Group chief executive, Akbar Al Baker, said: "We are delighted to formalise this important partnership, which will help increase Meridiana's competitiveness in the European market.

"We look forward to working together to reinforce its position to provide even more connectivity to Italy and other European destinations, as well as those in the US and beyond."

EgyptAir / Aegean expand code-share

EgyptAir and Aegean Airlines have expanded their codeshare cooperation to include new routes.

Captain Sherif Ezzat, EgyptAir chairman & CEO said: "The expanded codeshare agreement with Aegean Airlines will initiate commercial opportunities for both airlines and, more importantly, unleash the true benefits of the partnership by offering optimum connections to both business and leisure travellers. Cairo and Athens have close cultural and business cooperation in various areas, including aviation. The expansion of this codeshare will add more value to our commercial ties and will be equally beneficial for our customers."

Turkey abandons regional jet plan

Reports from within Turkey's defence secretariat suggest that the country's first regional jet programme –

based on the Dornier 328 – has been cancelled.

The TRJET which was expected to have a first flight in 2019 was said to be too costly, according to the Undersecretariat for Defense Industries. The programme was launched in late 2015.

Spatial wins Aer Lingus contract

Aer Lingus has awarded Ras Al Khaimah-based Spatial a contract to upgrade and overhaul its A320 cabin emergency evacuation trainer and A330 door trainer.

Marc Van den Broucq, Spatial managing director, said: "We have invested significantly in building a reputation with our customers for reliability. We are glad Aer Lingus has recognised this and look forward to serving the airline over the years to come."

Flydubai rolls out new uniform

Flydubai has rolled out a new uniform as it enters its ninth year of operation.

More than 2,500 uniformed staff will wear the new design across the Flydubai network.

Chief executive, Ghaith Al Ghaith, said: "We have come a long way from being a start-up airline and this maturity needs to be reflected through multiple touchpoints across the airline. Undoubtedly, the uniform is the most visible of all."

Bahrain orders Sniper pods

Lockheed Martin has received a direct commercial sale contract from the Bahrain Defense Force (BDF) to provide Sniper advanced targeting pods (ATP) for its F-16 fleet, becoming the 25th

international customer for the programme.

Under the \$22.45 million contract, Lockheed Martin will deliver ATPs, spares and support equipment for integration.

To meet the BDF's urgent operational need, pod deliveries will begin in early 2018.

Inmarsat signs with Rockwell Collins

Inmarsat has signed a strategic agreement with Rockwell Collins for the global distribution of its next-generation SwiftBroadband-Safety (SB-S) flightdeck connectivity solution.

SB-S is the first secure communications system for the flightdeck and meets stringent aviation requirements for safety and operational data exchange with the ground.

Emirates partners with PwC

The Emirates Group has partnered with PwC Middle East to offer UAE national graduates a secondment opportunity.

Two Emirates Group employees have been selected this year to join PwC's Watani graduate programme, providing them with a unique training opportunity in fields such as consultancy, assurance, audit and finance.

Amira Al Awadhi, Emirates' VP, national recruitment and development, said:

"We are always looking to invest in programmes and initiatives that provide UAE nationals with various training opportunities, further developing their careers and growing their skillset."

Lion Air roars into Saudi

Indonesian low-cost carrier, Lion Air, has opened up nine new connections between the south-east Asian nation and Saudi Arabia.

The airline began flights in October from Jeddah to Balikpapan, Banda Aceh, Bandar Lampung, Bandung, and Palembang, while Medina will be served from Medan, Padang and Pekanbaru.

Lion said it intends to use Airbus A330-300s and Boeing 737 MAX 8 aircraft on those services, but has not yet confirmed the schedules or whether the operation will be charter.

DAE acquisition

Dubai Aerospace Enterprise (DAE) has completed the previously announced acquisition of the AWAS group of companies. DAE will now conduct its aircraft leasing business using the DAE Capital brand name.



Round-the-world pilot takes Emirates challenge

Emirates hosted round-the-world pilot Shaesta Waiz (left) for a Boeing 777 simulator challenge during her stop-off in the UAE.

Waiz is the founder and pilot of Dreams Soar (DSI), a non-profit organisation with a mission to inspire and empower young women to become the next generation of science, technology, engineering and mathematics (STEM) and aviation professionals, through a global outreach mission, during which

she circumnavigated the Earth in a single-engine Beechcraft Bonanza A36. She was met at Emirates Aviation College by Bakhita Al Muheiri, Emirates Boeing 777 first officer.

Afghanistan-born Waiz said: "An aircraft doesn't know if you are a girl or boy or what your religion or background is. It reacts based on the input of the pilot. Let us work together and expend our resources to create brighter futures for our tomorrow."



RJ awarded PCI DSS compliance certification

Royal Jordanian has successfully attained the latest version of the PCI data security standard version 3.2 compliance certification and attestation of compliance for the second year.

RJ president/CEO, Stefan Pichler, received the certification from Dr Ramzi Al Sunna, co-founder of ScanWave CTS, at RJ's head office in Amman.

"We are proud to be playing a part in securing payment card data globally. This achievement is a testament to our continuous efforts to protect bank consumer interests and deliver cutting-edge secure payment channels and services," said Pichler.

Wataniya links up with Jeppesen

Kuwait's Wataniya Airways has selected Jeppesen to assist it with several operations. It will receive paper charts for navigation and international trip planning services from Jeppesen in the near term.

After air service is established, the airline also will use Jeppesen electronic flight bag (EFB) services to increase operational efficiency. For the short time at the point of beginning operations, Wataniya Airways will also use Jeppesen trip planning and flight dispatch services.

DXB traffic tops 43 million

Passenger traffic at Dubai International (DXB) surpassed 43 million in the first half of 2017.

The airport handled a total of 43,054,268 passengers, up 6.3% compared to the corresponding period in 2016, when the airport

welcomed 40,507,251 passengers. Monthly traffic in June reached 6,084,674 compared to 5,857,503 during the same month last year, up 3.9%. The relatively modest growth was the outcome of the holy month of Ramadan falling in June, a traditionally slow month.

Comlux in ACJ320 cabin completion

Comlux Completion has signed a VIP interior completion for an ACJ320 neo aircraft. The aircraft is to be delivered green by Airbus in September 2019 and is scheduled to take approximately 10 months to complete within the Comlux Indianapolis facilities. This completion is for a private customer based in Asia.

TAI's Airbus contract

Turkish Aerospace Industries (TAI) has won business from Airbus – covering the design, build and supply of Pratt & Whitney nacelle fan cowls for the A320neo.



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Rolls-Royce

Boeing order sealed with Kish

Iran's Kish Air chief executive officer, Mohammad Taqi Jadidi, has confirmed the carrier has signed a memorandum of understanding (MoU) with Boeing for the purchase of 10 B737 MAX aircraft.

Jadidi said: "We recently negotiated with the representative of Boeing, which has been licenced to negotiate aircraft sales. The aircraft is able to travel five to six hours, for example, from Tehran Imam Khomeini to China, London, the Gulf states, Russia, Europe, Stockholm, and south to Sri Lanka."

Ethiad in Argentinas codeshare deal

Ethiad Airways and Aerolíneas Argentinas launched a new codeshare partnership in August.

Under the agreement, Ethiad Airways customers are able to connect via Rome and Madrid to Buenos Aires, and onwards to nine other popular Argentinian destinations.

Maximus workhorse: the Antonov AN-124-100.



Maximus to the rescue after Hurricane Irma

Maximus Air, the UAE's largest all-cargo airline, provided vital humanitarian relief to Barbados in the aftermath of Hurricane Irma, which caused catastrophic damage when it swept across the Caribbean and several US states in early September.

The Abu Dhabi-based airline sent three flights to the area on its Antonov AN-124-100 to provide relief cargo for those who were

affected by the disaster. The Maximus team faced several logistical challenges during the mission, including vast geographical distance, short notice and a challenging time frame.

Maximus CEO, Mohamed Al Qassimi, said: "Since our inception, we have held true to the belief that we have an important duty to help those in need around the world."

Turkish orders Dreamliners

Turkish Airlines has made a commitment to order 40 787-9 Dreamliners.

"Our agreement to purchase 787 Dreamliners is a significant step forward in enhancing our passengers' flight experience as these aircraft are the latest and one of the most advanced in the world," said chairman Iker Ayci. "During the talks to finalise the order, we are

strictly evaluating the \$1 billion worth business volume for the local Turkish supplier industry," he said.

Gulf Air and Aegean in codeshare

Gulf Air and Aegean Airlines, Greece's largest carrier, entered into a codeshare partnership in August.

Specifically, travellers can now codeshare on flights from Bahrain, via Athens, to and from the European cities of Brussels

and Rome, while travellers from Geneva, Milan and Vienna can now codeshare on flights, via Athens, to the Kingdom of Bahrain with Gulf Air.

Rolls-Royce Trent 1000 TEN certified

The Rolls-Royce Trent 1000 TEN, which will power all variants of the Boeing 787 Dreamliner, has been granted full flight certification from the European Aviation Safety Agency (EASA).

Thales supports Morocco

Thales has opened an industrial competence centre in Casablanca.

The new facility is specialising in metal additive manufacturing, also known as metal 3D printing.

This move forms part of the industrial acceleration plan 2014 to 2020, supported by the Kingdom of Morocco, which backs the development of an innovative ecosystem involving Thales and its local suppliers, including the creation of a high-tech industrial competence centre.

Nesma and Flyco in training agreement

Nesma Airlines has entered into a long-term training service agreement with Flyco Group.

"An advanced learning management system and a wide-ranging courseware, both for pilots and cabin, including the cabin type rating courses, were some of the many reasons why we have decided to select Flyco for our online training requirements," said Nesma CEO Ashraf Lamloom.



Qatar signs with Diamond for trainer

Qatar Aeronautical College (QAC) has ordered 14 training aircraft and two simulators from Austria's Diamond Aircraft. The 10 single-engine DA40NGs and four DA42-VI twin-engine aircraft, along with the simulators, will be based with QAC in Doha.

QAC CEO, Sheikh Jabor bin Hamad Al-Thani, said: "These aircraft have proved their efficiency and endurance particularly regarding to air turbulence in the Qatari environment and hot weather conditions."

DHMI and Aireon sign space MoU

Aireon has signed a memorandum of understanding (MoU) with the General Directorate of State Airports Authority (DHMI), Turkey's air navigation service provider (ANSP), for work on benefit analysis and concept of operations for the deployment of space-based automatic dependent surveillance – broadcast (ADS-B) in Turkish airspace.

"DHMI controls one of the fastest-growing airspaces on the European continent. There has been significant growth in international routes utilising Turkey as a hub, and passenger traffic is at an all-time high," said Cyriel Kronenburg, vice president, aviation services, Aireon. "Aireon is primed and ready to assist DHMI in the creation of a concept of operations for the deployment of space-based ADS-B."

SaudiGulf Airlines selects Rusada

Envision, an aviation maintenance and engineering technology suite from Rusada, has been chosen by SaudiGulf Airlines.

The airline will use the Envision suite to support its continuing airworthiness management organisation (CAMO) requirements, line maintenance, materials management and quality and safety management functions across the operation.

EgyptAir receives sixth Boeing 737-800

EgyptAir has received the sixth of its nine ordered B737-800 aircraft.

"We have steady goals to achieve regarding the EgyptAir fleet," said



The first Qatar 747-8F freighter takes flight.

Freighters set to deliver for Qatar

Qatar Airways has taken delivery of its first Boeing 747-8F, with a second freighter due to arrive in Doha in November.

Qatar could be ordering a third soon. CEO, Akbar Al Baker, told journalists at the September delivery ceremony near Seattle, that the first two were already planned to be at full capacity.

"The addition of our very first 747-8 freighter is a significant moment for our cargo division, and a welcome addition to our 20-strong cargo fleet of wide-body aircraft," Al Baker said.

Qatar also took the opportunity to order four additional 777-399ERs as part of the \$2.1 billion deal.

Atkins celebrates 50 years with a survey

Automation and biometrics will dominate Arabia's aviation infrastructure development over the next 50 years, according to a new future-gazing survey by design, engineering and project management consultancy Atkins Middle East.

Julian Small, aviation market director, Atkins Middle East and Africa, said the survey, carried out to mark the company's half-century of operations in the Middle East, identified that the "most likely" tech innovations in aviation infrastructure would be automated check-ins (94%), biometric gates (90%) and laser-powered security scanners (90%).



Atkins' Julian Small.

EgyptAir group chairman Safwat Musallam. "When the ninth is delivered later this year the fleet will have an approximate average age of six years.

He added that the company is currently working on reviewing several transactions offered by major manufacturers and lease-funding companies in a bid to add 33 more aircraft of different types that will vary between

short-, medium-, and long-haul.

MEA extends with Amadeus

Middle East Airlines (MEA) has extended its partnership with Amadeus, the advanced technology provider for the global travel industry.

Adib Charif, head of IT at Middle East Airlines, said: "Throughout our time

working with Amadeus, the company has demonstrated not only reliability and quality support, but its robust, stable and flexible solutions have been imperative in supporting our business strategies. Amadeus solutions enable us to operate efficiently, by delivering products and services that are beneficial to our customers, while also keeping our operations running smoothly."

Boeing & ALC order 737 MAXs

Boeing and Air Lease Corporation (ALC) have finalised an order for 12 737 MAXs. The agreement also includes two new orders for the 787-9 Dreamliner. The five 737 MAX 7s and seven 737 MAX 8s, bring ALC's total MAX orders to 130.

"ALC understands the value and flexibility these aircraft will bring to its customers all over the world," said Boeing Commercial Airplanes president and CEO, Kevin McAllister. "We're excited to grow ALC's order book and look forward to continuing our strong partnership."

SANS and Aireon sign MoU

Aireon has signed a memorandum of understanding (MoU) with Saudi Air Navigation Services (SANS), the country's air navigation service provider (ANSP). SANS will develop and analyse a concept of operations for space-based automatic dependent surveillance – broadcast (ADS-B) as an additional layer of surveillance.

SANS chairman, Abdullah Alsuweilmy, said: "Deploying space-based ADS-B is an opportunity to optimise air traffic flow, while reducing the current separation minima and providing significant airline benefits. Space-based ADS-B will also help us increase safety for all aviation stakeholders and the flying public."

Emirates defers order

Emirates president, Tim Clark, has said the airline has deferred plans to place a new wide-body order this year.

Clark said that a much-anticipated order for either the A350 or B787 was off the table for now.



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Egypt snaps up Alligators

Russian Helicopters says it will this year deliver 15 Kamov Ka-52 'Alligator' helicopters to Egypt as it forges ahead with the fulfilment of a 2016 order of 46 units.

Russian Helicopters Holding Company head, Andrey Boginsky, said: "Three helicopters (were delivered) in the first batch for training, three will go in the second batch until we reach 15 this year. There are 46 in total."

A contract to supply 46 Ka-52 helicopters to Egypt was reported in 2016.

Oman Air CEO visits key destinations

The chief executive officer of Oman Air, Paul Gregorowitsch, has undertaken a series of high-profile visits to Delhi, Zurich and Kuala Lumpur.

Gregorowitsch said: "These routes are of special significance to Oman Air and



Rubb and Alireza hangaring out together

The world's largest defence show, DSEI, held in London in September, saw Saudi Arabian company, Haji Abdullah Alireza, team up with Rubb Buildings to develop a "significant number" of aircraft hangar projects together.

continue to prove extremely popular with our guests both in Oman and further afield.

Ka-226T test success

Russian Helicopters, together with Iran Helicopter Support and Renewal Company (IHSRC), successfully completed testing of the Ka-226T light multirole helicopter in Iran during August and September.

The results confirmed the usability of the rotary-wing aircraft in extremely high temperatures.

Gogo speeds up connectivity

Gogo Business Aviation is expanding its reach to become a global provider with the announcement of a high throughput satellite service for business aviation. The new service will utilise Gogo's existing

Ku-band satellite network, the same trusted high-capacity satellite network that is currently providing bandwidth for more than 550 commercial aviation aircraft across 10 airlines globally.

"Gogo's Ku satellite service will deliver a superior experience to anything else in the market today for anyone flying globally on business jets," said Sergio Aguirre, senior vice president and general manager for Gogo Business Aviation.

Airbus forecasts doubling of ME fleet

The fleet size of airline operators in the Middle East is forecast to more than double from 1,250 to 3,320 aircraft over the next two decades, according to the Airbus global market forecast issued in October. The region needs 2,590 new aircraft by 2036, for replacement of 520 older generation aircraft, and 2,070 aircraft for growth. 730 are expected to remain in service over the period. The current orders from Middle East-based carriers stand at 1,319 aircraft, of which 687 are single-aisle, 409 twin-aisle and 162 very large aircraft.

Etihad weighs in for Lufthansa contract

Etihad Engineering has been awarded its first heavy maintenance contract by Lufthansa. The contract is for several long-haul aircraft, including the Airbus A340-300 and A380-800.

Etihad and Citi mark treasury project finale

Etihad Airways and its international cash management bank partner, Citi, successfully completed a project six months ahead of schedule to introduce new automated treasury tools at the airline. The 18-month project saw Etihad Airways implement Citi's liquidity management solution across its international network to achieve substantial cash optimisation and competitive market rates, resulting in significant transaction cost savings.

Pictured: Left: Emre Karter, Citi's head of treasury and trade solutions for the Middle East, North Africa, Pakistan and Turkey; Ebru Pakcan, Citi's regional head of treasury and trade solutions for Europe, Middle East and Africa; Ricky Thirion, Etihad Aviation Group interim group chief financial officer; and Adam Boukadida, Etihad Aviation Group, acting group treasurer.





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The leaders of more than 30 airlines from across the Arab world will meet in Sharjah this month for the Arab Air Carriers Organization (AACO) annual general assembly.

Alan Peaford looks at the importance of this event.

Can AACO lead Arab airlines to the next level?

That this is the 50th annual general assembly of the AACO is an indicator of how vital this face-to-face forum is.

It is a reflection of the value the carriers, both legacy and start-ups, put on the organisation that it has not just survived in such a diverse – and sometimes divided – region, but has actually grown.

This year's AGM will be held at the Radisson Blu Resort in Sharjah from November 20-22, under the patronage of HH Sheikh Dr Sultan bin Mohamed Al Qasimi, Supreme Council member and ruler of Sharjah. Adel Ali, group chief executive of Air Arabia, will host the event.

As well as the 33 member airlines, delegates will include a large number of stakeholders, AACO partner airlines and industry partners, as well as international and local press. All will be gathered together for two days of networking, brainstorming on industry issues and high-level discussions.

Heading the top table is the association's secretary-general, Abdul Wahab Tefaha, who, with almost 40 years' experience in the industry, has managed the delicate task of balancing the interest of the airlines and representing them in the big battles, such as taxation, infrastructure, security and safety.

He is often frustrated at a lack of actionable information as he takes on the regulators on the global stage.

This year's assembly will see the director general of the Arab Civil Aviation Commission (ACAC) and the CEO of the International Air Transport Association (IATA) join him on stage to add weight to the arguments.

Currently Tefaha is agonising over the issue of some of his war-torn members.

Currently banned

Five of the group's 33 airline members are currently banned from flying to Europe due to their inclusion in the European Union's air safety list – better known as the blacklist. The affected members are Libya's Afriqiyah Airways and Libyan Airlines; Sudan's Badr Airlines and Sudan Airways; and Iraqi Airways.

The Sudanese members are hamstrung by sanctions on their government and would find it difficult to serve Europe even without being blacklisted. But the Iraqi and Libyan airlines are banned solely because of perceived shortcomings in their regulatory compliance – shortcomings for which Europe is providing no corrective support. This inaction, says Tefaha, is another example of regressive policymaking that isolates underperformers instead of helping them lift their game.

“The EU has to be proactive ...they have to teach those lessons.”

**ABDUL WAHAB
TEFFAHA**



Smoothing the way: Abdul Wahab Tefaha leads AACO into its 50th assembly.

“We believe it's not helpful and we believe that, instead of being passive – identifying some things and not doing anything about it – the EU has to be proactive,” he said. “They have to teach those lessons.”

“Let's not forget Iraq has been living in a constant state of war for decades now. In order to rebuild a safe, secure and credible aviation industry it needs to be taught by somebody how to do things. This is an issue ethically speaking, otherwise it is as if you are saying, ‘I don't want Europeans to be harmed, but it's fine for others to be harmed’. That doesn't make sense.”

Huge opportunities

Tefaha believes that, despite the obvious problems affecting the Arab world, there are still huge opportunities for the airlines served by the AACO.

The organisation firmly believes that any government can increase the strength of its economy through aviation. The prime example of this is Dubai where, by 2020, an astonishing 37.5% of gross domestic product (GDP) is expected to come from aviation-related industries.

Apart from the huge supply chain – and its workers – that a major airline now requires, aviation means tourism. Tourism means hotels. Hotels mean resorts. Resorts mean services, restaurants etc. All of this contributes to an economy.

The potential of the Arab market is huge, he said. In population terms alone, the market is substantial and if the current conflicts could be resolved: “There would be a positive explosion of traffic in the Arab world.

“There's the potential for an extra 500 million passenger flights annually in the Arab world on top of the 200 million that Arab airlines carry today,” he concluded.



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“Today, in Europe, the biggest chunk of people fly on LCCs. I think it’s something that will inevitably come to this part of the world too.”

Adel Ali

Air Arabia’s cautious growth strategy and budget product may not have the ‘wow’ factor but, as the region’s glitzier airlines fly into turbulence, this low-cost carrier is proving that substance beats style every time.

*Group chief executive Adel Ali talked to **Martin Rivers**.*

ARABIA’S KNIGHT

When it comes to press coverage about Gulf aviation, Air Arabia, the 14-year-old flag-carrier of Sharjah and the region’s only true low-cost carrier (LCC), flies well under the radar most of the time.

Winning the attention of media outlets is not easy when you operate in the backyard of the ‘big three’ super-connectors – Dubai’s Emirates Airline, Abu Dhabi’s Etihad Airways and Qatar Airways – goliaths that have transformed the airline industry with their insatiable appetite for double-digit traffic growth and on-board luxury.

Air Arabia’s slow steady expansion and frugal no-frills product, by contrast, seems mundane to observers.

Yet, as Sharjah hosts the 50th annual meeting of the Arab Air Carriers’ Organisation (AACO) in November, media and industry professionals would do well to draw lessons from the LCC’s strategy. At a time when Emirates is deferring aircraft orders, Etihad is selling foreign investments, and

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**CONTINUED FROM PAGE 23**

Qatar Airways is battling a regional blockade, Air Arabia continues to reap profits from a low-cost business model that many had dismissed as too lowbrow for the Gulf.

“The market has really changed. LCC used to be a bad word,” smiled Adel Ali, Air Arabia group chief executive.

“Today, in Europe, the biggest chunk of people fly on LCCs. I think it’s something that will inevitably come to this part of the world too. In terms of ease to arrange, ease to travel, the speed of doing things, LCCs are helping people to do what they really want. The millennials of this world don’t want complicated things; they want to just manage their own lives. LCCs offer them that freedom.”

Looking at overall market share, the Middle East still lags behind other parts of the world for low-cost penetration.

Penetration rate

Ali estimates that LCCs provide about 17% of capacity in the region today – less than half the penetration rate in Europe. What’s more, the Middle Eastern contingent includes hybrid carriers like Kuwait’s Jazeera Airways and Flydubai – companies which use the ‘low-cost’ label to project affordability, but which, in truth, offer full-service perks like free checked luggage. Those airlines barely qualify as LCCs under the European definition, whereby all non-essential services attract a surcharge.

This more gradual ascent of LCC operators in the Gulf can be attributed to a number of causes, ranging from lengthier flight sectors to more

restrictive bilateral agreements to lingering – and wholly unfounded – concerns about safety.

Far from being a weakness, however, Air Arabia’s conservative growth trajectory and disciplined cost management is ideally suited to prevailing market conditions. When industry yields plummeted last year amid a volley of economic, security and competitive headwinds, the Sharjah-based carrier still delivered a net profit of 509 million UAE dirhams (\$139 million). It then stayed comfortably in the black for the first half of 2017.

That contrasts with waning fortunes among the full-service Gulf carriers, which have scrambled to freeze traffic growth and renegotiate ambitious aircraft orders.

“We have been consistent in managing our costs year after year, whether the year is good or bad. As a result, it helps in the difficult times,” Ali said, referring to last year’s perfect storm of currency instability, low oil revenues and global terror attacks.

“I think, as we move on, economic conditions are going to bring more pressure on the industry in the region, and that probably will make some operators reconsider some of the overcapacity that exists. We are different because our DNA [entails always] having a low-cost mind-set. So we end up having to do less restructuring and less cleaning when markets get difficult.”

Air Arabia currently deploys 35 Airbus A320s from its hub at Sharjah International Airport, configuring the planes in an all-economy layout with 162 seats.

Its route network stretches out in all directions to 69 markets within range of the

narrow-body fleet. Alongside a deep footprint in the Middle East and the Caucasus, the airline serves seven countries in Asia (Bangladesh, China, India, Kazakhstan, Nepal, Pakistan and Sri Lanka), four in Europe (Bosnia & Herzegovina, Russia, Turkey and Ukraine), and four in Africa (Egypt, Kenya, Somalia and Sudan). The Indian subcontinent accounts for more than 50% of its available seat kilometres (ASK) capacity, while Saudi Arabia is the largest regional market with more than 100 flights a week.

Since 2014, Air Arabia has also based two A320s in the neighbouring emirate of Ras Al Khaimah to fill the void left by defunct home carrier RAK Airways.

Part of the puzzle

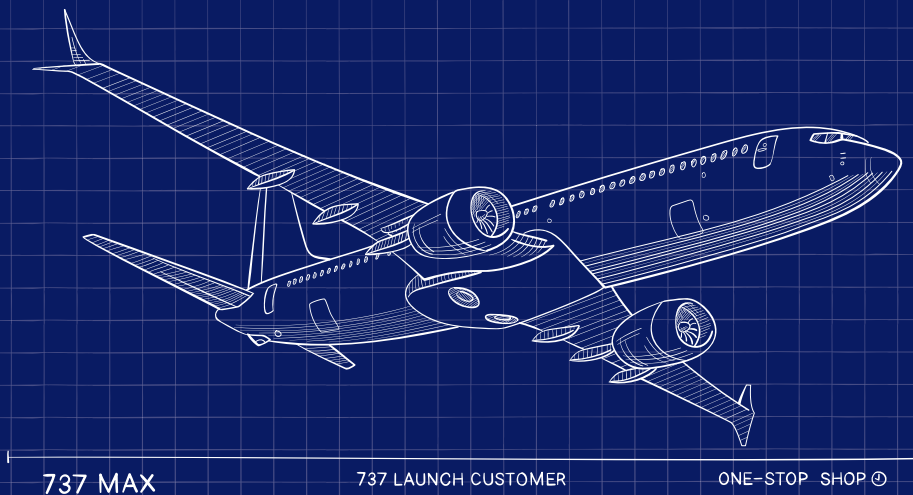
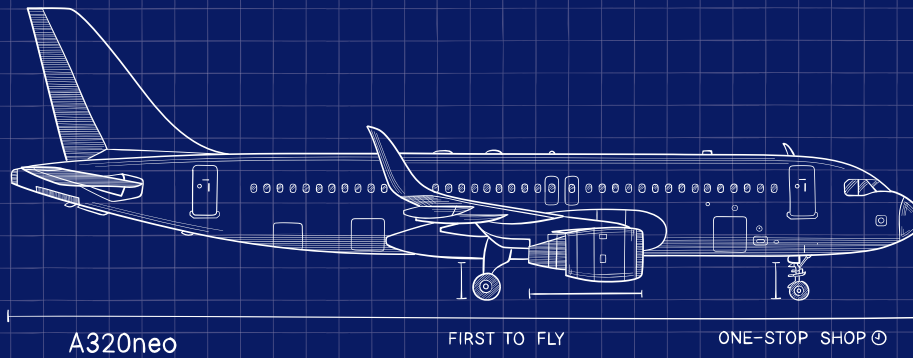
However, flights from the UAE are only part of the puzzle.

Like Ryanair in Europe, Air Arabia’s long-term goal is to offer point-to-point connectivity between all major cities in its home region. Its major handicap is that, unlike in Europe, there is no single aviation market spanning the Arab world. Basing aircraft outside of the UAE, therefore, necessitates joint ventures with local partners – a franchise model that brings with it heightened complexity and the ever-present threat of protectionism.

“It’s not difficult for us to establish [foreign bases] from the logistics point of view,” Ali said of the strategy. “But this is not the EU. This is not a single air operator’s certificate (AOC). A lot of countries have national carriers that are owned by

Continued
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CONTINUED FROM PAGE 24

governments and you could be going in competing with governments. So we always need to make sure that the opportunity is right.”

His cautious approach has so far seen three affiliates established in Morocco, Jordan and Egypt.

Air Arabia Maroc is by far the largest operation, with eight A320s flying from six domestic bases to 29 points in western Europe plus Istanbul. Two aircraft are also based in the Jordanian capital Amman, offering connections to Egypt (Sharm El Sheikh), Georgia (Tbilisi), Iraq (Erbil) and Saudi Arabia (Dammam, Jeddah and Riyadh). In the northern Egyptian city of Alexandria, one more A320 flies to the same three Saudi points plus Amman and Kuwait.

The multi-hub strategy gives Air Arabia broad exposure to markets in the Middle East and North Africa. But, in its current form, it falls short of a pan-Arab offering. Algeria and Tunisia are entirely absent from the network, for example, while no outbound services are operated from key Arab markets like Cairo and Jeddah.

While he recognises these limitations, Ali is in no rush to establish more franchises. “We are by nature conservative about protecting the investors’ money, so I’m not prepared to just sign up to joint ventures [for the sake of it],” he said. “You can burn too much money in this business.”

Higher priority

Growing the existing hubs is considered a higher priority – albeit a challenging one in a region where protectionism seems to lurk around every corner.

In Amman, Ali admitted that operations have “not grown as fast as we would have liked” due to high airport taxes and difficulty securing traffic rights. Despite signing an open-skies treaty with Europe, the Jordanian authorities have stonewalled plans for connecting flights between Sharjah and the continent. Requests to serve Beirut and Istanbul have also gone unanswered. “There’s a long list of places that we would like to go to from Jordan,” Ali shrugged. “It’s been with the authorities in the Civil Aviation Authority for more than a year, but it’s just not been coming through.”

Protectionism in Egypt also keeps Cairo off the table, though Ali believes the country is turning a corner after a difficult few years. He expects to base a second A320 in Alexandria this year, and will consider further growth following the 2018 presidential elections.

Morocco, meanwhile, is the star performer in the group thanks to the government’s comprehensive – and faithfully enforced – open-skies deal with Europe. Even here, though, traffic rights can be a bugbear: Royal Air Maroc, the flag-carrier, still enjoys a monopoly in the all-important West African market.

“I’m sure it will come one day,” Ali said of his stalled request to enter the sub-region. “The

Multi-hub strategy key for Air Arabia

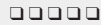
In addition to serving the North African market from its main hub in Sharjah, Air Arabia has three solid hubs in Morocco, Egypt and Jordan, strategically located to serve the African and the European market.

Air Arabia plans to expand in underserved markets and maximize its operational efficiency, while providing passengers with cost-effective, easy and accessible travel.

“Expanding our operation in Morocco is in line with our business strategy by offering more air accessibility from and into the country”, says Adel Al Ali, Group CEO of Air Arabia.

The company is continuously working towards developing its network especially from its hubs in North Africa. Air Arabia Jordan recently inaugurated its services from Amman to Tbilisi and Sohar, becoming the first carrier to link the two countries with a direct flight while Air Arabia Maroc continues to grow at a fast pace to support the tourism vision set for the kingdom. Air Arabia now operates from six airports in Morocco with direct connectivity to Europe.

“We aim at strengthening our operation from North Africa by further expanding and serving the rest of the African markets and we will do so when we are granted the necessary traffic rights approvals.”



Air Arabia launches its sixth base in Agadir (149 292 additional seats) with direct flights to Dublin, Manchester, Cologne, Munich, Copenhagen, Stockholm and Toulouse. It has thus joined Casablanca, Fez, Marrakesh, Nador, and Tangier where it currently offers direct flights to over 25 routes in Europe. These hubs connect North Africa with Europe and the Middle East.

The Air Arabia brand philosophy has proven its efficiency. The company heads the top-ten low-cost operators in a growth survey for 2016 carried out by the French civil aviation authority (DGAC). Air Arabia Maroc has recorded a 33.2% growth by carrying 280 000 passengers from different French airports including Paris.

With its multi-hub strategy, Air Arabia spreads across several regions with a high density of potential travellers.

challenge is to say when.”

With just three units outstanding from the group’s original Airbus order – two destined for Sharjah and one for Cairo – Air Arabia is also now turning its attention to fleet renewal.

Management will sign commitments for “around 100 aircraft” in “either the latter part of this year or early next year”, laying down a roadmap for gradual expansion and renewal of the fleet. Airbus, Boeing and Bombardier products are all being considered, with Ali insisting he would be “daft not to look at everything”.

Indeed, while Boeing and Airbus are the only contenders in the 150-seat-plus market, Ali heaped praise on Bombardier’s 110-130 seat CSeries. “There are very positive vibes coming out,” he said, referring to glowing reviews from launch customer Swiss International Air Lines. “CSeries could be a good size for some of our thin routes, some of our development routes... domestic flights in Morocco, some of the Egyptian routes. They could do quite a lot of routes in the region.”

His only concern is that the aircraft has not yet proven itself reliable in the Middle East’s “harsh weather climate”.

Finance diversification

Another new aircraft type, the A321neo, a stretched re-engined version of the A320, will, meanwhile, join the fleet thanks to an agreement with Air Lease Corporation. Six of the aircraft will arrive in 2019, kick-starting Air Arabia’s finance diversification programme as it moves away from a fully-owned fleet.

Confirming his preference for the long-range variant, Ali said the A321neoLR would open up new markets in China, Russia, the Far East and Africa from Sharjah. Air Arabia Maroc could also use the type to extend its reach into eastern Europe, as well as into West Africa when traffic rights are eventually secured.

With about 40 more seats than the A320, the stretched aircraft will further enable up-gauging on dense routes to the Indian subcontinent and Moscow.

Despite its suitability for mid-haul flying, however, Ali is in no rush to add western European points like London and Paris. Citing overcapacity and yield pressure in these markets, the chief executive said he wanted to stand back and see how his struggling rivals adapted their premium products. Some have already vowed to “completely stop service at the back end of the aeroplane,” he noted, meaning there could soon be “very little difference between legacy and low-cost” models.

“The only difference is, ‘Who is the true low-cost carrier that manages costs, and who isn’t’,” Ali asked, hiding his confidence behind a smile. “To survive in the industry from now onwards, you’ve got to manage your costs. It’s nothing to do with your revenue.

“And we are the only pure LCC in the region.”

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Saudi Arabia's national carrier, Saudia, is going on the offensive with a huge expansion campaign and the launch of its own low-cost carrier. Alan Dron reports.

Saudia aims low for a high return

Often forgotten when outsiders look at the airline market in the Gulf, Saudia is one of the region's major carriers. It is undergoing a major transformation plan to re-equip its fleet and is positioning itself not only to fight off ever-growing competition but also to expand in its own right.

One indicator of its rapid expansion can be seen in its passenger figures. At present, the airline flies close to 30 million travellers annually. By 2020, just three years from now, it is confident that figure will have grown by 50%, to 45 million, said Saleh bin Nasser Al-Jasser, the Saudi Arabian Airlines' director-general.

Those additional passengers will be carried by a rapidly expanding fleet, he explained at Airbus' Finkenwerder assembly plant in Hamburg, Germany.

Speaking as he accepted the first Airbus A320ceo for the group's new low-cost carrier, Flyadeal (see page 30) he noted that when Saudia started its 'transformation plan' in 2015, it operated 117 aircraft. By the end of 2020, that figure will have grown to 200. It received no fewer than 28 new aircraft in 2016 and plans to take a further 32 into its inventory this year.

At the same time, it is retiring older types such as its 15 Boeing 777-200ERs. By the end of the decade, it will have one of the youngest fleets in the region and intends to use it both to expand its route network and increase frequencies to its existing destinations.

Among the new types that have joined the fleet in the past couple of years are Boeing 787-9s, of which it has eight on order, plus the Airbus A330-300R (for 'Regional'), a high-capacity, shorter-ranged version of the A330-300, which it uses on major trunk routes on its network. Compared to earlier versions of the A330-300, which fly with 288 or 298 passengers in Saudia service, depending on internal configuration, the

'R' has capacity for 330, partly through a smaller business class cabin (30 seats as opposed to 36). The airline is close to accepting the final aircraft in its order for 20, which it placed at the 2015 Paris Air Show.

The airline's growth is being mirrored by major investments in the country's airport infrastructure. One of the most important facets of this investment is a new passenger terminal at Jeddah's King Abdulaziz International Airport, which is due to open in early 2018 and which will be "a major milestone" for Saudia. That will give the airline the capacity to take its fair share of the region's traffic, said Al-Jasser.

It is often forgotten that a major component of Saudia's traffic is domestic. Before the arrival of local newcomers such as Saudi Gulf and Nesma, it was reckoned to take 90% of internal flights, with hybrid carrier Flynas taking the rest.

Untapped demand

That domestic traffic, thought to be growing at around 6% annually, is believed still to have considerable untapped demand. It will be one of the foundations for the national carrier's growth in coming years, although Al-Jasser was careful to say that Saudia would be pursuing growth in all three segments of its passenger market – domestic, regional and long-haul.

One intriguing potential aspect of Saudia's future domestic growth is the acquisition of turboprop aircraft. "Turboprops can be a solution for short domestic routes," noted Al-Jasser, but no decision had yet been taken on whether to procure them, he said. He noted that one carrier, the Saudi-Egyptian carrier Nesma, was using ATR 72-600 turboprops out of the regional centre of Hail.

There are also plans to create a south-western hub at Abha, but this is an initiative by the General Authority for Civil Aviation, the Saudi

Arabian regulator, rather than Saudia, said Al-Jasser.

On the human side of the company, as part of its transformation programme, Saudia is working to improve on-board service standards in a region where these are already formidably high. Those efforts appear to be paying off. "We're receiving a lot of compliments on the improvements," said the director-general, who noted with visible pleasure that Saudia had been named 'most improved airline' in the authoritative annual Skytrax awards, which measure airlines' quality over a wide range of parameters.

Saudia has two specific niche operations not found in many other airlines – flights catering for the annual Haj pilgrimage and a business class division, Al Bayraq, that taps into the huge demand for flights between the Saudi capital, Riyadh, and the country's main commercial centre, Jeddah.

The national carrier has a major role to play in helping Moslem pilgrims fulfil one of Islam's five basic tenets, the pilgrimage to Mecca. As well as carrying Haj passengers on scheduled flights, it operates charter services to help bring pilgrims in from all over the Islamic world and return them home at the end of their devotions.

This year, it has had around 21 aircraft dedicated to Haj charters, six or seven of them from its own fleet, with the rest of the necessary capacity leased in from other airlines.

"We do still lease in aircraft, but it's less than we used to, because of our expansion," said Al-Jasser. The charter business will continue, but as both the fleet and network expand "we will be able to meet a lot of the demand through our scheduled services".

Al Bayraq puts Saudia in a very small club of carriers that operate all-business class aircraft. It operates only on the heavily trafficked Riyadh-

“At present, Saudia flies close to 30 million travellers annually. By 2020, just three years from now, it is confident that figure will have grown by 50%, to 45 million.”

SALEH BIN NASSER AL-JASSER

Jeddah service and uses three Airbus A319s (two in service, with one on standby as a back-up) in a 48-seater cabin layout.

“It’s catering for a very niche market between Jeddah and Riyadh for people with very specific requirements.” Typical customers are businessmen and government officials.

“The volume of traffic between those two cities is huge and there’s a segment that, when we looked at our strategy in early 2015, we saw a market for this very niche product. It’s a different style.”

Al-Jasser said it was difficult to say whether Al Bayraq provided a more premium service than Saudia’s standard business class cabins, but it placed high emphasis on standards of food and overall service and: “It’s receiving an excellent perception from the market.”

Challenges for Saudia remain. “The biggest challenge is over-capacity in the entire region. Yields are already under pressure and we think this will continue for a few years to come.” Al-Jasser also accepted that Saudia is “definitely over-staffed” and was making efforts to become more efficient in this area. However, it was very difficult to set a target for staff numbers when the airline was growing so quickly, he said.

■ **Page 30: Can Saudia’s low-cost challenge be the real deal?**



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Flyadeal CEO Con Korfiatis (left) and Saudia director-general Saleh bin Nasser Al-Jasser take delivery of Flyadeal's first Airbus A320 at Hamburg. Right: Flydeal's purple seating.

Can Saudia's low-cost challenge be the real deal?

Flyadeal is the latest operator to take advantage of Saudi Arabia's liberalisation of domestic air services.

Alan Dron reports.

The low-cost section of the market in the Gulf is starting to look rather crowded. Flydubai, Air Arabia, Flynas, Jazeera Airways and Salam Air are already in the arena. They have now been joined by Saudi Arabia's Flyadeal, which began services on September 23, the country's National Day.

Flyadeal is the latest operator to take advantage of the kingdom's liberalisation of domestic air services. The combination of the largest population in the region – around 28 million – and relatively long distances between its major cities gives it the chance to develop a wide-ranging network of domestic services.

"I would estimate the domestic market at 20 million passengers a year and there's healthy growth," said Saudia director-general Saleh bin Nasser Al-Jasser. "The market has definitely been liberalised quickly in the last year. However, its total size and potential for growth is huge, so there's a space for all participants."

Al-Jasser believes there is still room in the marketplace for another LCC: "I don't see some of those [existing] brands as being low-cost airlines. I would call most of them hybrid. What that enables us to do is have a lower cost-base than them." Flyadeal would have a "world-leading" cost-base, he said.

Despite the competition, he believed there was a place for another airline that could provide high standards of service at an affordable price and the aim was to reach financial break-even quickly.

Asked if he thought Flyadeal would cannibalise Saudia's own traffic, he said the new LCC was aimed at a very specific, price-conscious segment of the market. "Of course there will be some cannibalisation but I think it will be marginal," he said.

Doubts have been raised by some industry observers as to whether a full-service carrier like Saudia can successfully give birth to a true low-cost carrier; there have been several examples in recent years of mainline carriers attempting to do so, only to fail. Those observers generally take the view that traditional airlines do not have the necessary 'DNA' to operate a successful LCC.

"Statistically you're correct, but it's not 100% of the cases," said Flyadeal's CEO, Con Korfiatis, who noted that he previously worked at two LCCs that successfully

emerged from full-service carriers – Jetstar from Qantas in Australia and Citilink from Garuda in Indonesia.

Flyadeal will start services with two Airbus A320neos, building up to eight of the type by the end of 2018's second quarter.

Its aircraft will be in a single-class, 186-seat configuration, with predominantly 28in. seat pitch, although several rows at the front of the cabin will have 30in. pitch. They will have Airbus' latest Spaceflex galley, a more compact unit than its predecessors that will allow an extra row of 30in-pitch seats to be fitted directly in front of it: "The dreaded 'last row' will actually be a comfortable row," said Korfiatis.

Absolute minimum

Some will look at the 28in seat pitch as being the absolute minimum that an averagely sized man can cope with. However, said Al-Jasser, the latest-technology, ergonomic, slim seats were being fitted that effectively gave an extra one inch of space compared to previous generation rows. They will also have a large slot on the seatback to provide space for a laptop or iPad, together with sockets to allow passengers to recharge their electronic devices on board.

It is also intended to have internet-streaming services on board, but details were not released.

Flyadeal aims to start operating international schedules in the second quarter of 2018. Korfiatis declined to identify possible initial international destinations, but said that "three or four routes" were under study and the airline's intention was that eventually "a significant proportion" of the carrier's route network would be international.

Religious tourism and labour traffic from countries such as India were potentially major markets and the inbound market has "enormous strength", he said.

The A320s' range allows them to fly well beyond the Gulf, including into eastern and central Europe and down into central Africa.

Korfiatis gave a strong hint that other LCCs will have a fight on their hands when Flyadeal takes to the air. The company was aiming to have their aircraft in the air for 13-14 hours a day, with load factors as high as possible. "We will be pricing to fill the aircraft."



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Libyan Wings' two Airbus A319s currently operate to Tunis and Istanbul from their Mitiga base.



SPREADING WINGS

Starting an airline in a country with continuous unrest around you may seem unwise but, as Alan Dron discovered, Libyan Wings is doing remarkably well... if only it could fly to more destinations.

Libyan Wings at present operates a daily flight to Istanbul from its base at Mitiga, outside the country's capital Tripoli, plus no fewer than three daily services to Tunis, just under an hour away from its home base. It would be fair to describe its business as 'healthy'.

"The response of the market is just amazing," said chief executive officer, Edgardo Badiali. "In July and August we were running at around 96% load factor. OK, that was partly because of Eid, but we actually had to put on additional flights. And the trend goes on."

Factors behind the remarkable loads include a strong punctuality record, which is "very much appreciated" by passengers who for years have put up with a distinctly lacklustre performance in this area by other carriers, together with good service, on ground and on board, said Badiali. "All our employees deserve a big 'thank you' for that. We manage to be punctual at all stations, even in Tunis."

This is no small feat, especially in the summer peak season at the Tunisian capital, when infrastructure and suppliers struggle to cope with the high demand.

"Nearly every day, a majority of the other

carriers were delaying flights. We always managed to get out pretty much on time because of the efforts of our people (ground staff, pilots and cabin crew) as well as the support of a small company there doing supervision for us, pushing things through. We're really happy with that achievement."

Lucrative market

Tunis is a lucrative market for Libyan Wings, with several distinct categories of passengers: "There are a lot of Libyans living and investing in Tunisia. It is also a tourist destination for Libyans and there's also a lot of medical traffic, due to the good medical infrastructure in Tunis, which is becoming a medical tourism centre for people from other countries."

With most countries having withdrawn their embassies from Libya for security reasons, Tunis is the nearest convenient city to which diplomats can relocate. This has resulted in many Libyans making the trip to the Tunisian capital to obtain visas for foreign travel. Senior diplomats making trips into Libya are also regular passengers on Libyan Wings' flights, said Badiali.

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Libyan Wings' two Airbus A319s are operated in a two-class layout, with 12 business-class seats plus 108 in the economy cabin.



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Passengers have also been appreciative of his company's in-flight service, he said. Libyan Wings' two Airbus A319s are operated in a two-class layout, with 12 business-class seats plus 108 in the economy cabin. Business-class travellers get a hot meal, even on the 55-minute hop between Mitiga and Tunis, with the main cabin also provided with a meal tray. More extensive food is provided on the 2.5-hour flight to Istanbul.

Behind the scenes, Libyan Wings is working on several projects that, while not exciting to passengers, are potentially invaluable to the future operational and financial health of the company.

One of the most important of these projects is to gain qualification under the IATA Operational Safety Audit (IOSA) programme.

"There are two reasons why this is important: operations and commercial. It's good to get a view from outside, to make sure we're on the right track regarding our safety processes. And if the market opens up and I need to enter a codeshare or interline agreement, without IOSA status it's nearly impossible nowadays."

There is one problem in gaining IOSA certification: auditors are reluctant to travel to Libya while the uncertain situation on the ground persists. But Badiali is convinced they will find a solution to the problem.

Among other advances, the company is introducing electronic flight bags for its pilots and is developing an app for mobile electronic devices to make it easier for its customers.

Innovation will be at the centre of the company's focus in the coming months and years. "Some of that stuff (automation, digital development, etc) is not really 'mandatory' in our

actual situation but we need to go through our learning curve in this field in order to be prepared and have the right culture in place," said Badiali.

On the training front, the company makes use of Lufthansa's Airbus simulators for its pilots.

Libyan Wings still operates the two Airbus A319s with which it began operations in 2015. "We're looking for a third aircraft to lease or purchase, probably an A320, ideally. But we would take an A319 or A321."

The A321's additional capacity would make it useful for religious tourism traffic to Saudi Arabia, for example: "In some ways, an A321 would be ideal, but we prefer to be a little more conservative – despite the load factors we're running."

Keeping in touch

At the 2013 Dubai International Air Show, Libyan Wings, then still very much in start-up mode, announced its intention to buy four A320neos and three wide-body A350s. At the moment, the company is keeping in touch with Airbus regarding the deal and deliveries are likely to be some years in the future.

The biggest hurdle facing the young Libyan carrier is a lack of new destinations. Badiali would very much like to expand the airline's route map, but faces problems in doing so. Libyan Wings, like all Libyan airlines, is barred from flying to Morocco, for example. The same is true for Egypt if the flight does not originate from the eastern part of Libya – from which the fledgling company does not operate. Efforts to solve this problem are on-going and Badiali hopes a solution will be arrived at soon.

"I would go tomorrow," he said. "For us, that would be the most natural, next step. Cairo would be great."

Similarly, Europe is off-limits, due to a European Union ban on Libyan carriers, as the EU has blacklisted Libya's aviation authorities. But events are moving in that field, as well; the local civil aviation authority (LyCAA) has been putting in considerable efforts to overturn its current status as soon as the situation in the country normalises.

From the very beginning of its operations, Libyan Wings has been careful to find European Aviation Safety Agency-approved organisations to perform maintenance on its A319s.

An Italian company, approved by the LyCAA as well as its own CAA, handles the upkeep of the aircraft.

The same is true for the airworthiness management of the fleet, which has been outsourced to an EASA-approved organisation, under the supervision of Libyan Wings Technical department.

Closer to home, the Libyan authorities are talking about reconstructing Tripoli International Airport, which was badly damaged in 2014. If the country's main airport is re-opened with renewed facilities, Libyan Wings could think about traffic from sub-Saharan Africa and Europe, building a network hub between the two continents.

Mitiga Airport, located around 8km east of Tripoli, has been largely free of major security problems. Facilities there have been improved, despite the continuing unrest in the country, and Libyan Wings has a rapid alerting system if incidents occur near the airport that might affect safety.

"I am confident," said Badiali. "With the commitment and the enthusiasm of our people, we will be able to further grow and become, hopefully, an important player in the region."



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“We need to make sure Gulf Air is serving the Bahraini economy.”

KAMAL BIN AHMED
MOHAMMED

The Bahrain International Air Show is still a year away but more than 75% of exhibition space has already been sold. Bahrain’s Transportation and Telecommunications Minister, Kamal bin Ahmed Mohammed, talks to Alan Dron about the 2018 show, Gulf Air and the island kingdom’s new airport.

Bahrain bridging the Gulf

In aviation terms, Bahrain has seemed something of a backwater in the Gulf in recent years. Its international airport is relatively small and increasingly elderly; its national airline, once the leading operator in the region, has been dwarfed by the fast-growing ‘big three’ of Emirates Airline, Etihad Airways and Qatar Airways; and it seems to have missed out on the tourist boom in Dubai, Abu Dhabi, Oman and even Qatar.

Those factors are now being addressed, with the aviation sector receiving increasing attention from the Bahraini Government. And, as in other Gulf states, aviation is playing a wider role in stimulating the economy.

One of the most obvious examples of this is the island state’s international airport at Muharraq, which is in the process of gaining not only a new terminal building but also improved ancillary features, such as an air traffic control centre and maintenance facilities.

New airport

The new airport should be ready by 2019, said Transportation and Telecommunications Minister, Kamal bin Ahmed Mohammed, during a visit to London to promote the 2018 Bahrain International Air Show.

Until now, the show has taken place just three months after the much larger Dubai Air Show, a factor that dissuaded some companies with limited budgets from attending. From 2018, it will move to November, exactly midway between Dubai events.

Mohammed oversees the entire Gulf Air group – Gulf Air itself, Bahrain Airport Company, BAS ground handling plus a new company, Bahrain Duty-Free, of which Bahrain will own 45% for the new airport.

Construction of the new airport itself “is progressing very well”, he said. “We’ve reached Level 2 and started installing the roof.”

The new facility is on track for opening in the third quarter of 2019.

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The existing terminal was built in 1972 and has an annual passenger capacity of 3.5 million. In 2016, it handled 9 million travellers – an indication of how badly the new building is required.

The new terminal will have an annual capacity of 14 million passengers and is being built with a careful eye on costs: “I think with the budget this is the most optimum project in our part of the world. There are airports built with double the capacity, but with budgets eight to 10 times our budget of \$1.1 billion.”

The fate of the existing building is still being decided, with options being weighed on whether to maintain or demolish it, said Mohammed. The age and condition of its mechanical and electrical systems might make it more expensive to retain than demolish, but no decision has yet been taken.

As with airlines, ancillary revenues at an airport can bring in significant amounts of money and the provision of new maintenance facilities will allow work to be done in Bahrain that, at present, has to be sent abroad.

The main user of the airport is, of course, Gulf Air, which is about to undergo a major re-fleeting exercise.

Major new orders

At the 2016 Bahrain Air Show, it announced major new orders and adjustments to previous commitments. The new line-up included 16 Boeing 787-9s (replacing the previous order for ‘12 to 16’ of the smaller -8 version), as well as 17 Airbus A321neos and 12 A320neos; 10 of the A320s had previously been announced.

The company has a current all-Airbus fleet of six A330-200s, six A321s and 16 A320s.

Gulf Air has been through a major restructuring since early 2013, a process that saw its fleet reduced from 40 to 28 as it battled to cut huge deficits. The new Airbus order will replace the carrier’s narrow-body fleet and expand numbers again over the next few years.

At the time of writing, a replacement for Gulf Air’s retiring CEO, Maher Al Musallam, was still awaited and would be appointed “as soon as possible” through an open recruitment process, said Mohammed

“We’re also looking at appointing a new CEO for the Group,” he revealed. “The idea is to expand the portfolio and increase the impact of aviation on the economy of Bahrain.”

Al Musallam has been successful in greatly reducing Gulf Air’s previously heavy annual losses, but Mohammed cautioned that figures for 2016 were unlikely to be as positive as those of the previous year.

“In 2016 it was a tough year, not as good as 2015. The company needs to optimise its network and rationalise its operation.

“We’re competing with the biggest airlines in the world. They can afford to invest and expand their network. We need to make sure Gulf Air is serving the Bahraini economy. We will continue making sure that Gulf Air has the largest



Gulf Air is about to undergo a major re-fleeting programme.

connection of destinations within our region and expanding connectivity to east and west. We need to expand in Europe a little bit. We think the airline is an important infrastructure to connect Bahrain with the world. Without it we can’t connect to other business activities.

“Gulf Air will receive a new fleet next year; 10 787s have been ordered, a figure that can be increased to 16. It’s also receiving the Airbus A320neo from next year. So I think improving the quality of the services and our product, together with optimisation, will enable the new business to improve.

“The new board needs time to finalise their plan. All options are open.”

Asked how the dispute between several Arab nations and Qatar was affecting Gulf Air, he said: “I think it’s affecting Qatar Airways more than us. They have lost all their destinations in the Gulf. It’s sad to see this and we hope it won’t last long.”

Making money

Meanwhile, the Gulf Aviation Academy, which trains commercial pilots, “is performing very well and making money. Gulf Air is only 24% of our customers. It serves other airlines. We’re now commissioning a new Airbus A320 simulator and procuring a new simulator for the Boeing 787-9.”

The island’s major aviation attractions now include the Bahrain International Air Show, whose 2018 iteration aims to achieve a balance of growing in size, while keeping the sense of intimacy that has characterised the previous events.

There will be more exhibition space and the hangar that was only half-used in 2016 will be fully utilised this time.

“We need to be sure we don’t make it too big,” warned Mohammed. “We don’t want to increase the number of chalets, although we can. We’ve never had a problem in selling the chalets; that’s the easiest aspect. And you think, ‘Why not build more and make more money?’ But we want to keep the uniqueness. It’s a cosy airshow.”

One major nation that will have a more notable presence in 2018 than in previous years is Russia, whose United Aircraft Corporation (UAC) signed an agreement in July that will see several UAC subsidiaries including Sukhoi, Ilyushin, Tupolev and Irkut appearing at Sakhir Air Base, the site of the show.

Russian participation

State technology and weapons export agencies, Rostec and Rosoboronexport, will also be present. “There will definitely be bigger Russian participation,” said Mohammed. “We’ve signed for two chalets with UAC and Rostec and Rosoboronexport, who will bring all the companies with them. We’re expecting the Russian Knights [aerobatic] team to appear.”

Turkey, which had a major presence at the 2016 show, will also be present again, as will Indian company, Hindustan Aeronautics, and the country’s defence research and development organisation. Thales, CFM International, SITA and Leonardo are among other major names, which will be presenting their wares.

“All the big names have signed up but we’re now looking at SMEs who want to expose themselves,” said Mohammed. Traditionally, Arabs like to meet people face-to-face, to size them up and get a feel for their qualities; personal contact is important. “If you don’t come to the region, you won’t be known,” noted the minister.

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Emirates and Flydubai are coming closer together and, while the competition is jittery about this alliance, Emirates CEO Sir Tim Clark explained to Seth Miller why the move is important.

Emirates battles against the LCC big squeeze



Sir Tim Clark: He often “banged the table” about the rise of long-haul, low-cost operators.

Right: Flydubai business class.

Long-haul low-cost carriers are squeezing Emirates from east and west. With European and Asian challengers, Dubai’s hometown airline finds itself forced to rebuild to maintain its high load factors, while meeting the price point challenges that the upstarts present.

Speaking at the Aviation Festival in London, Emirates CEO, Sir Tim Clark, said he had often “banged the table” about the rise of long-haul, low-cost operators, and added that their encroachment on to legacy carrier territory was “only a question of time”.

Pointing to the development of Norwegian and AirAsia X, he said: “We can expect more of these and, as a competitor, I know I have to deal with it.”

And the plan to increase cooperation with the hybrid Flydubai, and potentially restructure its own economy-class offering, could deliver a low-cost option that keeps travellers connecting in Dubai while also protecting yields.

Clark presented a two-pronged approach to meeting and beating that challenge.

Cooperation with Flydubai is no surprise, of course, but the changes being made on both sides of the partnership are critical to its success. The hybrid carrier and the Dubai flag-carrier share the same ownership – the Investment Corporation of Dubai (ICD), but are currently operated independently and under separate management teams.

To meet the new demands, a simple solution would be to convert everything low-cost to the Flydubai brand, but it isn’t truly suited to that task.

Clark noted that Flydubai is built on a LCC base but it is more of a hybrid operation – business-class seating, in-flight

entertainment (IFE), lounges and a loyalty programme all on offer – so much more than a traditional low-frills LCC. Then again, in the long-haul market, LCCs tend to offer such benefits – often for a price. So, integrating those features into a combined hybrid offering could be compelling.

The two carriers currently interline more than 17,000 passengers each week, according to Clark, with plans to grow that number significantly. Success on that front depends on improving the transfer process and better aligning the passenger offerings.

In essence, as Clark explained, the pair must “strip out what we cannot do together” to present a more unified passenger experience. Or, if full alignment is not viable, “at least a set of services that is easier to sell across both carriers”.

Delivering on the LCC promise is easier with Flydubai, particularly in some of the smaller markets, but one must

remember that Emirates operates with some LCC characteristics, even as a full-service airline.

To that end, Clark is keen to leverage the existing fleet, particularly the A380s, in a manner that keeps unit costs down while maximising flexibility.

The LCC proposition is built on ancillary sales and, with a bit of work on the back-end systems, Clark believes Emirates can convert to a

similar model as a subset of its broader offering.

Clark describes a scenario for “stripping out and reconstructing” the end-to-end services offering. Ultimately Emirates “will be able to match the long-haul LCCs in certain segments of inventory”.

Key to this is the A380 fleet. With nearly 100 flying today, Emirates has the ability to further segment, offering a ‘basic economy’-type product on board. Clark believes potential exists for “creating multiple classes of economy on the main deck” to deliver on that.

Imagine one section of the cabin offering reduced pitch and a limited baggage allowance. Should the company truly want to press its luck, converting those rows to the much-maligned 11-abreast option could be viable. The carrier could even consider removing the embedded IFE screens or making that a paid service. If the ancillary model can be implemented, dependent on the digital transformation Clark is so keen on, Emirates may end up with a true airline-within-an-airline model.

A single A380, flying a typical route network, would deliver a basic/LCC economy option plus the regular main cabin seating. That’s a powerful competitive position against the long-haul LCC challengers.

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PROPELLING THE NEXT CONNECTION

RIAHI FOCUSES FLEET

Tunisia's new all-cargo airline, Air Cargo Express, is now operating a second freighter and plans to have another three by the end of 2017. **Tom Pleasant** reports.

Air Cargo Express gained its air operator's certificate in September 2016 and launched its first flight, using a 737-300 freighter, from Tunisia's Enfidha-Hammamet International Airport to France's Paris Charles de Gaulle in February 2017.

It now has a second of the aircraft type, flying to Germany's Cologne Bonn Airport.

CEO, Anis Riahi, said the airline would continue to focus on the 737, adding another three to the fleet by the end of the year.

Unlike the -300s, these will all be 737-400s, with the airline leasing one and buying the other two. The long-term goal, he said, was to reach 12 aircraft by 2020.

As well as for its own flights, these will be used to service interline-agreement partners, such as AirBridgeCargo, Air France, American Airlines and Cargolux. The airline has also partnered with one integrator, UPS, and Riahi hopes to secure more of these.

The airline is busy building a 2,000sqm warehouse at Tunis-Carthage International Airport, due to open before the end of 2017, to handle its increasing cargo shipments. As well as the usual electronics and perishables, such as mobile phones, fruit and vegetables, it will also be fully certified to handle pharmaceuticals, a profitable cargo, but one that requires extremely precise care throughout its journey.

Core freighter flights

For the moment, Riahi is concentrating on consolidating the core freighter flights, using Tunisia as a stepping-stone for air cargo between the two continents. "We won't only focus on the Tunisian market, because Tunisia's geographical position gives us a competitive advantage for pushing in both directions between Africa to Europe and Europe to Africa."

The path to these first-year operations has not been easy. The launch of Air Cargo Express was first announced in October 2015, with the first flight slated for January 2016, using a 737 and a CRJ 200. The fleet was then due to grow to six aircraft, adding a 767, another CRJ 200 and two Cessna 208B, by April last year, and a 767 five months later in September.

Riahi hints at meddling from a particular individual within the Tunisian Government for the delay and these subsequent fleet changes. While he didn't say so, it is likely that much of that interference came from Mehdi Ben Ghrabia, a Tunisian Government minister currently defending himself against allegations of

Anis Riahi: "We need to open the market to everyone so we can all operate on the same level."



corruption. One of his companies is World Freight Services (WFS, not to be confused with several other companies by the same name around the world), which was planning to start up its own cargo airline, in partnership with Tunisair, at the same time that Air Cargo Express was announced.

Even when Air Cargo express was launched, it faced additional problems over unfair competition, with allegations that the Ministry of Transport awarded licences to a European company that were not mutually respected in bilateral agreements.

Daily flights

Looking to the immediate future, Riahi, remains optimistic. "We want to have daily flights between Tunisia, and France and Germany and then expand to daily flights to Algeria and Morocco in North Africa and three or four destinations in West Africa, probably Cameroon, Ivory Coast, Nigeria and Ghana. Later, we would have [secondary] cargo hubs in Ivory Coast, Cameroon and Guinea-Conakry."

Eventually, he wants the airline to be able to fly to 51 countries within Africa by the end of 2018, but securing the traffic rights for these, and anywhere else in Europe, will be "a big headache and a big fight".

That fight has already drawn blood in Malta,

which withdrew permission for Air Cargo Express to fly there, refusing to honour the two countries' bilateral agreement. "We are working with our transportation authority to return to Malta and we're confident that will happen soon," said Riahi.

He remains philosophical about the overall rights situation, though: "If there's any issue with the fleet, crew or maintenance, those are things we can control. But, honestly, the only thing we are not able to directly control is securing traffic rights, particularly in Africa.

"This is an issue that affects the development of all airlines, not just us. We need to open the market to everyone so we can all operate on the same level. Competition needs to be transparent and it's too easy for political interference to get in the way of that.

"Securing full authorisation for traffic rights could actually be the main issue we focus on next year and also be the biggest challenge for us. That is why we are working with the Tunisian transport authority to secure the Yamoussoukro Decision. We are doing our best to convince [other countries to accept this], but now it's just down to politics."

Aviation associations are also hard at work on this same issue, which is why, due to its North African heritage, as well as being a member of

ON EXPRESS DELIVERY



the African Airlines Association (AFRAA), Air Cargo Express is also a member of the Arab Air Carriers Organization (AACO). “We are very happy to work with both associations. We want to consolidate our relationships with them, either with procurement or any other services.”

As well as cargo, the airline is also planning to provide maintenance to other airlines. Currently, it has a deal with FL Technics to provide it with maintenance services. However, in July of this year, Riahi was part of a Tunisian trade and political delegation that flew to the US. Among the agreements signed on the trip was one between Air Cargo Express and Boeing to open a 12,000sqm maintenance centre at Enfidha Airport, scheduled to start operating in the middle of 2018.

“Tunisia is a low-cost country but we also have good aeronautical engineers and maintenance knowledge,” says Riahi. “We are confident that we will not only be able to look after our own fleet, but also to compete against European MRO providers for contracts with other African airlines.”



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First UAE spyplane breaks its cover

The first of the UAE's Global 6000 special mission aircraft is seen at Cambridge, UK.

In addition to its openly acknowledged procurement of three Saab GlobalEye airborne early warning aircraft, based on Bombardier's Global 6000 platform, the UAE is also set to receive two further Global 6000s converted for electronic intelligence (ELINT) or signals intelligence (SIGINT) duties under a more secretive programme.
Jon Lake reports.

The first of the UAE's two shadowy spyplanes has been spotted and photographed undergoing pre-delivery testing at Marshall Aerospace's facility at Cambridge Teversham Airport in the UK.

The Global Express family forms the basis of a number of military special missions variants, including the Saab GlobalEye, the UK RAF's Raytheon Sentinel R1 radar surveillance aircraft, and the US Air Force's Northrop Grumman E-11A battlefield airborne communications node, (BACN), which allows disparate battlefield communications systems to share data, and allows fifth-generation fighters, like the F-22 and F-35, to share their sensor picture with older aircraft.

The UAE is understood to have helped fund development of the GlobalEye – also known as the swing-role surveillance system (SRSS). It carries a new S-band Erieye-ER airborne early warning (AEW) radar, which has its active electronically scanned array (AESA) carried in a 'ski-box' fairing above the fuselage, and an X-band Leonardo Selex Seaspray 7500E maritime search radar under the forward fuselage. The Erieye ER uses gallium nitride semiconductor technology to allow more power to be transmitted.

Extensive modifications

Saab is currently carrying out extensive modifications to a green Bombardier Global 6000 to convert it into the first of three SRSS GlobalEye's for the UAE.

When the UAE decided to procure a SIGINT aircraft, it made sense to base it on the Global 6000 in order to gain some commonality with the GlobalEye, especially as such an aircraft requires the same blend of endurance, long range and high altitude performance as an AEW platform. Surprisingly, though, the Emiratis did not turn to Saab, whose Sirius SIGINT system could be integrated on a variety of different platforms, including the Global 6000.

Details of the Emirati SIGINT programme remain sketchy. The two aircraft involved were delivered with Isle of Man registrations, and were registered to a Swiss-based company, AGT (Asia Global Technology) International, which was previously responsible for the UAE's Falcon Eye

surveillance system and the Abu Dhabi safe city project.

The two aircraft were reportedly delivered to maintenance, repair and overhaul company Marshall Aerospace's facility at Teversham, where it is understood that work was carried out on them by Marshall and Spec Ops Technology – a US, Netherlands and UAE-based company that specialises in airborne intelligence, surveillance and reconnaissance (ISR) platforms.

The first aircraft, carrying the UAE serial 1326, emerged from Marshall Aerospace's hangars on April 27. It superficially resembled a Raytheon Sentinel, albeit without that type's prominent dorsal satcom hump, and with a host of minor differences.

Large ventral canoe

The large ventral canoe fairing was very similar in shape and size, however, extending back from just behind the nose gear bay to the centre of the wingbox, leading some analysts to question whether it might be based on the flight-cleared shape and structure of the Sentinel canoe.

The fairing did not seem to have a large dielectric section, so appears unlikely to accommodate a surveillance radar, and would seem most likely to contain 'spinners' (tuning heads) for ELINT equipment. It may also have an electro optical/long-range oblique photographic (EO/LOROP) sensor.

A large antenna farm behind the wing, with about a dozen feelers, would seem likely to serve COMINT equipment, while there appears to be a number of antennas for missile and/or radar warning receivers.

Two ventral fins are fitted for stability, but these look smaller than those fitted to the Sentinel.

On top of the fuselage is an array of satcom antennas and a number of unidentified blade aerials. Extra cooling is provided by an additional non-standard intake on the port side of the rear fuselage, next to the engine.

The first aircraft carried out some rejected take-offs, taxi trials and high-power runs on June 4 before making a four-hour test flight on June 21. The aircraft made a second test flight on July 7.

Typhoon blows into Qatar

Eurofighter's disappointments in India and Malaysia boosted Qatar's negotiating hand.



Qatar surprised many analysts with its order for the Eurofighter Typhoon. Jon Lake explains why the procurement strategy makes sense.

On September 17, Qatar's Minister of State for Defense, Khalid bin Mohammed al Attiyah, and his British counterpart, Defence Secretary, Sir Michael Fallon, signed a statement of intent outlining a proposed Qatari purchase of 24 Eurofighter Typhoon aircraft.

Though many media outlets expressed surprise at what they described as an 'unexpected' announcement, the Qatari deal follows several years of negotiations, and meets a long-standing Qatari requirement for at least 72 fighters that had not been completely fulfilled by recent orders for 24 Dassault Rafales in March 2016 and for 36 Boeing F-15QA (Qatar Advanced) Eagles in June 2017.

Moreover, when its fighter requirement was first unveiled, Qatar said that it would acquire new aircraft from two or even three suppliers – as reported by *Arabian Aerospace* at the time, with a predicted three-way split, including 24 examples each of the Rafale, F-15QA and Typhoon.

The Typhoon briefly appeared to have slipped off Qatar's shortlist after a Qatari evaluation of the Eurofighter Typhoon in the UK, scheduled for April 2011, was cancelled because the personnel involved on the Qatari side were all involved in the Libyan operations, and after reports emerged that Qatar had been unhappy with the costs being quoted by the UK MoD for flying RAF aircraft.

Qatar's procurement strategy has been first-rate. The Emirate opened negotiations with France first, judging that Dassault was 'hungeriest' and most likely to give the best deal. By taking out options as well as ordering aircraft, it would appear to subsequent suppliers that if they did not make a similarly competitive offer, then Qatar might just go back and order more Rafales.

The Eurofighter Typhoon was left until last, as the most expensive offering. By doing so, Qatar fortuitously found itself dealing with a Eurofighter that had lost out on a large order in India, and whose campaign in Malaysia had stalled, and where prospects for a second batch in Saudi Arabia seemed to have faded. All of the cards were in Qatar's hands, and serious negotiations between Qatar and Britain began in about 2015.

Splitting a 72-aircraft order three ways is extremely unusual, and is superficially hard to understand – since it will

inevitably impose higher costs and reduce any economies of scale, while also requiring more infrastructure and more complex logistics.

But for Qatar, where costs may not be the primary concern, the three-way split can be seen to make much better sense. The three procurements will give Qatar relationships with three suppliers (and six primary customer air forces) rather than with just one, and will allow its senior officers to see different operational and support concepts at close quarters.

Partner air forces

Qatar's fighter pilots will be able to train and exercise with the Armée de l'Air's Rafale squadrons, the US Air Force, and with the Eurofighter partner air forces. They will be able to pick up techniques, tactics and doctrine from all of their new allies. The three types have complementary and slightly overlapping capabilities, meaning that Qatar's multi-type fleet will be more capable than a single-type would have been, while also reducing the country's exposure to possible future embargoes.

The Typhoon has already been purchased by eight nations around the world (the UK, Germany, Italy, Spain, Austria, Saudi Arabia, Oman and Kuwait), four of them in the Gulf Cooperation Council, and Qatar's purchase will boost interoperability across the GCC.

Kuwait's order for 28 aircraft will reportedly push production out to 2023, and the Qatari order, together with an unconfirmed Omani follow-on, a still-possible Saudi second order and a long-hoped for order from Bahrain, could keep the Typhoon production line hot for another five years or more – potentially keeping the aircraft available to meet further future fighter requirements.

The Typhoon has seen extensive operational use in the Middle East, having seen action during the 2011 intervention in Libya (Operation Ellamy) and, more recently, over Iraq and Syria (Operation Shader).

The Royal Saudi Arabian Air Force has used its Typhoons operationally in its long-running campaign in Yemen, and also as part of the multinational operation against the so-called Islamic State.



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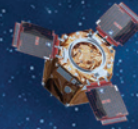
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The first PC-21 at Mafraq during the acceptance flight by RJAF.



AMMAN ON A MISSION

The Royal Jordanian Air Force (RJAF) is in transition. With the recent delivery of the first Pilatus PC-21 trainer aircraft, it has taken a huge step forward in its future fighter pilot training capabilities.

Frank Mink visited Amman to see the new arrival in action.

In 2015, the RJAF placed an order for nine PC-9M aircraft with Pilatus Aircraft in Stans, Switzerland.

The PC-9M was to replace the Casa 101CC that had been in service since 1987.

The order was amended when, in April 2016, it was decided to buy eight PC-21 aircraft instead of nine PC-9Ms.

An option for two additional aircraft was converted into an order in October 2016 and, in January 2017, Pilatus announced that another two PC-21s had also been ordered.

The role of the PC-21 will be basic and advanced training, used before the students join the fighter squadrons.

The RJAF has 43 F-16MLU fighter aircraft in its inventory, divided over three squadrons at Al Azraq Air Base. It will soon receive another 15 former Royal Netherlands Air Force F-16MLUs that are upgraded to the M6.5 standard.

At the time of writing, four instructor pilots had been converted to the PC-21 and, by October 3, it was expected that all 11 Squadron instructors would have changed over.

The initial instructor conversions took place in Stans, where two weeks of ground school were followed by 20 hours of actual PC-21 flying. Training also included five simulator flight

sessions.

All PC-21s will be delivered to 11 Squadron as part of the King Hussein College based at Mafraq Air Base.

The first delivery flight took six stretches divided over three days. Pilatus ferry pilots flew the two aircraft to Mafraq on August 23. The company's production test pilot, Reto Amstutz, said: "The ferry flight was smooth. That third day we flew from Aqaba to Mafraq in 40 minutes."

Amstutz is a former Swiss Air Force fighter pilot and has flown the F-18 Hornet. He was also a member of the famous Swiss Air Force aerobatic team, Patrouille Suisse. As well as his job at Pilatus, he is still a Swiss Air Force reserve pilot flying the F-5E Tiger II.

At Mafraq, 40-minute acceptance flights for both aircraft were completed on the day of delivery. The flights consisted of an extract from the production flight-test programme.

During the whole process of production and delivery, the aircraft had a Swiss civil aircraft registration. Only after customer acceptance were they deregistered. At that point, emergency locator transmitter (ELT) and transponder 24bit codes were changed to customer settings.

The ferry flight included stretches over water. Therefore, the ejection

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seat personal survival package (PSP) had a dinghy installed, including associated survival equipment. After the ferry flight, the packages were replaced by desert PSPs to accord with RJAF requirements.

The RJAF PC-21 aircraft have the new Saab mission computer installed, along with a new pilot memory module (PMM).

“In the old days we did the flight data recording through a separate recorder. Now the recording goes through the mission computer,” explained Amstutz.

“You can store several missions on this PPM. You can upload approach plates, for example, or load different maps in different scales and bring them up in the multi-function displays (MFDs). You can define different mission loadouts and alternate parameters, like tactical parameters. Mission loadout can be air-to-air or air-to-ground weapons, or what you like for your specific missions or intelligence line.”

Amstutz continued: “We have the hardware installed for TERPORM, which is basically a tactical terrain avoidance system. It will work in visual flight rules (VFR) conditions in any situation, also in inverted flight. It will not only warn you for terrain but also for obstacles. Right now we have started the engineering phase, so it’s not certified yet. Actual testing will start in a few weeks time in Switzerland. When certification is complete, the RJAF will get the new software installed.”

Ground-breaking move

Pilatus made a ground-breaking move in the turboprop trainer aircraft class with the installation of a dual flight management system (FMS) in the PC-21.

The RJAF has Esterline CMC CMA-9000 FMS, which can be coupled to the autopilot. Esterline CMC has been awarded the contract to supply the cockpit avionics for the RJAF aircraft.

The early PC-21 models had one global navigation system sensor unit (GNSSU) installed. The current aircraft being delivered to the RJAF contains two CMA-5024 GNS landing system sensor units (GLSSUs).

With the GLSSU, regional navigation (RNAV) approaches with lateral guidance can be flown. Now the PC-21 can achieve GPS-based precision approaches on a spaced-based augmentation system with vertical guidance.

Both cockpits are equipped with new state-of-the-art 6in x 8in active matrix LCD displays. Both front and rear cockpits have a centre smart MFD-2068 that functions as a primary flight display. Two CHDD-268 side displays can show additional information, such as radar images or system pages.

The front cockpit has a CMC-4000 Sparrowhawk head-up display (HUD) installed, including an up-front control panel. The rear cockpit is equipped with a ‘repeater’ screen, which shows the camera picture of the outside world and the HUD symbology, as seen by the pilot in the front.

The HUD has various modes, such as flight



RJAF PC-21 awaiting delivery at Pilatus factory in Stans.

Centre: PC-21 view on centre fuselage.

Right: Offset engine and propeller.

PHOTOS:TRISTAR AVIATION

Ferry flight

Under call signs PCH83C and PCH84T, the first two RJAF PC-21s departed Stans airfield for the delivery flight to Jordan on Monday August 21 2017.

The first stop was Abruzzo International Airport at Pescara, Italy followed by another fuel stop at Kithira, Greece. Iraklion Airport of Heraklion was used for a night stop.

The following day a fuel stop was made at Borg El Arab, Alexandria, Egypt.

The next leg brought both aircraft to King Hussein Airport Aqaba, Jordan for another night stop.

On the third day both aircraft flew a 40-minute flight to Mafraq. During the ferry flight both aircraft flew under their own instrument flight rules (IFR) flight plan with a 10-minute separation, while continuously staying in touch.

mode, target mode or approach mode, where it gives instrument landing system (ILS) symbology and glide path guidance.

A benefit for the students is that the system is adapted to the RJAF F-16MLU symbology.

To further assist the student with preparing to fly an F-16MLU, the hands-on-throttle-and-stick (HOTAS) system has several buttons reassigned through software to operate the mission systems on the PC-21 in the same way as an F-16.

The PC-21 is fully night-vision goggles (NVG) compatible for the latest generation systems. Students do not use NVG yet but, in the future, operational F-16 pilots will be able to use the PC-21 for recurrent NVG training as an alternative to using the (more expensive) F-16.

A huge step forward in training is the mission briefing and debriefing suit that comes with the PC-21. A student can plan the mission to be flown and load it on to the PMM via the mission planning and debriefing system. Once connected to the aircraft, PMM data can be loaded into the mission computer.

Every system page is continuously recorded and cockpit images, filmed through the HUD camera, are also stored on the PMM. During debriefing, all this stored data can be retrieved and the student can replay the flight in 3D, even showing screens that weren’t looked at while flying.

Simulated air-to-air radar training can be accomplished by linking automatic dependent surveillance – broadcast (ADS-B) signals from joining PC-21 aircraft. These signals are computed



and presented in realistic radar contacts for students on the mission system displays.

Air-to-ground training can be performed retrieving ground data from a database and presenting it to the student in the cockpit. A training area as large as 100 by 100 miles can be stored in the database.

The PC-21 is powered by a Pratt & Whitney PT6A-68B turboprop engine with electronic engine control (EEC). The engine delivers a maximum of 1,600shp. The power output is speed-rated and controlled by the EEC to give the aircraft a jet-like handling.

Aircraft bulkhead

The engine is mounted on the aircraft bulkhead with a four degree offset to the right to minimize torque effect and prop wash. It drives a Hartzell E8991KX graphite/titanium composite scimitar five-blade propeller.

Two Martin-Baker CH-16C ejection seats with zero-zero capabilities are installed, which can be used at up to 400kts for ejection. Both seats are slightly tilted for crew comfort.

The engine drives an air-conditioning pump for the updated environmental and pressurisation system. Also, crew oxygen is supplied when the engine is in operation.

A two-piece canopy gives the crew ample view outside the aircraft. The front piece is reinforced with an insert against bird-strikes and has a detonation cord for when the ejection seat is used.

The swept low wing structure has wet-wing fuel tanks. The leading edges are filled with foam to minimize the impact of foreign objects like bird-strikes. Hydraulic-operated spoilers are added to reduce the stick force and to increase roll rate. Also, an auto rudder trim is installed. Both features add to the fighter-like flying characteristics of the PC-21.

The RJAF aircraft are equipped with the latest generation LED exterior lighting. Furthermore, four fluorescent stripes are installed on each side of the aircraft for night formation flying training.

All in all, the RJAF now has a sophisticated aircraft that has the capabilities to train its students up to the level where they can transfer directly to the F-16 squadrons. There they only have to get accustomed to fast-jet flying and higher G-load handling.

As proven by other PC-21 customers, the graduation rate also significantly improves by using this next generation trainer aircraft.

Major General Yousef Al-Hunaiti is the current RJAF commander and is head of the committee that sets the configuration and the scope of operation for the future training of RJAF pilots.

The RJAF sees a benefit in having the PC-21 over the Casa 101CC by transition from analogue to glass cockpit and by mimicking advanced aircraft systems. The plan is to have the first students start training on the PC-21 between January and February 2018.

PC-21 vital statistics

The first flight ever of a PC-21 took place on July 1 2002. Since then more than 210 aircraft have been delivered to seven air forces worldwide.

The Republic of Singapore Air Force was the launch customer. Since then, aircraft have been delivered to the air forces of Switzerland, the UAE, Saudi Arabia, Qatar, Australia and Jordan.

France and the United Kingdom also ordered PC-21s and will receive their first aircraft in the near future.

Maximum take-off weight:	4,250kg
Maximum operating altitude	25,000ft
Take-off ground roll, sea level	490 metres
Landing ground roll, sea level	600 metres
Maximum operating speed (Vmo)	370 KEATS
Maximum operating Mach number (Mmo)	0.72 Mach
Cruise speed 10,000ft	335KTAS
Stalling speed at idle power (Vso)	81kCAS
Roll rate aerobatic configuration	220 degrees/sec at 10,000ft
Maximum positive G aerobatic mode	+8.0 G
Maximum negative G aerobatic mode	-4.0 G
Wingspan	9.11 metres
Fuselage length	11.22 metres
Fuselage width	1.00 metres
Wheel base	2.69 metres
Propeller diameter	15.22 metres
Minimum operating temperature	55 Celsius (-40 degrees oil temperature for engine starting)
Maximum operating temperature	+55 Celsius



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BAE Systems has flown the demonstrator for a new so-called Advanced Hawk configuration.

Jon Lake takes a look at the new aircraft.

The faster and more agile Advanced Hawk takes to the air.



All eyes on the Hawk

The Advanced Hawk demonstrator made its maiden flight in its new configuration from the company's Warton, Lancashire site on June 7 2017, after being unveiled at the Aero India show at Bengaluru on February 14 2017.

The availability of this enhanced model could lead to new orders from Gulf and Middle Eastern air forces.

The new variant will be a faster, more agile Hawk that can also carry smart weapons, and the programme aims to give the aircraft an "edge in fast-jet pilot training, as well as offering increased operational utility", according to Dave Corfield, BAE Systems head of Hawk India.

The Advanced Hawk is intended to be closer in performance and capability – both real and synthetic – to the frontline aircraft that the pilots are training to use.

The original BAE Systems Hawk advanced trainer is still going strong 43 years after its maiden flight, not least in the Middle East, where the type remains in service in Bahrain, Jordan, Kuwait, Oman, Saudi Arabia, and the UAE.

Though they look very similar to the original Hawk, a new generation of Advanced Jet Trainer (AJT) and Lead-In Fighter Trainer (LIFT) Hawk variants was introduced in the late 1990s. These aircraft had only 10% commonality with their forebears, introducing a new airframe with four times the fatigue life, and with advanced embedded training systems that made them arguably the most

The Advanced Hawk is faster and can carry smart weapons.



effective advanced pilot training aircraft in service today.

Production of the latest batches of Hawks for Oman (eight Hawk Mk 166) and Saudi Arabia (22 Hawk Mk 165) is now complete, and most of these have now been delivered.

BAE Systems confirmed that it had signed a contract to supply the Royal Saudi Air Force (RSAF) with a second batch of Hawk 165s in February 2015 and, more recently, the company confirmed that it was to establish a Hawk aircraft final assembly line in Saudi Arabia as part of the Saudi Vision 2030 programme. This is the economic diversification strategy pioneered and led by Crown Prince Mohammed bin Salman, deputy premier and interior minister.

First deliveries from the Saudi Hawk production line are expected in the third quarter of 2018.

But the Hawk has been facing increasingly tough competition from newer designs like the Leonardo Alenia Aermacchi M-346 Master and KAI T-50 Golden Eagle. And, in the US T-X trainer competition, the Hawk was dropped by Northrop-Grumman in favour of a new airframe design.

There was reportedly concern that, while the Hawk's embedded training systems, emulation and simulation were second-to-none, its airframe/engine combination was unable to meet some T-X key performance parameters.

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It is understood that, following the failure of Northrop's clean sheet of paper T-X, serious consideration was given to submitting a new Hawk-based bid. Indeed, some of the improvements on today's Advanced Hawk may have originated from work undertaken to allow it to fully meet T-X requirements, as well as to meet Indian and other requirements for a higher-performance, combat-capable Hawk light attack aircraft.

But, according to BAE Systems, the Advanced Hawk was developed after listening to its customers' views on where fast-jet pilot training would go in the future and how the aircraft could be upgraded to ensure that it continues to meet their requirements.

Modified wing

The Advanced Hawk features a modified wing with an almost full-span active leading-edge slat (using the slat actuation system from the Tejas light combat aircraft) and an upgraded combat flap. The leading-edge slat has three manually selectable positions (0°, 6° and 16°) on the demonstrator, but would be fully variable (and automatically actuated) in production models.

The new wing confers significant improvements in take-off and landing performance, a 17% improvement in climb performance, a 20% reduction in turn radius, and a 25% improvement in turn rate, as well as giving much better high-alpha (angle-of-attack) capability, with wind-tunnel testing and simulation indicating that the Advanced Hawk should be able to achieve 22-23 units of Alpha,

about ten units more than the current Hawk.

All in all, the Advanced Hawk should be comparable to current frontline fighters like the F-16 in terms of manoeuvrability.

To cope with the increase in angle of attack (AoA), the height of the vertical stabiliser will be increased by nine inches, and a yaw-axis stability augmentation system will be provided to cope with any adverse yaw.

The Advanced Hawk will be powered by the 6,500lb Rolls Royce Adour Mk.951 turbofan, and not the 6,000lb Adour Mk.871 used on many in-service Hawks. Some consideration has been given to providing even greater thrust.

The Advanced Hawk has an all-new cockpit with a large area display, similar to that used on the F-35 Joint Strike Fighter, but capable of replicating the cockpit configurations of older aircraft, including those with analogue instruments or with smaller multifunction LCD displays.

The aircraft incorporates BAE's LiteHUD, a low-profile digital head-up display, and is also fitted with a ground proximity warning system, traffic collision avoidance system, and a datalink.

With these cockpit systems, the Advanced Hawk can simulate or emulate the latest frontline sensors and weapons, including those of the F-35.

The Advanced Hawk is also fitted for air-to-air refuelling and has a radar warning receiver and countermeasures dispensers, as well as provision for a laser designator pod and full smart weapons capability – making it suitable

for use as a frontline light attack aircraft, as well as for realistic weapons training.

It is the first Hawk platform with a full frontline combat capability, (the aircraft has been referred to as the Combat Hawk), and has both beyond-visual-range and precision-strike capabilities

The Advanced Hawk is the result of a cooperative, jointly funded 24-month programme with India's Hindustan Aeronautics Ltd (HAL), and it will be jointly marketed by BAE Systems and HAL.

New customers

The aircraft will be offered to new customers, and also to existing Hawk operators, and the companies have projected a market for at least 300 airframes over the next 10 years.

Most Advanced Hawk features and capabilities, including the large area display and new wing, could be retrofitted into older in-service Hawks, either as modules, or as a whole. Depending on the customer, BAE and HAL will jointly decide where such upgrades will take place.

As a new-build aircraft, it is anticipated that most Advanced Hawks would be built in and exported from India, which already has a low-cost production line and an existing Indian supply chain, though the aircraft could also be built at BAE's Warton plant.

The related HAL Hawk-i adds Indian-developed embedded training system, mission computer, communications, datalink and countermeasures systems.

Oman's new generation takes off

The Royal Air Force of Oman (RAFO) has inducted the first of its newly acquired Eurofighter Typhoon swing-role fighters and BAE Hawk Advanced Jet Trainers, ushering in a new era for one of the UK's oldest and closest regional allies. Jon Lake reports.



An Omani Hawk and an Omani Typhoon at the ceremonial rollout event at BAE Systems' factory airfield at Warton.

The Sultanate of Oman signed a £2.5 billion (\$4.06 billion) contract for the purchase of 12 Typhoons and eight Hawk Mk 166 Advanced Jet Trainer (AJT) aircraft, along with in-service support, in December 2012, with deliveries scheduled to begin in 2017.

Oman thereby became the seventh customer for the Typhoon (of which 624 have now been delivered or are on order).


The Hawk has been delivered to 18 nations and remains in service in 14, and the total number of Hawk aircraft sold, or on order, has now reached 1,020.

The RAFO already operates 23 Block 50 Lockheed Martin F-16C/D Fighting Falcons (of 24 originally ordered), and the order for the second batch of these aircraft was interpreted in some quarters as indicating that Oman's long-standing plan to acquire the Typhoon had been abandoned. In the event, though, the Typhoons will replace the RAFO SEPECAT Jaguars that were withdrawn from use in late 2014.

The new Hawk Mk 166 trainers will

Continued
on Page 58

Building the future together

A group of four young women, likely students, are gathered around a table. They are wearing school uniforms consisting of light blue shirts and dark blue or black vests, along with black hijabs. They are looking intently at a laptop screen. The laptop has a sign that reads "make it AI ASAYEL SCHOOL". A small UAE flag is attached to the laptop. In the background, there are logos for "BAE SYSTEMS" and "make it".

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INSPIRED WORK

PERFECT PAIR: The Hawk and Typhoon together on the ramp.
INSET: The RAFO Commander, Air Vice-Marshall Mattar bin Ali bin Mattar Al Obaidani, greeting the pilots of the first pair of Omani Typhoons.



CONTINUED FROM PAGE 56

probably replace some or all of the RAFO's fleet of about four legacy Hawk 103s and 12 single-seat, radar-equipped Hawk 203s, delivered in the mid-1990s.

The order strengthened the long standing relationship between the UK Government, BAE Systems and the Sultanate of Oman, which dates back more than 50 years, and which has seen the supply (through BAE Systems' predecessor companies) of Scottish Aviation Pioneers, Percival Provosts, BAC Strikemasters, Hawker Hunters, BAC One Elevens, and SEPECAT Jaguars, as well as older variants of the BAE Systems Hawk.

On February 18 2016, BAE Systems announced that final assembly of the first Eurofighter Typhoon for the RAFO (the programme's seventh customer air force) had entered final assembly at its Warton factory in Lancashire, with the start of the marry-up of the fuselage, wings and undercarriage.

Maiden flight

The aircraft was identified as being one of three two-seat trainers in the order. This first Omani Typhoon made its maiden flight on November 15 2016.

The first Omani Hawk Mk 166 jet trainer (ZB123/161) completed its maiden flight from BAE Systems' Warton factory airfield on May 6 2017.

The first Eurofighter Typhoon and Hawk advanced jet trainer aircraft for the RAFO were formally rolled out and presented to the customer in a ceremony at Warton on May 15

2017, in front of an invited audience of more than 100 dignitaries. The guests included the RAFO commander, Air Vice-Marshall Mattar bin Ali bin Mattar Al Obaidani, and His Excellency Sayyid Badr bin Saud al Busaidi, Oman's minister responsible for defence affairs. A fly-past by a RAFO Eurofighter Typhoon aircraft concluded the ceremony.

The Omani Typhoon was painted in an overall air superiority grey colour scheme, similar to that used on RAF Eurofighters, but the Hawk wore a three-tone sand, stone and olive drab colour scheme, similar to that applied to the Jaguars at the end of their service in Oman.

The first pair of Typhoons for Oman (both two-seaters) departed Warton on their delivery flight at 0910hrs on June 19 this year. The two aircraft arrived at the RAFO's new Adam Air Base on June 21, where the force commander greeted them. Oman is expected to receive four additional Typhoons – three single-seaters and a dual-seater – by the end of 2017.

The first pair of Hawk Mk 166 advanced jet trainer aircraft were delivered to Masirah Air Base on July 29, and four of the eight are now in service.

Britain's defence relationship with Oman continues to strengthen. During a recent visit to the Sultanate, Defence Minister Michael Fallon praised its role, under the leadership of His Majesty Sultan Qaboos bin Said, in reducing tension in the region.

During his visit, Fallon signed a memorandum of understanding covering the use of some facilities at Duqm Port, and to finalise the supply of a number of vessels to the Royal Navy of Oman.

He also announced a major exercise between the two countries and confirmed that the Red Arrows, the Royal Air Force aerobatic team, would perform a formation display over Muscat on October 3 2017 as part of its Middle East Tour, which will also take in Saudi Arabia, Jordan, Kuwait, Qatar, Bahrain and the UAE and is intended to be a visible demonstration of UK engagement in the region.

The BAE Hawk and Eurofighter Typhoon have been particularly successful in the Gulf Cooperation Council (GCC) market. All six nations operate the Hawk, while Saudi Arabia, Oman, Kuwait and Qatar are also current (or future) operators of the Typhoon.

Largest export customer

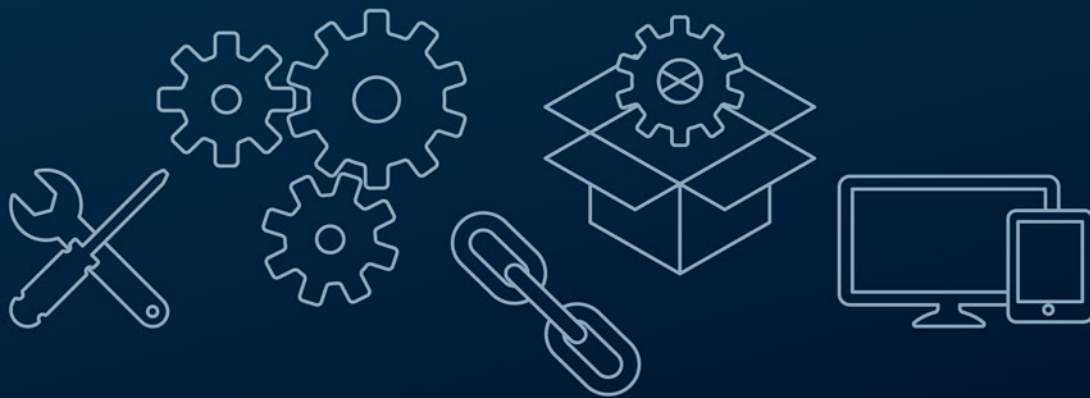
Saudi Arabia is the largest Typhoon export customer, having received 72 aircraft – one aircraft was lost on September 13 2017, with its pilot, during a close air support mission against Houthi fighters in Yemen – and the Saudis are reportedly in talks with the UK Government for another batch of 48 Typhoons.

The final 24 Saudi Typhoons were built to tranche 3 standards, and these are fully capable of swing-role operations, including long-range strike with stand-off weapons.

The weapons package being procured with the Typhoons has not been detailed, but is likely to include ASRAAM rather than IRIS-T short range air-to-air missiles, and may include the new MBDA Meteor beyond-visual-range air-to-air missile (BVRAAM), as well as Paveway IV dual-mode bombs initially, probably followed by Brimstone and Storm Shadow.

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*Today's asymmetric and counter-insurgency operations have placed a premium on persistent, cost-effective, armed intelligence, surveillance, and reconnaissance (ISR) and close air support aircraft that are able to detect and engage fleeting targets, and that can operate from semi-prepared forward airstrips. As **Jon Lake** reports, among the many aircraft types developed to meet these requirements are at least three derivatives of humble agricultural crop-sprayers.*

CROPS AND ROBBERS...

Some aircraft initially designed for crop-spraying are, these days, being asked to fly a very different mission.

The development of light attack and ISR aircraft based on platforms that were originally designed as cropdusters dates back to the 1980s when the US State Department bought a fleet of modified Ayres Turbo Thrushes to be used in the 'War on Drugs' in Latin America.

Cocaine and marijuana growers did not take kindly to having their lucrative cash crops sprayed with Roundup herbicide, and frequently greeted the crop-spraying aircraft with a hail of gunfire. Consequently, the Ayres Turbo Thrush narcotics eradication delivery system (NEDS) aircraft were fitted with armour plating around vital components and had bulletproof windshields and cockpit windows.

While the NEDS aircraft were armoured but unarmed, the US Central Intelligence Agency (CIA) in Colombia reportedly undertook a similar programme, using similarly modified Air Tractor aircraft. Some reports suggest that these aircraft were also used for ISR and attack missions against the drug cartels and FARC rebels.

Though Ayres and Air Tractor were separate companies, both produced a very similar aircraft, designed by the same man, Leland Snow!

What this means is that the main competitor to the Air Tractor (a crop-sprayer derived from the

original Snow S-2) is the similar Thrush (another derivative of the Snow S-2). Both types have spawned armed light attack and ISR derivatives.

Before the company went bust, Ayres launched the Ayres V-1-A Vigilante, a dedicated close air support derivative. This attracted interest, but failed to win orders, and it was not until 2008 that another attempt was made to develop an armed crop-duster.

Counter-insurgency aircraft

In response to the nascent US Air Force light attack/armed reconnaissance (LAAR) programme and a growing international requirement for light counter-insurgency aircraft, Air Tractor developed an armed model, the AT-802U.

The AT-802U prototype was displayed at the 2009 Paris Air Show, where it was reported that it was expected to become the first of 24 production aircraft ordered by the UAE.

In the event, the UAE turned to a relatively new company, Iomax of Mooresville, North Carolina, instead. The Block I Border Patrol Aircraft (as the company called its conversion of the Air Tractor AT-802U) was its first aircraft programme.

Iomax delivered an initial batch of 10 Block I Border Patrol Aircraft between November 2010 and May 2011 and then, from January 2012, delivered a batch of 14 similar aircraft to Block II



standards, modified to carry heavier payloads and with other detail enhancements.

The UAE has already moved on to the further-improved Archangel, designed as the third iteration of the BPA, maintaining all its current weapons capabilities (GBU-12 Paveway II laser-guided bomb, GBU-58 Paveway II dual-mode bomb, Cirit laser-guided rocket, and AGM-114 Hellfire anti-tank guided missiles) but based on a different airframe.

The UAE has gifted six of its Block I aircraft to Jordan, where they are still employed on a daily basis. The aircraft have been upgraded to virtual Block II standards, with the Archangel weapons control system, heavy stores pylons (which allow the carriage of 500lb stores), and some new avionics.

A dozen Block IB and Block II aircraft were gifted to Egypt in a programme that concluded in June 2017. These aircraft all have heavy stores pylons but have two slightly different cockpit configurations.

A fully loaded Block Archangel taking off from a dirt runway, with weapons including rocket pods, Paveway II dual mode bombs and AGM-114 Hellfire missiles.



In July 2017, Iomax signed a contract with Egypt to service, support and provide training and spares for these aircraft.

Five BPAs currently remain in use in the UAE, but with the delivery of all 24 Archangels, these are also likely to be cascaded to an ally.

The UAE's BPAs were used operationally in Libya, in Egypt and over the Yemen, proving themselves to be extremely useful and versatile ISR and light attack platforms.

Experience with the Block I and Block II BPA led the UAE and Iomax to conclude that the Air Tractor platform had significant flaws, and that the Archangel, as the next iteration of the BPA, would require extensive modifications, some of which would need to be incorporated on the production line.

This prompted Iomax to move away from using the Air Tractor AT-802 as the basis for the Block III BPA (soon to be renamed as the Archangel) and to shift to the Thrush Aircraft S-2R Turbo 660 Thrush.

The original BPA proved hard to operate from the back seat, while the vertical stabiliser was judged to be inadequate for completing the mission that was being asked.

In the Archangel, Iomax moved the cockpit forward, added area to the vertical tail, and built in significantly greater safety features, correcting what it saw as deficiencies in the AT-802.

The company is now working on a further improved Block II Archangel for the UAE and other customers, and this is due to be formally launched at the Dubai Air Show.

Iomax has worked aggressively to improve the overall flight characteristics, lightening the airframe by using titanium in place of steel for a wing 'carry-through' spar in the fuselage, and substituting a titanium spring main landing gear for the original steel spring.

It has improved the acceptable centre of gravity range by moving equipment, and has increased the horizontal tail and elevator area to enhance control authority in pitch.

The Block II Archangel has improved braking, with bigger wheels, tyres and brakes, and is fitted with a bigger 25-inch diameter electro optical/infrared (EO/IR) sensor (an MX-25), giving double the sensor range.

For improved adverse weather targeting Iomax will add radar – either in the shape of a podded Thales I-Master or a fully integrated Leonardo Osprey 30, with two arrays in the wing leading edge.

Two new weapons systems are also being integrated, one of them forward-firing, one unpowered. Iomax is coy about detailing these, which it says are "proprietary to the client" (which is not necessarily the UAE).

The company began flying the Block II configuration in stages, starting in June, using its original Archangel EMD aircraft as a test-bed.

Iomax's charismatic CEO, Ron Howard, passed away on June 12, and was succeeded by his son, KC Howard.

"Finding customers who have a

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requirement for this kind of aircraft was one of my primary objectives when I took over from my father in June," he said. "We're excited about the number of opportunities in the market right now – foreign military sales (FMS) and direct commercial sales, plus US customers."

Iomax has now delivered 48 of this class of aircraft and these have used 3,500 munitions in action (4,500 total), making experience and combat record a key differentiator for the Archangel.

But the Archangel is not 'the only game in town'.

The US Air Force's 6th Special Operations Squadron began looking at the armed ISR crop-duster concept in 2012 and, when a requirement emerged to provide such an aircraft to Yemen, the Big Safari programme office approached L3 to provide a solution.

L3 had made a name for itself as a provider of special mission aircraft conversions as a result of the MC-12W Liberty programme, which saw Beech 350s converted into ISR aircraft to meet an urgent operational requirement in Afghanistan.

The company aimed to do the same thing by converting AT-802Us into AT-802L Longsword ISR platforms.

The first four L3 Longsword aircraft, which were built to an unarmed, interim standard, were not delivered to Yemen because of the rapidly deteriorating situation, and were, instead, eventually delivered to Jordan, where Iomax may convert them to full Block II BPA standards.

The full-up Longsword was unveiled at the Paris Air Show in July 2017 and featured L3's ForceX Widow MMS mission software

system, an L3 Wescam MX-15D high-definition EO/IR sensor, and the Thales Scorpion helmet-mounted display.

The aircraft is fitted with an armoured cockpit, self-sealing fuel tanks, an AN/AAR-47 infrared warning receiver and an AN/ALE-47 electronic warfare countermeasures dispenser system. It can be armed with a range of weapons from gun pods, bombs and rockets to the AGM-114 Hellfire missile.

In January, the US State Department approved the potential \$418 million sale of up to 14 Longswords (12 AT-802Ls plus two AT-504 trainers), but the sale has been dogged by

controversy, and Iomax is fighting hard to overturn it and to sell its own combat-proven Archangel.

A further contender is offered by the Bulgarian company, Light Armed Surveillance Aircraft (LASA) Engineering Ltd. LASA's T-Bird, a lighter and cheaper aircraft than the Archangel or Longsword, is based on the Thrush 510G and is optimised for ISR rather than for interdiction.

LASA seems to have had some involvement in the controversial programme that saw two Thrush 510Gs modified as ISR aircraft for Frontier Services Group (FSG) by Airborne Technologies at Wiener Neustadt in Austria from about August 2014, but which was abandoned in the face of a potential breach of weapons export

The pod incorporates stabilised, gimballed EO and IR payloads with an integrated sighting system giving precision weapons capabilities. It has a data link that allows for real-time exchange of intelligence and coordination between the aircraft and ground forces, but which also allows intelligence officers and commanders to play their part in the decision-making and targeting process.

The aircraft is wired for the carriage of a range of weapons and incorporates pylons that could accommodate Western and Eastern-bloc weapons and provision for podded 23mm machine guns.

It was also fitted with 19mm bulletproof ballistic glass cockpit windows, a Kevlar-lined cockpit, an armoured engine block, and explosive-suppressing mesh in the self-sealing fuel tanks.

LASA's philosophy in developing the T-Bird was to keep the price and costs as low as possible, excluding smart and stand-off weapons from the base variant and, instead, offering a range of NATO and Eastern European munitions that are widely and cheaply available, and already in extensive use.

Orlin Trifonov, LASA's T-Bird project manager pointed out: "T-Bird is by far the lightest of the three similar airframes and, as such, cannot carry as much payload. The lesser fuel consumption, however, gives her unrivalled endurance – 14 hours with the TR-Pod only.

"A typical mission will last about six hours carrying a rocket pod, a cannon pod and an electronic countermeasures (ECM) container (now under development) in

addition to the TR pod. In our view, this load will account for more than 80% of the missions.

"Overall, the idea behind the T-Bird is to give the governments, suffering from ever-greater expenses, a readily available, cheap yet potent airframe for countering asymmetric threats. This way, the solution (rather a part of the solution) is as asymmetric as the problem.

"State-of-the-art sensors and data links are indispensable in counter-insurgency. At the same time cheap, yet effective, munitions will be able to swiftly and efficiently eliminate 95% of the threats, without raising the price and operational costs."



L3 claim greater payload/range for their Longsword, and the aircraft has more weapons hardpoints, but critics aver that visibility from the cockpit is worse than its rivals. RIGHT: LASA's T-Bird represents the cheapest and least capable of the three main rival 'armed crop-dusters'.



regulations.

LASA managing director, Vesolin Djurov, said: "Maybe in the very beginning the idea for an efficient ISR plane based on a common crop-duster originated from FSG Group. But, even though the T-Bird is based on the same idea, it is not an FSG project. For any sales abroad, LASA Engineering is strictly adhering to both national and European regulations."

The T-Bird is integrated with the targeting and reconnaissance (TR) pod – a version of Airborne Technologies' self-contained aerial reconnaissance (SCAR) pod with targeting capability.

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Saudi Arabia will be the sixth customer for the P-8A.

Saudi's Poseidon adventure?

A deal for between four and six P-8A maritime patrol aircraft was reportedly signed during a visit to Saudi Arabia by US President, Donald Trump, and his Secretary of State, Rex Tillerson.

Jon Lake reports.

The Saudi P-8A procurement – Boeing declined to give details of numbers or contract value – forms just one part of a massive naval fleet replacement programme that the kingdom has been pursuing since 2008.

Requirements for the Royal Saudi Naval Forces Eastern Fleet replacement programme were detailed in February 2015. They included three maritime patrol aircraft for coastal surveillance and 30-50 unmanned air vehicles, as well as four 3,500-tonne “frigate-like warships” that would be able to operate Sikorsky MH-60R helicopters and be capable of anti-air warfare, armed with an 8-16 cell vertical launch system (VLS) for Standard SM-2 missiles; six 2,500-tonne warships (also able to operate MH-60R helicopters) and with combat systems compatible with the frigates.

King Salman bin Abdul-Aziz Al Saud, Crown Prince Mohammed bin Naif Al Saud, and Deputy Crown Prince Mohammad bin Salman Al Saud, signed agreements or letters of intent during President Trump’s visit to purchase a wide range of military and naval equipment, which together formed the biggest arms sales deal in US history, worth \$350 billion, including contracts worth \$110 billion that took “immediate effect.”

\$6billion agreement

The deal is understood to include a \$6billion agreement for the purchase of four Lockheed Martin Freedom-class Littoral Combat Ships (LCS). The Littoral Combat Ship is particularly well suited to the Gulf’s shallow waters and will provide a useful deterrent against Iran.

Saudi Arabia first expressed interest in buying six Boeing P-8A Poseidon maritime patrol aircraft in April 2010, at an estimated cost of \$1.3 billion. The aircraft were to have formed part of the wider naval modernisation programme, and were to have been delivered alongside Sikorsky MH-60R Seahawk helicopters, and Northrop Grumman Fire Scout unmanned helicopters. It is believed that a Boeing P-8A Poseidon order was agreed in 2015, although it was not finally signed and announced until this year.

The P-8A Poseidon is a maritime patrol and anti-submarine warfare aircraft derived from the Boeing 737-

800 airliner, optimised for hunting submarines from high altitude, using an innovative, if unproven, multistatic active sonobuoy system and an equally unproven high-altitude concept of operations (CONOPS).

Saudi Arabia will be the sixth customer for the P-8A, joining the United States, India, Australia, the United Kingdom, and Norway. It is not known whether Saudi Arabia will order the US Navy standard P-8A, or specify an aircraft with additional capabilities, as India did.

Saudi Arabia has not previously operated a long-range maritime patrol aircraft (MPA), but has opted for what is widely believed to be the most capable, most advanced and most expensive MPA available. It is an aircraft with much greater range and endurance than the Saudi requirement would seem to demand.

Anti-submarine warfare aircraft

The order may lead other Gulf nations to seek to acquire their own anti-submarine warfare aircraft, or to recapitalise their ASW aircraft fleets, but whether it will lead to more P-8A orders in the region remains uncertain.

It has not been revealed whether the Saudi P-8As will be operated by the Royal Saudi Naval Forces or by the Royal Saudi Air Force, and no delivery schedule has been released, though it is unlikely that any Saudi P-8A would enter service much before 2021-2022 at the earliest.

The latest arms deal also included up to 150 Sikorsky S-70 Blackhawk and 48 Boeing CH-47F Chinook helicopters, terminal high-altitude air defense (THAAD) integrated air and missile defence systems, radar systems, surveillance systems, and tactical aircraft.

Lockheed Martin and Taqnia will form a joint venture to support the final assembly of an estimated 150 S-70 Black Hawk utility helicopters for the Saudi Government, while Alsalam Aerospace Industries, Saudi Aerospace Engineering Industries and Boeing are forming a Saudi Rotorcraft Support Center joint venture.

It has been reported that the majority of the deals signed by President Trump were actually finalised during the Obama administration, but have only now come into effect.



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AN-188 MOOTED FOR SECOND SAUDI ALLIANCE

With the An-132D joint venture between Antonov and Saudi partners, King Abdulaziz City of Science and Industry (KACST) and Taqnia Aeronautics Company, well under way, both sides are now looking for new potential collaborative ventures.

At one time, some expected the next joint Ukrainian/Saudi aircraft programme to involve the twin-engined An-178 tactical airlifter. However, it has now been suggested that the larger An-188 could become the next project for the partners.

The Antonov An-188 was originally launched at the 2015 Paris Air Show, but the programme stalled as a result of relations between Ukraine and Russia.



The An-188 is a derivative of the An-70, powered by four jet engines, with some aerodynamic modifications, and fitted with a modernised NATO-compatible western cockpit.

Antonov was forced to abandon the An-70, whose D-27 propfan engines were built by Russia's Aerosila, because of its Russian content.

Current plans are to use a Ukrainian engine from Motor Sich, possibly the Ivchenko-Progress D-436-FM turboprop that powers the An-158 civil airliner.

At this year's Paris Air Show, Dr Alexander Los, head of Antonov's design organisation, said that the An-188 was one of the future products under

The as-yet unflown An-188 is to be a turboprop-powered derivative of the propfan-powered An-70 seen here. It may be the next programme in Antonov and Taqnia's joint venture.



consideration for joint development with Saudi Arabia, following the An-132D joint venture with its Saudi partners.

The An-132D is now in flight test, following its maiden flight on March 31 2017, and the aircraft appeared at the Paris Air Show in July. Plans for manufacture in Saudi Arabia from 2020 are now well advanced, with Saudi industry eventually expected to provide up to 60% of the required components.

The cooperation between Antonov and its Saudi

partners forms a part of the kingdom's ambitious Vision 2020 plan, which aims to replace its reliance on oil with a range of high-tech industries.

The An-188 is intended to fill the gap between the C-130 and the C-17, with a maximum take-off weight of 140 tonnes and a maximum payload of 40 tonnes, and able to operate from unpaved airfields and short runways of just 915 metres.

All this makes the An-188 a direct competitor to aircraft like the A400M.



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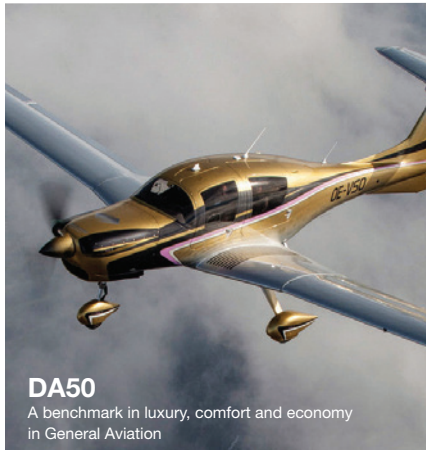
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New Hornets carry a huge sting

The Boeing F/A-18E/F Super Hornet aircraft ordered by Kuwait last November will be delivered to the latest Block III standards, which transform the already impressive Super Hornet into a fully networked fighter, fit for service into the 2040s. Jon Lake reports.



The Block III upgrade is intended to allow the Super Hornet to viably complement the F-35C Lightning II Joint Strike Fighter.

The US Defense Security Cooperation Agency informed Congress of the potential \$10.1 billion sale to Kuwait on November 17 last year.

Under the terms of the deal, it listed 32 single-seat F/A-18Es, and eight two-seat F/A-18Fs, together with their F414-GE-400 engines and spares.

Also included was AN/APG-79 active electronically scanned array (AESA) radars, AN/AAQ-33 Sniper advanced targeting pods and joint helmet-mounted cueing systems (JHMCS), and a range of other equipment items and weapons, as well as the required support and logistics services.

Originally developed to meet US Navy requirements and built to satisfy an immediate need for greater numbers of strike fighters with advanced capabilities, the Block III upgrade is intended to allow the Super Hornet to viably complement the F-35C Lightning II Joint Strike Fighter.

The F/A-18 will be the “predominant aircraft” on US Navy carrier decks through 2040, since its programme of record is for more than 560 Super Hornets and 160 EA-18G Growler electronic attack derivatives, whereas it only plans to buy 260 F-35Cs.

The continuing importance of the Super Hornet to the US Navy should provide some reassurance and certainty to export operators of the type.

The Block III configuration brings a range of enhancements and improvements, the most visually obvious of which lies in its ability to be fitted with conformal fuel tanks (CFTs). These impose a smaller aerodynamic penalty than traditional external drop tanks and do not take up weapons hardpoints. It has been calculated that CFTs give 150 nautical miles more range compared to traditional drop tanks.

The very sharp-sighted might also notice some of the enhanced low observable (stealth) features incorporated on the Block III – including a redesigned gun muzzle above the nose and redesigned angle of attack sensors on the sides of the forward fuselage.

With a planned service life extending out to 2040 and beyond, the structural service life of both in-service and new-build Super Hornets is being extended from 6,000 to 9,000 flying hours.

The Block III Super Hornet will also feature a new advanced cockpit with a wide area display, designed by Elbit Systems USA, with new mission processors, a low-profile head-up display, and a large 10-in by 19-in touchscreen HD wide-area display.

The aircraft is fitted with a new Boeing distributed targeting processor-networked (DTP-N) computer, a Rockwell Collins tactical targeting network technology (TTNT) internet protocol-based datalink, and a Lockheed Martin AN/ASG-34 infrared search-and-track pod.

The aircraft also features a Harris AN/ALQ-214 Block IV integrated defensive electronic countermeasures (IDECM) suite, while the Raytheon AN/APG-79 active electronically scanned array (AESA) radar will incorporate some upgrades.

Assembly line open

The Kuwait deal, along with an expected US Navy order for 12 more Super Hornets, promises to keep Boeing’s F/A-18 St Louis assembly line open for about two years longer. Keeping the Super Hornet line open will allow Boeing to offer the aircraft in further export campaigns, perhaps most notably in India, Canada and Finland.

The Super Hornets will form just one element in a major expansion and modernisation of the Kuwait Air Force, which has also ordered 28 Tranche 3 Eurofighter Typhoons.

When the Typhoon order was announced on September 12 2015, some interpreted the move as indicating that Kuwaiti patience had worn thin while waiting for the US Congress to clear a long-planned Super Hornet purchase. In the event, Kuwait had decided on a split purchase and massive expansion in the size of its frontline fighter force.

Pending the delivery of the new Super Hornets, Kuwait is to equip some of its ageing F/A-18C/D Hornet aircraft with 14 Lockheed Martin Sniper Advanced Targeting Pods (ATP). The pods have been selected for the Kuwait Air Force’s newly ordered Eurofighter Typhoons, and will also be used on the new Super Hornets.

The Sniper ATP provides critical targeting and non-traditional intelligence, surveillance and reconnaissance (ISR) capabilities and is able to detect, identify, automatically track and laser-designate small tactical targets at long ranges, supporting the use of all laser-guided and GPS-guided weapons against multiple fixed and moving targets.

Following the delivery of the Super Hornets, Kuwait’s existing F/A-18C/D ‘heritage’ Hornets will most likely be sold.

Whatever the aircraft
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MBDA's air-to-air and air-to-surface missile systems equip the latest generation of aircraft in service with many of the world's air forces. These systems include both short range and beyond visual range fire-and-forget weapons designed to ensure the aircraft's safety as it strives to secure and protect the airspace. To carry out the surface attack mission, MBDA missile systems feature exceptional precision at long, stand-off range.

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The Middle East is a keen acquirer of sophisticated military technology, so it is no wonder the region has taken an interest in unmanned aerial vehicle (UAV) procurement. **Beth Stevenson reports.**

MIDDLE EAST ADDICTED TO GAME OF DRONES

The stand-off range and surveillance capability of a UAV makes it a key asset to be operated in the Middle East, as the systems can provide over-watch of neighbours with whom there are tensions, while maintaining a distance from the target at hand.

There is a relatively small indigenous development of UAVs in the Middle East, so technology import is the way many countries acquire these systems.

While neighbouring Israel is one of the top producers of UAVs internationally, its systems are off limits to most of the region. So, despite the attempt at indigenous development, the Middle East largely relies on the US and Europe for its unmanned systems.

The most prolific military UAV on the market is the General Atomics Aeronautical Predator family of systems, which has been exported to the United Arab Emirates, albeit in a modified form.

The UAE acquired the RQ-1E Predator XP in 2013 through domestic prime International Golden Group, under a \$197 million deal for an

undisclosed number of UAVs. The type has a reduced payload capacity in accordance with the rules of the Missile Technology Control Regime (MTCR), ultimately meaning it cannot be armed.

MTCR is a voluntary multilateral agreement that aims to reduce the proliferation of missile-related technology by restricting export of systems that can carry a 500kg payload over a 3000km range.

Long endurance

To this end, the UAE – not a signatory to the regime – acquired the XP remotely-piloted aircraft (RPA) with a reduced capability but with a long endurance.

While the exact payload capacity is unknown, General Atomics says that the XP has an endurance of 35 hours and can operate at altitudes of 25,000ft, although previous testing conducted in 2015 demonstrated a 40-hour endurance for the UAV.

Comparatively, the company's MQ-9 Reaper can only operate for some 27 hours, but at some

50,000ft.

“The RPA includes a state-of-the-art sensor system optimised for missions over land and sea, and has proved its long endurance capability by flying beyond-line-of-sight missions in excess of 35 hours,” a company spokesperson said.

Deliveries of an undisclosed number of the examples have now been completed, and the spokesperson confirmed that the company is in discussions with the UAE regarding the potential purchase of additional systems with new capabilities.

In May 2017, it was announced that Canadian manufacturer, CAE, had been awarded C\$56 million (\$45.3m) by the General Headquarters of the UAE to deliver training for UAVs over a five-year period, notably including training for the Predator.

To include academic, simulator and live flying training, the contract is to be delivered by the company's CAE Maritime Middle East division, based in Abu Dhabi.

The success of the XP in the UAE has





Main picture: The UAE acquired the RQ-1E Predator XP in 2013, and has now committed to acquiring the Piaggio Aerospace P.1HH Hammerhead (inset).

undoubtedly piqued the interest of other nations in the region.

“The delivery and subsequent operation of the Predator RPA by the UAE armed forces has led to high interest in the system by other countries, and not just for military roles,” the General Atomics spokesperson said.

He noted that the role of a medium-altitude, long-endurance (MALE) UAV, such as the Predator, extended past a siloed military mission, demonstrated by the use of the family of systems by US Customs and Border Patrol in addition to US forces.

“The Predator XP is uniquely situated to help perform very similar mission sets for border security, law enforcement, wildlife conservation, oil and gas infrastructure management, event security (such as Dubai 2020), maritime sea-lane patrol, as well as a host of other non-military applications over the coming years,” the spokesperson added.

One avenue that could be appealing to the region is the offer of the XP on a services basis.

Rather than purchasing the UAV outright, General Atomics is offering customers the chance to contract intelligence, surveillance and reconnaissance (ISR) hours from the company, which would be suited to their various needs.

“New payloads are being integrated into the product line specifically to support this expansion to provide our customers with the timely and relevant intelligence data they require to perform their missions,” the spokesperson said.

Data link

“Coupled with Predator XP’s long endurance and ability to fly in the national airspace, a new data link to create digital interoperability across the customers’ inventory, sensors such as wide area motion imagery (WAMI) to create larger situational awareness over a cityscape, as well as advances in the C4I capabilities, [these] are all going to be seen coming on line in support of our valued MENA customers in the near future.”

The UAE has also committed to acquiring the

Piaggio Aerospace P.1HH Hammerhead, having signed a deal for eight examples in March 2016.

Hammerhead is derived from the company’s manned P180 Avanti II twin-pusher, configured with Leonardo-developed mission systems, and is being acquired by the UAE under a \$316 million deal signed between the government and Abu Dhabi Autonomous Systems Investments. Abu Dhabi-based investment firm Mubadala Development Company owns Piaggio.

All of the aircraft will be delivered with electro-optical/infrared (EO/IR) cameras, radar and communications systems, Piaggio said, while logistic support and training are also included.

“This important contract recognises Piaggio Aerospace’s efforts in establishing a world-class military programme and state-of-the-art manufacturing facilities that position the business for long-term sustainable success,” said Carlo Logli, then-CEO of Piaggio, at the time of the signing.

While the Italian Government has backed the development of

Continued on Page 72

Saudi Arabia operates the Chinese CH-4B variant.



CONTINUED FROM PAGE 71

Hammerhead, it has skirted around an actual contract signing to date, making the UAE the launch customer for the type.

After the crash of one of the prototypes near Sicily in May 2016, little was reported on the status of the development until the company announced, on July 5, that flight-testing had resumed at Birgi military airport in Trapani, Italy, following ground-testing runs.

Piaggio confirmed that first deliveries are expected in 2018, and training will begin in 2018 ahead of the first delivery.

Elsewhere, it was announced during the 2016 Farnborough International Air Show that two Gulf/Middle Eastern nations had become the launch customers for Leonardo's Falco Evo UAV.

This has a 20-hour endurance and can carry a 100kg payload. Deliveries to these two customers are now pending.

While the nations remain undisclosed, Jordan and Saudi Arabia are customers for the baseline Falco system, and it was claimed by Leonardo at the time of the contract announcements that the new Evo customers would be operators of the older model.

The Evo has a longer wing and additional tail booms, and the baseline system can be retrofitted to convert it to the newer model to provide it with the ability to fly at 6,000 metres at ranges of 200km line-of-sight.

The Falco Evo can carry the company's newest Osprey multi-antenna active electronically

scanned array radar, as well as its Sage electronic support measures system that allows an operator to geolocate ground-based radars. However, it is unclear what payload configuration the launch customers have opted for.

Aside from western manufacturers, Chinese industry is also a key exporter of technology to the region, with the Iraqi Air Force beginning operations of the CH-4B Rainbow UAV from China Aerospace Science and Technology Corporation (CASC) in 2015.

Armed version

The CH-4B is the armed version of the type, and the UAV has similarities to the General Atomics MQ-9 Reaper. It is being used by the army aviation division of the Iraqi military in the fight against Islamic State militants in the region.

Saudi Arabia also operates the CH-4B variant and, in March 2017, CASC was contracted by Riyadh to establish a manufacturing in the kingdom to domestically develop the UAV.

Iran has also developed a reputation as a keen UAV developer, although the designs it produces are often reverse-engineered western systems, given the sanctions on selling this type of system to Tehran.

One system known to have been reverse-engineered by the nation is a US-operated Lockheed Martin RQ-170 Sentinel, while an Israel-owned Elbit Systems Hermes 450 was also shot down in 2014.

In September 2017, footage of an undisclosed

UAV base in Iran was revealed, showing a number of different systems parked up on a flight line.

The Iranian press reported that Brigadier General Farzad Esmaili, head of the Khatam al-Anbiya Air Defense Base – a branch of the Islamic Republic of Iran Army – was seen in the video claiming that the UAVs and aerial targets demonstrate the nation's military power, which was interpreted as a warning to Iran's opponents.

However, given that the nation has been siloed in its development over recent years, the level of sophistication of the aircraft and the payloads they can carry remains to be seen.

In July 2017, Iranian news site, *Press TV*, reported that Brigadier General Amir Ali Hajizadeh, commander of aerospace with the Iranian Army, claimed that the nation is entirely self-sufficient in its development of a number of military technologies, including UAVs.

He claimed that the array of technology it has developed "correctly proves that we can overcome all problems by relying on domestic capabilities", although he added that the military systems Iran has pose no threats to other countries, and are simply a deterrent.

Aside from the defence applications being seen in the region, there is also movement in the civil sector, particularly from Dubai.

The Emirate state is trying to pioneer the introduction and development of UAVs for civil applications, with Sheikh Mohammed bin

Two Gulf/Middle Eastern nations had become the launch customers for Leonardo's Falco Evo UAV.



DUBAI STEERS UAVs IN NEW DIRECTIONS

In addition to the research into using unmanned aircraft as taxis, the UAE is trying to establish itself as a pioneer in UAV utilisation in a number of other ways.

A series of government-backed projects are springing up that apply the disruptive technology to areas such as law enforcement, road surveillance and critical infrastructure monitoring, in the hope that the country can tap into a global market that is expected to be worth some \$11.2 billion by 2020.

The GCC and the UAE, in particular, is rapidly growing to take advantage of this boom in UAVs, according to a report from global defence industry intelligence specialist IQPC, which claims this is a "remarkable" turnaround given that this technology was considered a threat to public safety and security in the Middle East just a few years ago.

The Dubai smart government plan includes the employment of a range of autonomous and robotic systems, in order to bolster the efficiency and convenience of a number of areas of everyday life.



Dubai Police, for example, is using them in a number of different ways, including for traffic monitoring. The UAVs can assess congestion and accidents and send data back to an operating centre, which can help other police units and offer information to motorists.

The police also use unmanned systems to monitor criminal activity, for example in tracking suspects in crowded areas, while officers have also mounted water hoses on to UAVs for bomb disposal missions.

Furthermore, the Roads and Transport Authority (RTA) has also launched an initiative to monitor Dubai's streets and traffic flows, collecting live data and collating it to be acted upon by a command and control centre.

The RTA can then send notifications via social media and mainstream news feeds to inform the public of traffic hotspots, accident areas and parking space availability, the report notes, and UAVs can additionally be used to survey road conditions and other critical infrastructure.

Dubai Electricity and Water Authority (DEWA), meanwhile, launched its so-called Sirb initiative in 2015, which uses high-end UAVs to support Dubai's infrastructure and contribute to providing efficient and easy-to-use utilities and services.

The Emirate state's waste management department has also used UAVs to improve the speed and efficiency of operations, and following a trial period that used one aircraft to monitor landfill sites and beach areas to search for people illegally dumping and general littering, UAV use for this application has been expanded.

Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, being responsible for launching the 'Drones for Good' award.

This sees teams compete to develop technology that can improve living standards in the areas of the environment, education, logistics, transportation, construction, infrastructure, healthcare, civil defence, tourism, and humanitarian aid.

Innovative initiatives

"The Drones for Good award and other innovative initiatives have reinforced the UAE's position as an international destination for advanced technological innovations," said Mohammed Al Gergawi, Minister of Cabinet Affairs and chairman of the organising committee for the awards.

Now in its second guise, the award has gained "considerable momentum" in this iteration, drawing attention at an international level, Gergawi added.

"The award has given a new dimension to the concept of drone technology, and contributed to shaping an active economic sector that will have a major role in the global economy."

Dubai is also seriously exploring the introduction of unmanned taxis, under its initiative to target 25% of autonomous passenger travel by 2030.

Its Roads and Transport Authority (RTA) has claimed that testing of a prototype may be carried

out this year, and Chinese manufacturer, Ehang, is believed to have completed some preliminary testing of its 184 model in Dubai.

Additionally, German company, Volocopter, is also in talks with the RTA regarding testing of a 16-rotor system in Dubai by the end of 2017.

While the Middle East is not known for its UAV manufacturing capabilities, it is clearly a keen importer of this technology. However, this is not always as straightforward as the nations mighty like it to be.

Given that there are limits on the level of technology that can be exported from the west, nations such as Iraq and Saudi Arabia – typically buyers of western technology – have turned to China to import armed UAVs to bolster their offensive capabilities.

The UAE, on the other hand, has demonstrated loyalty to its western suppliers, and is importing a variant of the most ubiquitous armed UAV in the world, the Predator – albeit an unarmed version – and is investing in European capability in the form of the developmental Hammerhead.

Many of these acquisitions and investments are relatively embryonic, so whether or not nations in the region have purchased wisely – and if they can keep ahead in funding developments in this area – only time will tell. But, for now, the unmanned industry would be wise to keep an eye on the activities and considerations of these Middle Eastern countries.

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A host of critical subjects were discussed when Morocco hosted the second edition of the Middle East Business Aviation Association (MEBAA) conference and air show. Vincent Chappard was there, along with photographer Ian Billingham

Marrakesh a clear cut winner

Two major announcements stood out at the MEBAA conference in Marrakesh, which was held under the aegis of King Mohammed VI, with the support of the Moroccan Airports Authority, ONDA.

In addition to a new MEBAA insurance product being launched, ONDA also announced that Morocco's new business aviation airport project is on track.

The insurance was launched alongside discussions and presentations on important issues including aviation cyber security, market forecasts, the importance of FBOs in enhancing services, development projects, and human resources issues.

The conference heard that the MENA region has potential but growth in the sector is in a "budding" stage for the time being. Forecasts show no recovery before 2019, even though purchase for new jets is on the increase.

Mohamed Sajid, Minister of Tourism, Air Transport, Crafts and Social Economy, opened the show by discussing the kingdom's strategy to liberalise and develop air transport, a move that was praised by Mohammed El Masaoudi, CEO of Air Ocean Maroc, who said he was optimistic about what the Moroccan authorities proposed.

The main manufacturers – Bombardier, Gulfstream, Cessna, and Boeing – also deployed their sales strategies to bring on board new clients.

David Sale, the new sales director, presented Bell Helicopter's new baby, Bell 505, which had just received its FAA certification. "Morocco is a gateway to the African market," he said.

The event was also marked by the strong presence from FBO operators like Swissport, Jetex, XJet and SEA Prime.

■ **The MEBAA Air Show will return to Marrakesh on September 17 and 18, 2019.**



MEBAA opens in Marrakech in the presence of its Excellency Mohamed Sajid, Minister of Tourism, Air Transport, Crafts and Social Economy of Morocco and Ali Alnaqbi, Founding President and Executive of MEBAA.



Cover story: Launch of MEBAA Insurance by Ali Alnaqbi, founding and executive president of MEBAA, and Samir Abdul Ahad, co-founder and director of Surety Global Ltd.

INSURANCE TAILORED TO MEMBER NEEDS

A new MEBAA insurance package has been specifically tailored to address members' immediate needs.

Developed in partnership with UK-based reinsurance broker, RFIB, and risk management specialist, Surety Global Limited, the offer includes both insurance (aviation, medical and property) and cyber security to help members understand cyber threats and protect their technology. This issue is a major concern to airlines, manufacturers and authorities.

MEBAA executive chairman, Ali Alnaqbi, described it as a "lucrative one-stop shop" offering the "best market solutions" in a fast-changing world with unexpected turbulence.



Zouhair Mohamed EL Aoufir: This project is an "ideal fit to keep pace with the regional growth of the industry"

ONDA RENEWAL PACKAGE REMAINS ON TRACK

The Moroccan Airports Authority, ONDA, is pushing ahead with modernisation work at many of the country's airports.

Morocco is served by 26 airports (19 international) with a capacity of 30 million passengers. ONDA has been modernising its airport infrastructure with new terminals at Marrakesh, which opened in December 2016, and at Fez Saïis, which began operations in April this year.

On-going projects include the development of Casablanca Mohammed V International Airport, the expansion of Nador, Guelmim, Zagora, Errachidia and Ouarzazate, as well as the construction of a new regional control centre in Agadir.

The volume of business aviation activity remains relatively low in Morocco, with approximately 11,000 movements per year.

For 2017, ONDA forecasts show a growth in passenger traffic of about 18% (particularly for Laayoune and Agadir) and a 7.55% increase in aircraft movements.

According to ONDA, the current ground-handling service provided for business aviation in Morocco is "limited and insufficient". It is geared towards commercial aviation. Also, the quality of service needs to be improved to meet the segment requirements.

A new project – a dedicated business aviation airport at Tit-Mellil – is designed to help solve the problem. ONDA believes it will provide the greater

Casablanca metropolis with an integrated "one-stop shop" solution for business and private operators and ensure high-quality services with international standards.

"The goal is to make it an international business aviation airport," explained ONDA CEO Zouhair Mohamed EL Aoufir. "We want to involve a strategic partner, investors and operators in a public/private partnership."

This project is an "ideal fit to keep pace with the regional growth of the industry" and Morocco's will to become an aviation hub, he added.

A study, conducted in 2015, confirmed Tit-Mellil Airport as the ideal location for business aviation. It currently caters for general aviation operations.

The new facility is scheduled to be in service in 2025, with a further 10-year growth plan. The current runway will be lengthened to obtain B and C codes, enabling it to handle aircraft like the Boeing 737 BBJ or A320 corporate jets.

According to local authorities, by 2035, the airport will be able to meet the requested demands. "The concept of upgradeability is at the heart of planning to provide a progressive layout of parking lots, hangars and commercial activities to enhance our heritage," said EL Aoufir.

A project tender will be launched shortly.

Growing concern over cyber

The conference heard that the aviation industry is potentially vulnerable to cyber attack as it faces new computer-based security threats.

Martin Watts, chief commercial officer of Nettitude Group, a cyber-specialist consultancy, said that global serious organised crime trends were moving significantly towards cyber crime.

According to business technology news website, ZDNet, data breaches will cost the global economy \$2 trillion by 2019. It said 85% of airline CEOs had expressed a concern about cyber security, 24% higher than in other industries.

Watts added that, as greater connectivity became more pervasive in the aviation sector with electronic flight bags, in-flight WiFi, on-line booking systems etc, companies needed to be more aware than ever that they could be targeted.

There's a need to continuously strengthen policies and coordination between stakeholders, who should work together to share best practices and strategies, he said.

It should be noted that IATA has called for a partnership between industry, governments and regulators to enhance aviation security by embracing a globally harmonised, risk-based system.

Martin Watts: crime trends are moving significantly towards cyber crime.



AIRCRAFT MARKET STARTING TO RECOVER

The conference heard that moves were taking place towards a market recovery in 2019.

According to Honeywell International, 7,600 aircraft will be delivered by 2026 globally. In 2016, purchases increased nearly 5% compared to a 27% decrease the previous year.

The Middle East/Africa region is expected to contribute 3-4% of global demand over the next five years. Today it represents nearly 4% of the world fleet. The average age of business jets is around 17.

The annual fleet grew 2-3% over the last five years and is expected to record a 1-2% growth through 2021. However, the conference heard, recent fleet growth had slowed due to geopolitical issues, political instability and outmigration of aircraft from the region.

Even though the fleet had remained static in 2015, purchase expectations rose five points to 21% due to the Iran nuclear deal and some improvement in oil prices.

The region has the second largest preference for large cabin/long-range jets.

Worldwide, new jet purchase plans by aircraft class indicate that large-cabin jets account for 57%, small cabin 22% and midsize 21%.



Raghd Talih, Honeywell's director Middle East and Turkey, at the conference.

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- Nathan Grindstaff, Board Member, Mastercorp
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CHALLENGE.
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Robert Schmidt: "Chauffeur transportation is the most vulnerable part of our client's travel."



More drives for safety

The transport of business aviation clients outside FBOs has become a major challenge – particularly with insecurity in many countries and increasing 'Uberisation', where simple car owners proclaim themselves to be authorised drivers.

According to Robert Schmidt, Middle East operations executive for chauffeur management service Fortis Riders, more than 64% of security incidents for high network individuals happen in or around the vehicle. "So chauffeur transportation is the most vulnerable part of our client's travel."

Fortis Riders is designed to handle trips outside a client's local area with services tailored for private aviation travellers. It provides 3,000 chauffeurs in 1,100 cities in more than 120 countries in the world.

"Security comes down to two things – knowing who you are working for so that you have trustworthy and reliable people, and trustworthy and reliable information you are receiving," said Schmidt. "We have, therefore, a security network which gives all the information in real time. Security is really what ties all parties together."

CEO CALLS FOR MORE FLEXIBILITY

Air Ocean Maroc CEO, Mohammed El Masaoudi, has positively welcomed the determination of the Moroccan authorities to develop business aviation, especially for small operators.

Set up in 2015, Air Ocean Maroc is a private company specialising in business or leisure trips, medical evacuations and freight.

The company launched operations from Casablanca and Rabat. Its operational and logistics base is situated at Ben Slimane Airport.

The company carries out repatriation missions for insurance companies throughout Morocco, Europe, Western and Central Africa. Many flights head towards Casablanca, which is a real medical hub in the region.

While backing the authorities' current plans, El Masaoudi is looking for more legal, custom and tax facilities to operate in the sector, which, he says, requires "more flexibility compared to commercial aviation".

He raised another important issue: competition faced by operators in North Africa coming from those based in Malta. According to El Masaoudi, these competitors benefit from tax exemptions and exchange facilities with civil authorities, enabling them to bring down operational costs.

Air Ocean Maroc sees much growth potential in Marrakesh and the domestic network of the kingdom. It is looking to build and develop a network of partners with operators from Africa and Europe.



Mohammed El Masaoudi is looking for more legal, custom and tax facilities.



Benneth Walsh: "Our programmes are about the industry standards in order to operate and to reduce the risks."

Inset: Terry Yeomans: "Safe enough is not the same as safe."



Raising the standard to reduce risks

Managed by the International Business Aviation Council (IBAC), IS-BAO and IS-BAH were present in Marrakech to support MEBAA and promote their safety programmes in the region.

According to Benneth Walsh, programme director of IS-BAO, there's a challenge to reduce risks in the business aviation sector through proactive methods, adequate framework and operational effectiveness. "Our programmes are about the industry standards in order to operate and to reduce the risks."

More than 700 business aviation operators in 35 countries have adopted IS-BAO as the definitive standard for flight operations. The essential elements of IS-BAO, which is a code of best practice, include: standards and recommended practices, safety management system (SMS) tools, implementation guidance, and audits checklists.

IS-BAO is recognised by ICAO as a holistic safety approach for business aviation.

IS-BAH – the international standard for business

aircraft handling – reminds the industry that safety is an unwritten expectation.

At a recent Air Charter Safety Foundation (ACSF) safety symposium, according to the National Air Transportation Agency, only three out of 140 attending aircraft operators indicated that they talk with their ground-handling providers about safety and training.

"We are operating at zero accidents or nearby incidents in about nine years. Is that performance or luck?" asked IS-BAH Programme Director, Terry Yeomans. "Safe enough is not the same as safe," he added.

He also discussed historical general aviation ground-handling-related claims. The average cost per claim has increased from \$200,000 in 2015 to \$280,000 in 2016. The 2017 figures already show a cost of \$286,522.

Customer service remains the first priority in business aviation and customers expect "a responsible and properly risk-managed approach to safety", he said.

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As president of Jet Aviation in our 50th anniversary year, I'd like to extend sincere thanks on behalf of the entire Jet Aviation team for your business and support over the years. To celebrate this milestone — which we would not be doing without your ongoing trust and loyalty — we launched our 'One Jet Aviation' initiative earlier this year. We are investing in One Jet Aviation to ensure consistent global standards and processes across our sites and portfolio of services for the next 50 years, and beyond. We look forward to seeing you soon!



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NBAA gives

The world's largest business aviation event – NBAA – took place in Las Vegas in October and Alan Peaford was there.

Pictures by Billypix.

Just days after the worst mass shooting in recent US history, a sombre NBAA convention opened its doors to the business aviation community.

Nevada Congresswoman Dina Titus thanked NBAA for being the first city-wide convention to take place after the shootings. "Thank you for being here for us," she said.

While there were no new aircraft programmes unveiled, the mood was lifted by clear signs that the business aviation market is once again on the rise.

Honeywell's annual outlook

forecast 8,600 deliveries by 2026 with a value of \$249 billion.

One of the first of the new breed of aircraft predicted to make an impact was doing that at the show as the Global 7000 made its debut.

Bombardier's largest purpose-built business jet is not scheduled to enter service until next year, but is already making waves among potential competitors.

The 33.9 metre Global 7000 pushes Bombardier into a size class normally reserved for derivatives of commercial aircraft, such as the 33.9 metre Airbus ACJ319neo and



BLACKHAWK BOOSTS 350ER PERFORMANCE FOR ME MISSIONS

Special mission operators in harsh environments, such as the Middle East, will benefit from a new modification to the King Air 350ER currently being tested by Texas-based Blackhawk Modifications.

Speaking at NBAA, chief executive Jim Allmon said the XP67A upgrade would be ready for delivery in the first quarter of 2018.

"The XP67A will provide a 25-30% increase in power, which translates into improved climb and cruise performance for King Air 350ERs, especially on hot days at high altitudes," Allmon said.

Although the PT6A-67A will produce a 400 thermodynamic SHP increase over the stock PT6A-60A, the upgrade will actually reduce the overall weight of the aircraft by about 18lbs.

"This will truly be a game-changer, offering increased safety, performance, and mission capability," said Allmon. "We have seen the aircraft operating in places like the Middle East, where it is fitted with all sorts of extras. We tested the stock aircraft and know that it takes up to an hour to reach cruise altitude. With the XP67A it will take just 18 minutes and will increase the ability to get out of harm's way."

The programme is being developed with Sierra Nevada, which is offering it to both US and foreign governments.

big lift to sombre Vegas



the 33.7m Boeing Business Jet (BBJ).
 “No other business jet rivals the Global 7000 aircraft. It is redefining the segment in performance, smooth ride and interior comfort,” said Bombardier president David Coleal.
 Gulfstream was also showing off its latest types – the G500 and G600 – with full interiors at the static park, as it completes the final

stages of the G500’s flight-test campaign ahead of entry into service early next year.
 Gulfstream also announced that the G500 would now reach 5,200nm (9,630km), an extra 200mn, at Mach 0.85. Meanwhile, the larger G600 will reach 6,500nm, a 300nm increase.
 Embraer unveiled a new version

of its best-selling Phenom 300 light business jet. The Phenom 300E – the E stands for enhanced – marks the first major upgrade for the type.
 Another debutant was the new personal jet, the Stratos 714, with CEO Michael Lamaire calling for investors to help find the \$200million to bring the five-seater to certification.

Nextant on course with 604 revamp

Nextant Aerospace is progressing with its remanufacture of the popular Bombardier Challenger 604. Most importantly will be an increase of 500nm to the aircraft’s range giving it London-New York capabilities.
 The Nextant Challenger 604XT includes a performance enhancement to the existing airframe and an entirely new cabin design.
 The programme includes a Rockwell Collins Pro Line Fusion flightdeck in place of the legacy Pro Line 4 suite.
 The front half of the cabin is an ultra- modern media room hosting the latest connectivity while the rear features VIP seating with a full-width conference/dining table.
 Certification is expected in mid 2018.

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Falcon 5X hit by new Silvercrest engine blow

Dassault's Falcon 5X is facing new delays following further technical problems with the Safran Silvercrest engine.

Announcing the delay, Dassault chairman, Eric Trappier, said the manufacturer had just been informed of new performance issues by the French engine-maker.

Development problems with the Silvercrest engine had already forced Dassault to delay the entry into service of the 5X to 2020, and the new problem will push that schedule further back.

The Silvercrest's high-pressure compressor features an axial-centrifugal architecture, which is rare for aviation gas turbines in the 10,000-12,000lb-thrust power range. However, it is a common architecture for engines in thrust classes below about 5,000lb.

The Silvercrest was launched nearly a decade ago and eventually secured positions in the 5X and Textron Aviation's Cessna Citation Longitude.

The previous delay announced for the engine coincided with a broader revamp of the

Despite the Silvercrest issue, Dassault continues to develop and test the 5X.



Longitude programme and Textron dropped the Silvercrest in favour of the less-powerful Honeywell HTF7000 turbofan.

Despite the Silvercrest issue, Dassault continues to develop and test the 5X. Since first flight on July 5, the 5X test aircraft has built up 50 hours in flight, with testing focused on basic

handling and systems performance, Trappier said.

Asked if the new technical issue could prompt Dassault to consider another provider, he declined to rule it out. "It's too early to say," he said. "We are trying to fix the problem with Safran."



Glyn Jones (left) and Stephen Grimes: offering a new London base for business aviation.

NEW LONDON OFFERING FOR BUSINESS MARKET

An expanding London airport could become a big name in business aviation for Middle Eastern customers as others, such as London Luton (LTN) and London City (LCY), are squeezed for space.

The airport is London Southend (SEN) on the Thames estuary. The owner, Stobart Aviation, is investing in business aviation facilities with an expansion of its FBO, which opens this month.

"The Stobart Jet Centre will offer guests and pilots a smooth, premium experience because we can offer 24-hour availability and departure routes outside London's crowded airspace," said managing director Stephen Grimes. "We are confident that London Southend Airport will become a refreshing, hassle-free alternative to the capital's current, crowded private aviation terminals.

"It will appeal to sports stars and teams who want to get to London for matches hassle-free, CEOs who have urgent meetings and need the flexibility to fly in any time day or night, and VIPs from the Middle East and Europe, who want to get straight into the heart of the West End."

Stobart Aviation CEO, Glyn Jones, said the

expansion plans were widely supported by the local community. The airport, which has been growing its commercial business, has its own rail station with fast links to the city. It owns an Agusta 109 helicopter for fast transfers into London or key destinations in south-east England, such as Newmarket.

"We have plenty of space for parking and our rates are a fraction of those at other airports around London," Jones said.

Landing and parking a BBJ for 24-hours costs £1,000 (\$1,300) – it is seven times more at Luton, according to the Stobart team.

The airport can handle aircraft to the size of a BBJ or ACJ and has full customs and immigration facilities. "We also have a gate beside the FBO and can get passengers cleared, in a car and out of the airport in just about a minute," Grimes said.

The airport is just a few minutes flying time from space-constrained LCY. "That means VIP operators are able to fly into LCY and then position at Southend until needed back at LCY," Grimes said.

Dubai to live the seven-star Dream

Dubai-based UAS International Trip Support is to provide charter management of the Dream Jet, the Boeing 787 VVIP jet owned by Asian operator Deer Jet.

The jet offers seven-star hospitality services along with the advanced technology that makes it healthier, more comfortable, and more energy-efficient.

Capable of flying non-stop over 16,000 kilometres and for 18.5 hours straight, and accommodating up to 40 passengers, the aircraft has a main lounge, dining area, and guest cabin. It also has an impressive and spacious master bedroom, dressing area, and washroom.



The Dream Jet will be based at the strategic hub of Dubai and UAS will be promoting it to its Middle Eastern and European customer base of ultra-high-net-worth (UHNW) individuals and royal and presidential entourages.

Over the past few months, the Dream Jet has attracted international attention throughout its world tour. UAS has supported Deer Jet and its one-of-a-kind aircraft at exclusive displays and viewings by UHNW individuals and royal family members in several places globally, including Hong Kong, Shanghai, London, Dublin, Seattle, Marrakesh, Doha, Jeddah and Paris.

Omar Hosari, UAS chief executive said: "The Dream Jet is an exquisite aircraft, unlike anything else available on the planet. We have already begun successful charter flights for it in the past few weeks, and are confident that this aircraft will continue to surpass the expectations of even the most demanding clients."



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Turkey joins the rotary club

The TAI-625 is Turkey's first fully indigenous helicopter.

Jon Lake reports on the creation of Turkey's first indigenous helicopter.

First revealed at the IDEF (International Defence Industry Fair) at the Tüyap Istanbul Fair and Congress Centre in May 2017, and subsequently shown in the static display at the Paris Air Show in July, the TAI-625 is Turkey's first fully indigenous helicopter.

More than a simple mock-up, the T625 shown at Paris was largely based on a production-representative fuselage and other fully engineered components.

The Paris appearance was described as being part of a pre-marketing product awareness campaign, but serious work is already under way on the programme, with construction of the first prototype having begun in July 2016.

The T625 is a 12-passenger, 6tonne medium twin helicopter, designed to operate in hot and high environments and adverse weather conditions, and intended to compete with helicopters like the Leonardo AgustaWestland AW139 and the Airbus H175.

The helicopter is an attractive, modern-looking design and is broadly reminiscent of the Airbus H155 and the AW139 in appearance and configuration. It has a conventional but fully retractable undercarriage, with twin nose-wheels and single main undercarriage wheels, and is fitted with a five-bladed main rotor and a conventional four-bladed tail rotor.

The aircraft features a flat cabin floor that can be configured for passenger or VIP transport, emergency

medical services, cargo, offshore transport, and search and rescue missions, and has large sliding cabin doors on each side, with separate outward-opening cockpit doors. It will be equipped with a four-axis dual redundant automatic flight control system.

TAI began the detailed design of the T625 in 2013 under the name Ozgun, after a programme launch in June 2010. The numerical T625 designation was substituted in January 2017 with the initial '6', representing the helicopter's six tonne gross weight, '2' indicating the two engines and '5' the number of main rotor blades.

The T625 programme builds on TAI's successful development of the T129 Atak helicopter, a licence-built and extensively upgraded variant of the AgustaWestland AW129 Mangusta, which incorporates Turkish-developed avionics, self-protection equipment and weapon systems. Some 22 examples from an initial order for 59 units have been delivered to the Turkish army, and one further aircraft has been retained as a test platform.

Negotiations for a second batch of at least 25 helicopters are already under way, and TAI is reportedly in negotiations with Pakistan for an officially undisclosed number of T129s (thought to be 30).

TAI is also producing 109-121 Lockheed Martin/Sikorsky S-70i International Black Hawk helicopters for the Turkish Armed Forces under the Turkish utility helicopter

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CONTINUED FROM PAGE 89

programme (TUHP), a major manufacturing project that promises to give the company invaluable experience in the mass production of advanced rotorcraft.

Development of the T625 was largely driven by domestic requirements, and though there is, as yet, no launch customer for the type, the Turkish Government has reportedly expressed an interest in placing a multi-aircraft order, probably starting with an order for police helicopters for the Jandarma (a branch of the armed forces, reporting to the Ministry of the Interior) and/or for the Turkish National Police, controlled by the General Directorate of Security.

Steady growth

Turkey is also witnessing steady growth in its domestic helicopter market and TAI hopes to sell T625s for parapublic roles, including helicopter emergency medical (HEMS), air ambulance, law enforcement, fire-fighting and rescue, and also for executive and VIP transport. There is also a strong military market, with a pressing need to replace the Turkish armed forces' ageing fleet of Bell Model 205/UH-1Hs.

TAI sees a total domestic market for up to 300 T625s over the next 15 years. It also hopes for healthy export sales, another 400-500 airframes over a 20-25 year period.

The company is further hoping that Ankara's foreign relations might allow it to secure orders in markets that may not be so easy for rivals like Airbus Helicopters and Lockheed Martin/Sikorsky.

The T625 is initially being developed for the civil transport market and the military version will follow about two years after the first flight. That variant will be optimised for troop transport, search and rescue, and casualty evacuation missions.

The first of three flying prototypes is expected

to make its maiden flight in September 2018, with the second following in about March 2019.

The first two prototypes will be representative of the planned civilian version, while the third will represent the military variant. There will also be a number of ground-test aircraft, including a transmission test rig, a structural and fatigue test 'iron bird', and an avionics test rig assigned to Aselsan.

Turkish civil certification is expected in mid-to-late 2020, and European Aviation Safety Agency (EASA) certification will follow.

The T625 will be an almost entirely indigenous Turkish helicopter, although Sikorsky will be a major subcontractor, and Spanish firm CESA will be responsible for hydraulic systems.

Initially the helicopter will be powered by an imported engine, in the shape of the Rolls-Royce Light Helicopter Turbine Engine Co (LHTEC) CTS800-4A (T800) turbine engine, which was chosen for commonality with the T129 attack helicopter. The T625 will be the first commercial helicopter to be powered by the T800 engine.

Powerplant made in Turkey

In time, even the helicopter's powerplant will be made in Turkey, since Tusas Engine Industries (TEI) is already developing an indigenous TS1400 turboshaft engine for the T625 and the T129 under the turboshaft engine development project (TEDP), which was formally launched in February 2017.

The new TEI engine is also intended to power new versions of the TAI Hürku turboprop trainer and light combat aircraft.

Development of the new engine is expected to take 7-10 years, with design accounting for two years and prototype production and testing taking another four-and-a-half.

Until then, all T625s will be built with the LHTEC powerplant, which is expected to give a cruise speed of roughly 150 knots, and an

endurance of about 3.8 hours, with a full fuel load of 2,248lb (1,020kg).

Everything else on the production T625 is expected to be 'made in Turkey', and even the main gearbox and transmission is being developed in-house, with the support of several international consultants.

Testing of the first prototype gearbox, which is being produced by an unnamed outside supplier, will begin later in 2017, but TAI will also manufacture its first two in-house gearboxes this year.

Other Turkish partner companies include engineering and manufacturing firm Alp Aviation, which will be responsible for the production and assembly of the landing gear, and of some gearbox and dynamic components.

Avionics suite

Aselsan, Turkey's biggest defence electronics company, will supply the T625's on-board electronics, including a newly-developed avionics suite. This will feature two large wide-area touchscreen displays (one per pilot) showing flight data and map and engine information on the main panel, with two more touchscreens for flight planning, radios and aircraft system on the centre pedestal. The cockpit is designed to allow VFR and IFR single-pilot operation.

The military version of the T625 would probably be equipped with a variety of Aselsan systems, including the company's active phased-array electronic warfare and countermeasures system.

The T625 is intended to be the first model in what is planned to be a family of indigenous helicopters, spanning the size range from 3.5 tonnes up to 10-12 tonnes. A four-seat training helicopter is expected to be the next model in TAI's new helicopter family, but is unlikely to be launched until T625 development is complete.



The T625 is initially being developed for the civil transport market and the military version will follow about two years after the first flight.

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DOUBLE DCAF

Dubai South-based DC Aviation Al-Futtaim will mark a major increase in its capabilities in the coming weeks as it more than doubles its hangar space and enhances its services for the region's business and executive jet owners and customers. Alan Dron reports.



DC Aviation Al Futtaim's managing director, Holger Ostheimer, is eagerly awaiting the increase in capacity that the company's expansion at Dubai South will bring.

PICTURE: BILLYPIX

Right: The new hangar, due to open by the end of 2017, will more than double the company's under-cover space for aircraft.

By the end of this year, DC Aviation Al-Futtaim (DCAF) should have completed its second hangar at Dubai South (Al Maktoum International) and will be on course to increase substantially its capabilities in the executive jet market.

The new 7,500sqm hangar will more than double the company's capacity, adding to an existing 5,700sqm structure. It will also have an apron area of 13,000sqm and facilities such as a 1,300sqm VVIP lounge.

Once the second hangar is operational, the company will be able to accommodate aircraft up to Boeing 767 size, as well as substantially increasing its maintenance capabilities.

The additional capacity cannot come quickly enough for DCAF's managing director, Holger Ostheimer. "We have our current hangar facility already over-booked by long-term partners. This guarantees existing clients continuing hangar capacity and gives us the opportunity to add more parking capacity. But more than just parking space, we're looking to increase the complexity of the MRO facilities."

The expansion will enable DCAF to add two single-aisle aircraft maintenance bays and provide enough space for an additional workshop and equipment storage.

"We have a strategic partnership with Lufthansa Technik," explained Ostheimer. "It comes with the expertise that goes beyond the Airbus A319 and Boeing Business Jet-

sized aircraft category. Lufthansa Technik can flow from the A319 onwards, plus Boeing aircraft, which is something to which we've never had a great deal of exposure."

A minimum of two Lufthansa Technik personnel will be based at the site and DCAF believes that the German company's reputation will be a major factor in attracting the users of large executive aircraft to its facility for MRO activities.

Earlier this year, the company received CAR145 approval from the UAE aviation regulator, the General Civil Aviation Authority, to provide line maintenance for the Dassault Falcon 7X large-cabin executive jet. An extension to its licence means that it can provide both airframe and avionics services for the French-built tri-jet.

Other types for which DCAF can provide line maintenance include several Bombardier types, including the Global Express and Challenger 604/605, and other executive aircraft ranging in size from the Cessna Citation XLS+ to the Airbus A320 family, "which is where our

competence ends and where [Lufthansa Technik's] competence starts", said Ostheimer.

"We will be able to serve the market from the UAE, but particularly the Saudi market. That's a Boeing-rich market."

DCAF is a joint venture between Germany's DC Aviation, which emerged in 2007 from the former DaimlerChrysler Aviation and is now the country's

largest business jet operator, and Al Futtaim, a Dubai-based business conglomerate with more than 100 companies under its wing.

It lays claim to being the first fully-integrated business aviation facility at Al Maktoum International and says its position just off Al Maktoum International's runway and close to the airside security boundary makes it a particularly convenient location for executive passengers wishing to get on their way swiftly – either when departing or arriving.

In July, it began offering fuel services to its executive and business jet users alongside its other services of aircraft management, maintenance, FBO and ground-handling services, as well as business jet charter.

The group as a whole manages 28 aircraft, six of which are under the company's management, some on the UAE register, others on offshore registries.

DCAF broke ground on its new hangar in October last year and hopes to hold an official opening ceremony for its new facilities at this year's Dubai International Air Show.



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A Challenger 605 has joined the Lebanese operator's fleet.



LOUNGING IN PEACE

As peace and stability increases in Lebanon, the country is seeing a steady climb in business and tourism. Sky Lounge Services is reaping the benefit, as Marcelle Nethersole found out when she spoke to sales manager, Nour Oueida.

Business and private aviation in the Middle East has been a huge success story in recent years, with many Gulf countries beginning to dominate the market.

One Arab country fast becoming a business aviation hub is Lebanon, and private and business aviation services company, Sky Lounge Services, is growing rapidly due to customer demand.

Based at Rafic Hariri International Airport (RHIA) in the General Aviation Terminal, the licensed Lebanese air operation company only launched services in April 2016 but already it has added a new jet.

"We started out managing three private aircraft – a Global Express, a Falcon 2000, and Falcon 2000LX – as well as chartering a Hawker 400XP," explained sales manager, Nour Oueida.

"Because of the increase in market share and overload of flight bookings, we had to expand the AOC fleet to be able to match our clients' growing requests. Consequently, we recently acquired a newly refurbished Challenger 605, which started operating in August 2017."

The company sells, operates and manages aircraft – and it is soon adding ground-handling services to its fixed-base operations (FBO) profile.

Attention to detail

"We provide personalised FBO and handling services that typify professional attention to detail," said Oueida.

"Our customers include people from the political, business and family spheres. We fly to any destination in the Middle East, Europe and Africa, and are able to answer the demands of any business or lifestyle."

Oueida said Lebanon is seeing increasing business aviation as the country becomes more stable.

"Following the significant growth of flying hours and air traffic in the Gulf region, Lebanon is finally emerging into that wave and rising above the shocks of the political turmoil in the wider region and the remains of the global economic crisis," explained Oueida.

"This increase in peace is attracting more trade, business

and tourism to the country, and, as we can see, the industry is, indeed, spreading out in the region and the trending market is expanding.

"According to new figures released by Bombardier's market forecast, the Middle East is set to be the fastest-developing region for business aviation in the world, with an estimated 7% fleet growth by 2030."

Oueida is keen to point out that Sky Lounge Services is successful due to its attention to safety, reliability, and customer management.

"We have high safety standards and our winning point is client reliance," said Oueida. "Clients trust that we will always find an aircraft for them at any time and anywhere, and at the best price. And, from an operations point of view, we are definitely the fastest and most accurate and effective with flight scheduling, to get all the permits done on a timely manner, to process clearances, and to secure slots.

"We are still expanding our network with foreign operators to ensure we get priority notification on aircraft availability and special quotations for our clients."

As well as the new aircraft, the company is trying to build "stronger client relations" by working on a loyalty programme.

Oueida said: "The loyalty programme will ensure better quotations for our frequent flyers and loyal customers. We are also working on making the private aviation industry in the region more accessible. Although, in general, private aviation inspires pictures of luxury and wealth, we want the image to be seen as more friendly and closer to home by the public – a means of transportation that can be accessible at a point.

"We are still in the study phase of the project and how we can introduce it, given the demographic characteristics of our target customers."

The company is also in the negotiation process and contract phase with several owners willing to put additional aircraft under its management.

"These additional aircraft might soon be available for charter," said Oueida. "With all these things happening, it is a very exciting time for us, not just in the business aviation market, but also in Lebanon."

"Lebanon is finally emerging into that wave and rising above the shocks of the political turmoil in the wider region and the remains of the global economic crisis."

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IS THERE A REAL CASE FOR AN INTERNATIONAL AIRPORT AT AJMAN?

A new international airport will serve the emirate of Ajman in the UAE from 2019. Keith Mwanalushi discusses the business case for the new gateway with John Grant, senior analyst at air travel intelligence specialist, OAG.

Ajman International Airport is a planned construction project for the smallest of the UAE's seven emirates.

Back in 2007, the Government of Ajman granted the White Lake Consortium the sole concession to design, build and operate the airport.

The first phase of the project will reportedly consist of terminal buildings for arrivals and departures, runways, a cargo complex, aviation school, maintenance workshops, free zone and a commercial area. The plan is to have a capacity of one million passengers a year rising to 10.4 million passengers by 2046.

New airport developments are frequently expensive, aspirational and linked to national ambition. With few exceptions, they are also difficult to develop, compete against established operations and, sadly, often fail to deliver against the initial business plans. Against such backdrop, the planned Ajman International Airport development would appear to face numerous challenges in the coming years.

Ajman is just 12 kilometres from Sharjah Airport, the major base for Air Arabia and from where some 19 airlines will operate more than 35,500 scheduled flights in 2017. And, of course, the current Dubai International Airport is a

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further 15 kilometres away with its giant hub operation, with some 81 scheduled passenger airlines and 199,000 scheduled flights this year.

In global mega hubs such as New York, London, Los Angeles, Paris and Chicago, cases for additional capacity have been based on expansion at existing airports rather than a new competing airport facility. So, it begs an honest question, is there really a business case for Ajman International Airport and, if yes, then how can the chances of success be maximised?

White Lake Consortium did not respond when asked for an interview but John Grant, senior analyst at air travel intelligence company, OAG, weighed in on the key issues.

“Firstly, the proposed new airport needs to be placed in context,” he said, pointing out that an initial development capable of supporting a million passengers per annum represented a small fraction of the existing passenger throughput at neighbouring Dubai International and Sharjah (96 million).

“Assuming a modest level of growth when the new Ajman Airport opens in 2019 – that demand will be closer to 105 million – so capturing less than a 1% share of the market over time isn’t, perhaps, that challenging of a task.”

Rationalising the numbers and market share



John Grant: “Capturing less than 1% of the market over time isn’t, perhaps, that challenging of a task.”

seems easy but securing the necessary traffic at a new airport can be totally different matter.

The plan envisions a modern, state-of-the-art airport to provide increased air transport links across the UAE that will become the home at a new base-carrier airline. The project also extends into the surrounding area to deliver an infrastructure that supports the vision for Ajman’s on-going regional development.

Grant believes that, while the masterplan includes the creation of a locally-based airline which, while sensible and easier to factor into the project, it heightens the overall investment risk.

“Any new airline will compete in the low-cost sector, attempting to grab market share from surrounding carriers and airports and, therefore, the network design is likely to replicate the major volume markets currently served by Air Arabia and Flydubai,” he suggested.

Data from OAG shows that the top 10 low-cost markets from both Dubai and Sharjah are likely to include many of the launch destinations for any new airline operating from Ajman.

From a planning and aircraft utilisation perspective, all the largest low-cost-carrier (LCC) markets are within a three-and-a-half-hour sector length, which, with some

Continued on Page 98



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The Ajman airport plan.

CONTINUED FROM PAGE 97

judicious planning, should allow for high productivity on each aircraft.

For a new, locally based airline with an initial fleet of three or four single-aisle, new generation aircraft, with sufficient creativity around product offering and some ability to develop customer loyalty, there is the possibility of building some reasonable volumes.

Each aircraft, operating three round trips a day with typical LCC load factors, would generate the initial objective of one million passengers a year, once fully established.

However, four locally-based passenger aircraft averaging three rotations a day will hardly mark the newly laid asphalt, so Grant feels securing other services will be crucial.

“Certainly, generating new services from overseas carriers will be challenging. The inbound market attraction appears limited and, while the airport developers suggest that they have received letters of interest from 25 airlines for landing rights, those letters are merely expressions of interest rather than planned schedules and services.”

The opportunity for the new airport appears to centre on the planned move of Emirates to the Al Maktoum International Airport, which will occur before 2025. “If the current Dubai airport (DXB) ceases operation at that time, then inbound airlines will face a choice of relocating to Al Maktoum, Sharjah or, perhaps, Ajman International,” said Grant. “For most airlines currently operating to Dubai International, moving to the new Al Maktoum Airport will be an inevitable development. Once Emirates

LOW-COST AIRLINE CAPACITY FROM DUBAI AND SHARJAH, SUMMER 2017

From Dubai	Scheduled LCC Capacity Summer 2017	From Sharjah	Scheduled LCC Capacity Summer 2017
Kuwait	296,718	Trivandrum	132,516
Jeddah	220,552	Kozhikode	121,644
Muscat	222,729	Kochi	118,854
Delhi	225,525	Muscat	117,096
Riyadh	205,732	Damman	114,744
Bahrain	196,686	Mumbai	113,088
Mumbai	186,465	Dhaka	111,720
Kochi	157,224	Kuwait	109,368
Karachi	154,845	Karachi	109,368
Kozhikode	135,636	Kathmandu	103,152

Source: OAG Schedules Analyser, 16th August 2017, One-Way Seats

moves, everyone will follow. But there is a small cluster of airlines that may provide an opportunity for Ajman.”

OAG data also indicates there are currently 25 overseas airlines that operate to both Dubai International and Abu Dhabi Airports. Of those 25, eight already operate to both Dubai and Sharjah, although in all cases with a much-reduced programme from Sharjah. Those eight carriers may represent an opportunity for services to the new airport at Ajman, since they have already been managing a two-airport approach to the local market, although they would certainly require considerable incentives to support such a move.

Grant suggested, perhaps the larger market opportunity for the airport lies in the cargo sector, which certainly has greater flexibility in terms of airport usage, but equally, requires a specialist infrastructure and operating platform to succeed. Cargo demand frequently reflects global economic trade and confidence levels and,

in recent years, has been inconsistent to say the least in its growth rates.

The latest forecast from Airbus suggests that market sentiment is currently positive and that the cargo market is expected to double in the next 20 years in line with global trade.

For Ajman, the cargo market represents a key opportunity given the demand for high-value perishables and other consumer products that are imported into the region. “With a link to the local free trade zone, securing 70% of the airport’s commercial activity from cargo-related businesses is possible,” Grant believed.

With less than 18 months until the planned opening of the new airport, the clock is ticking faster as each day passes. “Airlines, freight forwarders and the wider supply chains associated with airports, will start looking forward towards 2019 in the next few months, by which time, Ajman International needs to have built a very credible story for presentation to the industry. While development and planning continues, the current absence of any marketing material or awareness-building activity is something that needs to be addressed very quickly,” Grant advised.

There are clearly lots of ‘ifs’ around the potential development of the new airport at Ajman—and some factors appear to be very changeable with others outside of direct control. There is a scenario whereby a new, small airport with a focus on cargo and some LCC passenger operations could be developed... but the key question for the investors is at what price and with what return?

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Dubai Airports has implemented an automated planning solution.



Growing with the flow

Software solutions for airport planning and operations are becoming more effective.

Keith Mwanalushi looks at how they can be used to improve passenger flow, particularly at busy Middle East hubs.

The International Air Transport Association (IATA) has indicated that the Middle East region will see an extra 244 million passengers a year on routes to, from and within the region by 2035. The UAE, Qatar and Saudi Arabia are leading the way.

Managing this growth, as well as the capacity constraints associated with it, requires the ability to make the right decisions at the right time to keep things moving.

“This relies on having the right, integrated systems to provide airport management with all the information they need to make informed decisions,” said Jihad Boueri, vice president – airports, Middle East, India and Africa at information technology specialist SITA.

He added that this included information from the various stakeholders that play a role in the operation of an airport, including the airlines and control authorities.

The ability to plan ahead is obviously vital for any airport to ensure smooth, proactive operations. “This is particularly important at the bigger transfer hub airports in the region, such as Dubai, Doha and Abu Dhabi, where the complexity is far greater,” Boueri said.

SITA has a suite of integrated software

applications designed to support and enhance airport planning and operations from landside to airside, from landing to take-off, according to Boueri. “It allows management to have a full view of what is happening in the airport at any time and makes it possible to proactively manage changes within the airport operation.”

Ensuring cost-effective and fit-for-purpose infrastructure is critical to the success of any airport. In June 2017, Quintiq – developer of planning, scheduling and supply chain optimisation software – announced it had been selected by Dubai Airports to plan and schedule its fixed resources at Dubai International Airport (DXB) and Dubai World Central (DWC).

Frank McCrorie, SVP operations at Dubai Airports, affirmed that Quintiq would enable the airport operator to maximise utilisation of current fixed resources and prepare for future expansions. “We aim to deliver a world-class experience to the airlines that use our airports and the passengers that they carry,” he said.

The intention is for the Quintiq solution to automate the planning process for airport stands, gates, baggage belts and check-in counters, to increase overall efficiency, reliability and

Continued
on Page 102

CONTINUED FROM PAGE 101

passenger satisfaction. The solution has been live at (DXB) for several months now.

At DXB, managing these fixed resources efficiently is crucial. From its 260 airport stands, 143 gates, 561 check-in counters and 28 baggage belts, airport planners will need have full visibility of resource allocation. They adapt this allocation to fit specific airline preferences and further streamline passenger flow.

Abu Dhabi Airports engaged SITA for the provision of airport management solutions for the on-going Midfield Terminal Building (MTB) project. When complete, the MTB, along with the existing terminals at Abu Dhabi International Airport (AUH), will serve the increasing number of passengers who fly through the UAE.

SITA is providing a range of fully integrated airport systems, as well as key passenger and baggage-processing infrastructure, to the Midfield Terminal. "This includes our airport management solution, which will allow Abu Dhabi Airports to proactively manage the operation of AUH by providing real-time information across all facilities," said Boueri.

He stated the solution integrates collaborative processes, enabling end-to-end management of airport resources in real time and proactive control of day-to-day operations. "These systems are key to the operation of the new terminal and our teams are working closely with the Abu Dhabi Airports to ensure we meet the requirements and deadlines of the new terminal."

Two years later

However, local reports have indicated that the MTB project is running two years later than the anticipated 2017 opening, with sources close to the project saying problems relating to the design and execution of the roof have caused the delay.

One of MTB's most impressive features from an architectural and engineering perspective is its central processor, the area at the heart of the building. The supporting structure for the roof of this central space consists of 18 inclined arches of varying heights, which gives the impression that the roof structure is floating above them. This complex roof design features the world's longest indoor arch spanning 180 metres. It is 52 metres at its highest point, with a weight of around 1,000 tonnes. The whole roof weighs around 20,000 tonnes.

Boueri said the IT solutions provider is currently engaged in testing interfaces and systems in collaboration with other sub-contractors. "However, delays on the overall Midfield Terminal project has had a downstream impact on all sub-contractors including SITA," he added.

Back in Dubai, improved passenger flow means that the two airports [DXB and DWC] can now handle increasing traffic without sacrificing passenger experience. Quintiq was



"Our airport management solution will allow Abu Dhabi Airports to proactively manage the operation of AUH by providing real-time information across all facilities."

JIHAD BOUERI

the clear choice, according to Abdul Razzak Mikati, managing director at Dubai Airports' implementation partner, Dubai Technology Partners (DTP). He said: "The cost of investing in new infrastructure can be prohibitively high. The customer needed a future-ready, industry-proven solution to efficiently manage the capacity of its current airport resources. With Quintiq, the need for manual planning has been eliminated, resulting in enhanced flexibility and agility of operations."

DTP has prioritised its target segments as airlines, ground-handlers and airports.

The Quintiq solution is able to handle calculations for 40 flights per second and take advantage of information from multiple sources to improve its automation process. These capabilities are crucial, especially when considering the rising passenger traffic at DXB, which surpassed 43 million in the first half of 2017 – up 6.3% compared to the corresponding period in 2016.

Passenger numbers at DWC have also seen an upward trend, growing by more than 35% in the first half of the year, according to Dubai Airports.

With more passengers to process, airports at their worst can be a stressful and frustrating place when things go wrong. With that in mind, disruption management becomes a key element of any planning solution.

The permutations for any kind of disruption are considerable. Bad weather, industrial action, IT outages, unexpected technical faults or staff sickness can hit at any time. Delays involving another airline or airport disruption may also result in the crew running out of legal work-time and overly complex notice to airmen (NOTAMs), which are not fully digested, leading pilots to miss potentially important information. The list is long and the consequences problematic.

SITA is already supporting this element through what it calls 'control bridge', which seamlessly integrates the command and control capability of an airport across multiple traditionally standalone functions – airport operations, physical security, engineering and facilities management, baggage-handling, emergency response, airport IT service desk – to create a single integrated airport control centre.

In May this year, DTP launched a new flight performance monitoring (FPM) solution at the annual Airport Show in Dubai.

Real-time data

The system provides real-time data and an holistic view of airport operations and flight-related processes.

Coupled with forecasting and decision-support tools, the new platform allows airlines and airports to minimise and possibly eliminate some potential delays. The resulting improved on-time performance (OTP) should allow airlines and airports to significantly reduce costs, while increasing customer satisfaction.

"One of the most critical challenges facing airlines and airports, not only in the region but also across the world, is meeting OTP," declared Mikati. He said airlines had a choice when managing turnarounds: "They can continue to be reactive and tackle issues as they arise, or they can direct those efforts and resources to prevention and mitigation to ensure a smooth turnaround process."

It's fair to say that, generally, airlines and airports are focusing their efforts on disruption management to improve recovery, in particular resolving the impact of disruption on passengers. Key to this is to better predict what could affect the airport operation in 12 or 24 hours and, therefore, better plan for those possible scenarios.

A small number of airports are already using predictive technology to minimise disruptions – an area SITA is exploring and further developing.

By 2019, SITA estimates that almost 50% of the world's airports expect to be using integrated systems to predict potential disruptions and their impact before they occur, while four out of 10 airports are looking to implement automated predictive alerts before flight disruption events.

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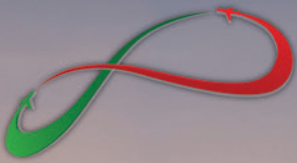
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Fleet replacement for around 25 A380s could be an orders boost – but as it showed two years ago the superjumbo is as impressive as its escorts, the UAE's Al Fursan display team.



The Dubai Air Show is the third largest business-to-business aerospace event in the world and is the showcase for the Middle East and North Africa's industry. This year's event promises to have all the fun of the fair. Alan Peaford reports.

DEAL OR NO DEAL?

Orders have been the cornerstone of the Dubai Air Show since the UAE began taking aviation seriously.

The explosive growth of airlines such as Emirates, Etihad, Flydubai and Air Arabia has seen the major airframers in attendance with the gold pens ready to formalise contracts for new aircraft to add to their already large fleets.

Indeed, Dubai holds the record for the largest ever order book taken at a single show. In 2013, the order book exceeded \$200 billion (\$206.1 billion to be exact), in a show that reflects the growing importance of the MENA region as the world's aviation hub.

Despite arguing for some time that orders do not determine a show's success, much of the value is the work that goes on behind the scenes in the rows of hospitality chalets housing the world's top companies.

Airbus will be there in force as it goes head-to-head with Boeing to meet the latest of the Emirates requirements, although Emirates itself has refused to confirm it will attend the show with its cheque book in hand.

The airline's CEO, Sir Tim Clark, has

said an order for more Superjumbo A380s is under consideration, particularly to help replace 25 A380s due to be retired in the mid-2020s, but he is not sure that it will happen at the show.

"Airbus would love us to do that but we've got a few things to sort out first so I'm not sure that we'll get there for the show," he said.

The airline is separately looking at the Airbus A350 and Boeing's 787 to meet its needs in the 250-300 seat market. But, again, Clark says the order is "off the table" for now.



Airbus' sales chief John Leahy: ready to wave goodbye after one last push to Emirates.

Clark said Emirates' procurement and operational groups were engaging with both manufacturers about potential orders, having cancelled an order for 70 A350s back in 2014.

"I don't want to focus on the Dubai Air Show," he said in an interview with *Reuters*. "The important thing is to get the right deal for the company at the time that suits us, not driven by a guillotine of the middle of November."

The manufacturers will be poised just in case.

Airbus' chief salesman, John Leahy, who has clocked up aircraft sales of more than a trillion dollars in his two decades with the French manufacturer, has confirmed he will be attending the show among rumours that he will be announcing his retirement.

Industry analysts are suggesting he wants one more crack at a big deal.

"He's anxious that we should order a squillion A380s before he goes, so that he'll go out with a fanfare of trumpets or whatever," Clark joked in an interview with *Reuters* in Asia. "But he's been telling me for the last four years that he'll retire in the next year, so I'll believe it when I see it."

There's no business like Show Business

The award-winning *Arabian Aerospace 'Show Business'* daily publication will be available free during this year's Dubai Airshow.

With the largest editorial team of the publications at the event, and with extensive knowledge of the region's aerospace and defence markets, it will be bringing news and analysis from the event both on paper and online. Electronic copies of the daily will be sent each evening to a 30,000 strong database and news will be updated on the website www.arabianaerospace.aero

"We are looking forward to hearing from exhibitors with news of their new products and services as well as deals they are doing at the show," said online news editor Ella Nethersole.



NOW IT'S A SHOW WITH REAL SECTOR APPEAL...

Regular show-goer **Alan Peaford** looks at what is in store for the 2017 edition.

Michele van Akelijen, show organiser F&E's, managing director, has promised more than 160 aircraft for the static display and over 1,200 exhibitors inside the halls – an indication that the show's importance as a networking experience and a showcase is far more valid than concerns over orders.

F&E's parent company, Tarsus, reported to investors that it was expecting an 8% growth from the show this year.

It has developed into much more than just an air show. The new features taking place at the event this year include new sector-specific pavilions.

The space pavilion, UAV summit, cargo zone and the return of Airport Solutions, are set to bring focus to new market sectors, while the Gulf Aviation Training Event (GATE) also returns with a one-day conference.

With the Middle East UAV market growing rapidly – both in terms of the number of UAVs operating in the region and also the increasing investment in manufacturing, it is fitting that Dubai will feature a UAV pavilion and conference in 2017. The UAV summit will include conference sessions with industry-leading experts, a flying display and the UAV exhibition zone.



The introduction of the cargo zone comes at a time when Al Maktoum International Airport now hosts the world's largest freight operations, boosting Dubai's claim to transform into a key regional hub with a capacity to handle more than 12 million tonnes of cargo annually.

Airport Solutions Dubai, part of the Airport Solutions Global Series, will also feature, bringing together the entire airports and aviation buying chain from manufacturers, airport operators, developers, regulators and investors, through to end-users.

Featuring a two-day programme, the conference will offer leading airport developers and suppliers the exclusive opportunity to interface with airports and

aviation leaders on the demand side of the growth equation.

"The Dubai Air Show has always been at the forefront of the aerospace industry," said van Akelijen. "It represents all sectors of the industry and, with recent advances in technology and capabilities in many sectors, it was the right time to make these focus points at the show. The response we have received has demonstrated that the market clearly has a need for these, and we are expecting all of our new features to be extremely busy."

The show is also focusing on the future, particularly for the burgeoning aerospace industry in the Gulf.



"Following the success of Futures Day at previous Dubai Air Shows, this initiative will be back again as we help build the next generation of aviation professionals," van Akelijen said. "Cadets and students from colleges, universities and academies will visit the last day of the show to interact with exhibitors and learn about opportunities in the aerospace industry. Students will hear about, touch and see the latest technologies, with the aim of inspiring young Emiratis to join the aerospace industry in the future."

One model on display that will excite aspiring partners will be the Phenom 100, manufactured by Brazil's Embraer.

Designed as a light business jet, the aircraft has been bought by both Emirates and Etihad training academies to use as a jet trainer.

Embraer sees the Dubai show as an important part of its international sales push.

With more than 50 aircraft in action in the region, it will be showing a Legacy 650 and a Legacy 500.

The 'large jet' 650 has three distinct cabin zones, the largest cabin in its class and the largest baggage compartment in all of business aviation. Like its bigger sibling, the Lineage, it is popular with the region's VIPs.

But it is the smaller, midsize, model, the

Legacy 500, which is interesting. Traditionally the market has favoured larger aircraft but, according to Ali Alnaqbi, the founding chairman of the Middle East Business Aviation Association (MEBAA), there are now greater opportunities in the midsize segment and below.

The Legacy 500 will demonstrate that potential opportunity, especially to the growing charter markets.

"As the world's fastest, longest-range midsize jet – and the only aircraft in its class to feature full fly-by-wire technology – this state-of-the-art aircraft combines next-generation avionics and ground-breaking design to deliver the most advanced business jet of its kind," said Embraer spokesman Guy Douglas.

"You can add that it has the largest-in-class stand-up cabin, best cabin pressurisation, unrivalled amenities and class-leading stowage capacity.

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While there are many newcomers to the show this year, one that really stands out is Japan.

With some 250 official delegations attending, the UAE's own defence force will not be alone in examining the debutant from Japan.

Japan's Air Self-Defense Force is sending its new C-2 long-range heavy-lift military cargo aircraft, built by Kawasaki Heavy Industries, overseas for the first time to show it off to potential buyers in the Middle East.

"A number of nations have shown interest in the C-2 and we want to show off our advanced technology," explained Japan's Defense Minister, Itsunori Onodera.

A C-2 sale would secure Japan its first major overseas arms contract.

The C-2 represents a major logistical upgrade on Japan's older C-1 transports. It can lift nearly four times as much and fly six times as far.

Michele van Akelijen: Show extras reflect advances in technology and capabilities in many sectors. And the static display could involve 160 aircraft.

"Following the success of Futures Day at previous Dubai Air Shows, this initiative will be back again as we help build the next generation of aviation professionals." MICHELE VAN AKELIJEN

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EXPERIENCE ADDED VALUE



New and familiar companies will be travelling from all over the world to exhibit at the Dubai Air Show and one-fifth of those will be from the Americas, with the USA having its biggest platform to date. Marcelle Nethersole reports.

A show of strength from the US

The Dubai Air Show has always been an important event in the aviation calendar, with companies from around the world making sure they attend to demonstrate their capabilities in the booming aviation region of the Middle East.

This also includes local companies such as Jetex Flight Support, which has been appointed, for the second time, as the official handler for the show.

Jetex will provide full FBO and ground-handling services for all private, military and commercial flights, operating from its facilities located at the Aviation District in DWC.

“With more than 160 aircraft expected for the static display and 1,200 exhibitors at the event, it was imperative we worked with a handler that could facilitate large numbers in a tight time schedule,” explained Michele van Akelijen, managing director of the event organiser Tarsus F&E LLC Middle East.

Expert team

Adel Mardini, CEO and president of Jetex added: “Our expert team of ground-handlers and customer service professionals is dedicated to ensuring best-in-class FBO and allied services for our valued clients, exhibitors and show attendees.”

Van Akelijen added that this year’s show also includes new exhibitors, further proving the importance of the region in terms of aviation.

“Seeing the geographical representations of this year’s exhibitors, both new and returning, travelling to Dubai to be part of the show demonstrates that it really is the place for the industry to do business,” he said.

New exhibitors this year include Lubair Aviation from Hong Kong, Taurus Systems from South Korea, Vector Aerospace from Canada, Bertin Technologies from France and TBS from Bulgaria, plus plenty of new representatives from across the Middle East.

UK company FliteTrak will present its ViatorAero system for ‘intelligent’ airline seating at the show.

“ViatorAero is aviation’s first working technology for the monitoring of individual seats by aircrew for temperature, passenger



Dubai ruler, Sheikh Mohammed bin Rashid Al Maktoum, finds plenty to inspect at the US pavilion at the last Dubai show.

movement, seatbelt closure and mobile phone activation,” said joint managing director Trevor Lea. “Its predictive maintenance capabilities also flag up faults and deadlines for maintenance, repair and replacement. It has already gained serious interest since its launch and we hope this will continue in Dubai.”

However, the largest contingent of companies will come from the United States – with more than 80 in attendance from across 25 states.

Global trend

Its centrepiece is the USA Partnership Pavilion, organised by Kallman Worldwide.

President and CEO, Tom Kallman, said the large presence reflects a global trend.

“Now, more than ever, success in international trade depends on partnership and teamwork,” said Kallman. “Well into our third decade of organising US exhibitors at trade events throughout the MENA region, the new USA Partnership Pavilion sharpens our focus on helping advance America’s national interests and security by building stronger relationships with our international customers. Many of our exhibitors already have significant business partnerships and operations in the MENA region.”

Companies exhibiting in the pavilion include Gladiator Technologies, which will introduce its new SX Series family of next generation LandMark miniaturised sensor-

based monitoring systems (MEMS) inertial solutions. These inertial measurement units (IMUs) offer ultra low-noise sensors and high-speed electronics in environmentally rugged packages for demanding aerospace, defence and industrial applications.

The Marvin Group will be demonstrating its configurable AME repair depot (CARD), a solution optimising F-16 mission readiness.

Extend tool life

And Hangsterfers will also be at the US pavilion with its use of advanced metalworking fluids that have been proven to increase surface quality and extend tool life.

Kallman also confirmed that the pavilion would be a full-service business destination.

“It’s an efficient location for buyers to meet more US suppliers, an on-site operations centre for American exhibitors to maximise their exposure and impact at the show, and a forum for all to share ideas and insights and/or by recruiting overseas partners to establish or participate in US-based operations,” he said.

“Notably, the states of Missouri, North Carolina and Washington, through their individual state departments of economic development and commerce, will organise state-based co-exhibitors on their own stands within the larger USA pavilion space.”



Tom Kallman: developing international partnerships in the MENA region.



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SPACE SECTOR IS FULL

Space exploration is a UAE priority, and the Show features a space pavilion for the first time. Steve Nichols reports.

The space pavilion has been developed to support the UAE Government's strategic objectives of building the region's space sector.

Exhibitors include Russia's Roscosmos, Reshetnev, Khrunichev Space Research Production Space Centre, Korolev Rocket and Space Corporation (Energia) and Russian Space Systems; Spain's Aistech and the USA's Orbital ATK.

The pavilion echoes the UAE's current interest in space, spearheaded by its 2020 'Hope' mission to Mars. Visitors will be able to find out more about Hope, which will launch in July 2020 and arrive at the Red Planet seven months later, in time for celebrations that will mark the 50th anniversary of the UAE's foundation.

Once in orbit, Hope, which was named after a public campaign, will explore the Martian atmosphere using scientific

instruments that include visible, infrared and ultraviolet spectrometers.

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

His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai, said: "An Arab official once asked me about the target the UAE wanted to achieve from launching the first Arab probe to Mars. I told him, 'We want to send a message of hope to 350 million Arabs that we are capable of reclaiming our future'."

Visitors can also find out more about the UAE's KhalifaSat Earth-observation satellite, which is due to launch in 2018. KhalifaSat will better the resolution of the UAE's DubaiSat predecessors, thanks to



Hope for the future: key theme for UAE space interests.



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OF HOPE

developments in imaging sensors and optics. KhalifaSat and Hope have a smaller sibling that is currently bringing space-based data right into Emirati classrooms.

A tiny CubeSat called Nayif-1, which means “one that soars high above”, was launched in February 2016. More than 250 ground stations around the world have provided telemetry to the Nayif Data Warehouse, which lets students perform scientific studies using the satellite’s data.

The new space pavilion has been developed in collaboration with the UAE Space Agency and is supported by industry leaders Orbital ATK and the Boeing Company.

It will also host a space conference on November 13 and 14. The two-day programme will feature sessions on Mars exploration, the UAE national space programme, space technology, space mining and global trends. It will also look at the legal and regulatory mechanisms for space under international aviation law and its relationship with air traffic management.



Colonel Al Worden, command module pilot of Apollo 15, will be a special US guest at the show.

THERE'S A STAR MAN WAITING IN THE WINGS

Visitors to the show will have an opportunity to meet face-to-face with Apollo 15 command module pilot (CMP) Colonel Al Worden, one of only 24 men who have flown to the Moon and back.

Worden is expected to attend the show in association with Kallman Worldwide on behalf of US exhibitors.

In 1971, Worden’s NASA mission had a scientific assignment to study the Moon’s geology. It was the first of the Apollo flights to carry a Lunar Rover, which gave the crew more surface mobility.

As CMP, Worden was the first human to carry out a deep space extravehicular activity (EVA) ‘spacewalk’.

Worden’s visit to the show includes planned appearances at the opening ceremony and ribbon cutting for the USA Partnership Pavilion and the opening of the new space pavilion. He will also participate in the show’s space conference and a reception in the USA Partnership Pavilion, where he will sign copies of his best-selling book, *Falling to Earth*.

Among the topics he will address will be the anticipated UAE Space Agency’s Hope mission to Mars, the global demand for qualified engineers – particularly in aerospace – and the importance of science, technology, engineering and mathematics (STEM) education as a foundation for all exploration.

“Forty-six years since my flight to the moon, I’m proud to attend my first Dubai Air Show as an advocate for space exploration and an ambassador for STEM education,” said Worden. “STEM’s universal language and shared values connect us all, nation-to-nation, generation-to-generation.”

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AIME-MRO Middle East is scheduled to take place in Dubai in January.

Marcelle Nethersole talked to some of the key companies attending.

Maintaining a high profile

MRO Middle East, organised by *Aviation Week*, will take place on January 23-24 at Dubai World Trade Centre.

Co-located with Aircraft Interiors Middle East (AIME), which is organised by F&E Aerospace, MRO Middle East's specific focus on commercial aircraft maintenance, repair and overhaul issues guarantees a tremendous business and networking opportunity.

It is the first major aviation event to take place in 2018 and, already, the organisers are predicting it will be bigger than this year.

One man looking forward to the event is new Joramco CEO Jeff Wilkinson, who 'hit the ground running' when he took over his new role in September.

Joramco is an Amman-based MRO and the engineering arm of Dubai Aerospace Enterprise (DAE).

"As an independent third-party MRO, we have great capabilities as well as a huge opportunity," said Wilkinson. "There is potential to grow this business significantly with different aircraft types and different back-shop capabilities."

Extending the customer base

Looking forward, he sees the possibilities for extending the customer base.

"We already have excellent customers signed. At MRO Europe, in October, we signed Swiss and the Lufthansa Group. We are seeing more C-checks coming in and, with Joramco's expertise, we can take this further, which is why we will be at MRO Middle East. It's a very important event for us."

The company has a strong client base in the Middle East. In September, it announced it had added the B737 MAX to its existing capabilities to support its FlyDubai customer.

Wilkinson said he isn't at the company's helm to change things – but rather to "improve them".

"Jordan has a sound base. Like an unpolished diamond, there is a huge opportunity there," he said. "We also need to mention the huge support of DAE, which cannot be underestimated as an 80% shareholder. I expect in six months there will be some really positive signs from Joramco and I am looking forward to being a part of it."



Jordan Airmotive's Mahmoud Basheer, has the CFM-56 in his sights.

Another company at the show will be Jordan Airmotive, an independent MRO.

The company is hoping to widen its customer base in the Middle East and may well be making a major announcement at the event.

"At MRO Dubai we shall be trying to penetrate the Middle East market further and get new leads," said Mahmoud Basheer, deputy chief executive officer. "We have a wide range of customers in the region but need to maintain our contacts, which is why it is important to attend the show."

"I am also hoping that, by February 2018, we will introduce the CM56-5B engine, which powers the Airbus A320 family. We are in the final stages of getting the certification for this engine and, hopefully, by MRO Dubai we will be ready to be certified."

Increase our revenue

Turkish Technic will also have a large presence at the event.

"We will be at MRO Middle East demonstrating our base maintenance services, our landing gear overhaul lease, as well as trying to increase our revenue in the Middle East and open up new home-based stocks to provide more component services for Middle East airlines," explained Orhan Alay, regional sales manager.

"Air Arabia is a very good customer of ours. We provide a component pool for all of its fleet, as well as base maintenance for some of its aircraft. We would like to increase that to the other Middle Eastern airlines."

The company's other Middle Eastern customers include Royal Air Maroc, EgyptAir, and Nile Air.

"We want to sell more to the Middle East region from our base in Istanbul. Attending MRO Dubai, as well as the Dubai Airshow, is very important. Dubai is a hub for aviation so there is no question of not attending," said Alay.

A new addition to the event will also take place a day before MRO Middle East. Airline Engineering & Maintenance: Middle East will run on January 22.

The one-day conference, which recently moved from Abu Dhabi, gathers key stakeholders in the aviation aftermarket to network, explore the landscape, and discuss emerging opportunities in the Middle East.



Turkish Technic's Orhan Alay has extensive offerings for Middle East customers.



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IRAN SHOW TARGETS THE MISSING LINKS

AeroPersia is a new name on the global aviation calendar. The inaugural exhibition, designed to create direct links between Iranian and foreign aviation companies, took place at the Tehran International Permanent Fairgrounds from September 15-18. Shahram Sharif reports.

The aviation and aerospace sector is growing fast in Iran – particularly since the lifting of sanctions following the joint comprehensive plan of action (JCPOA) agreement on the country's nuclear arrangements.

AeroPersia's aim was to establish direct links between domestic and foreign aviation companies and experts, as well as knowledge-based companies. Fittingly, the event launched with the slogan 'Hello Persian Sky'.

The event was backed by Iran's trade promotion organisation in cooperation with the presidential office; the ministry of roads and urban development; the ministry of industry, mining and trade; plus the country's aviation and civil aviation organisations.

The exhibition focused on air transportation, flight safety, airlines, aircraft equipment and services, investment, maintenance, repair and overhaul (MRO) centres, air traffic control management equipment, insurance, helicopters, training, and navigation systems.

It aimed to pave the way for increasing Iranian engagement with 'credible' international companies and to keep the country's aviation industry up-to-date.

Major figures attending the show over the first couple of days included: Mohammad Shariatmadari, Minister of Industry, Mining and Trade; Alaeddin Boroujerdi, chairman of the committee for foreign policy and national security of the Islamic Consultative Assembly of Iran; Sorena Sattari, Iranian vice-president for science and technology and president of the National Elites Foundation; Ali Abedzadeh, the head of Iran's civil aviation organisation; and Rahmatollah Mahabadi, chairman of the board and managing director of Iran Airports Company (IAC).

Export contracts

Shariatmadari said AeroPersia was an important event for Iranian aviation. Although it started mainly as an exhibition it would soon become a marketplace where manufacturers could find export contracts and domestic companies would make foreign contacts, he predicted.

The whole event was important to neighbouring countries, due to similarities of the market, he added.

This was quickly born out when Mahabadi revealed that Russian companies had opened negotiations with different managers at the exhibition. "One

of the Russian firms has asked Iran Airports and Air Navigation Company's flight-check services department about its services," he revealed.

Also, it was announced that the Industrial Development and Renovation Organization (IDRO) of Iran is going to build helicopters certified for civilian use in cooperation with a Russian company.

To boost participation, the Iranian trade promotion organisation had offered a 50% discount for companies taking pavilions, which were rented out in order to encourage knowledge-based organisations to take part in the event.

Domestic companies

However, for the inaugural show, domestic companies outnumbered their international counterparts – possibly due to the fact that the AeroPersia team had only been able to invite companies to attend about three months ahead of the show.

Three individual conferences looking at different areas of ATC management took place in the conference hall and were a favourite part of the event – all boasting maximum attendance.

Representatives of domestic and foreign companies specialised in airlines, air transport, ATC management, ground equipment and related fields all took part in the event, which was sponsored by UFI, the global association of the exhibition industry.

AeroPersia organisers included experienced Iranian aviation managers and pilots including Vali Oveisi, Shahram Rostami and Habib Baghaei, among others.



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The successful Aviation Africa Summit & Exhibition is moving to Cairo in April.

Mohammed Ali Ahli
reports.

Links between Africa and the Middle East are being reinforced through the location of the 2018 Aviation Africa event, which will take place at the Intercontinental Hotel City Stars in Cairo from April 17-18.

Hosted by EgyptAir and under the auspices of the Minister of Civil Aviation, HE Sherif Fathy, the event includes a two-day top-level conference, an exhibition, and a meet-the-buyer programme.

The conference programme is being driven by an advisory board made up of no fewer than 10 airline chief executives, as well as representatives of key sectors such as MRO, cargo operations, airports, safety and business aviation.

“The value of the advisory board has been priceless,” said Alan Peaford, MBE, who will be chairing the conference. “We are really getting into the crucial detail of what is important for the airlines and the whole aviation industry and I think we will be going into some new areas of thinking.

“With involvement in the programme from organisations like the African Airlines Association, the International Air Transport Association (IATA), Airports Council International, and the International Civil Aviation Organization (ICAO), I am confident there will be a line-up of speakers and panellists that will be both impressive and drive the discussions forward.”

Heading the agenda will be security.

Major theme

Minister Fathy backed the need to have the subject as a major theme. “Security – especially cyber security – is one of the biggest threats to aviation. We need to be hearing from world experts about what airlines and airports across Africa and the Middle East should be doing to counter these threats.”

This view was backed by IATA’s regional vice president Middle East and Africa, Muhammed Ali Al Bakri, who said there was a need for the industry and governments to work together to improve security.

“There is an opportunity through the publication of ICAO’s global aviation



Hosting the event: The Intercontinental Hotel City Stars in Cairo.

Security tops the Aviation Africa agenda

security plan – also known as GASeP – to provide a comprehensive framework for governments around the world to improve security measures in line with global standards. But GASeP will only be effective if governments cooperate on capacity building, information sharing, identifying conflict zones and so forth.”

Leading advisor

Former EgyptAir Maintenance and Engineering chairman, Hisham Nasser, who is now recognised as a leading advisor on MRO, will be one of the speakers addressing how the maintenance industry must change. “Security spreads across all areas and disciplines,” he said. “From physical security to the protection of paperwork and records, the industry needs to be focused.”

Speakers will be coming from across Africa, the Middle East and Europe.

Chris Zweigenthal, chief executive of the Airlines Association of Southern Africa, will be leading airlines from the south of the continent. “I enjoyed the event in Rwanda last year and am excited to be participating again,” he said.

Speakers from the main associations, from the African Development Bank, major manufacturers and the innovators of the latest technology developments will also be addressing the conference.

The summit will also be looking into the region’s infrastructure to understand what is needed and how it can be funded; human capital is high on the agenda with building talent, training and education being vital building blocks for North Africa.

There will be new initiatives for airlines to reduce costs in maintenance without affecting safety, while leading MRO providers from the Middle East and Africa will debate the role of independents versus OEMs or airline in-house teams.

“Of course, the old thorny issue of ‘open skies’ will arise, but with several airline panels from legacy flag-carriers to new low-cost-carriers (LCCs), I don’t think there is consensus. We could really get to grips with why it is taking so long... and if it will ever happen,” Peaford said.

Mark Brown, managing director of Times Aerospace, which is the main organiser of the event along with Access Group and Aerocomm, said the exhibition was already at 60% sold with nearly six months to go.

“With 10 airline CEOs as partners on the event, we have been promised great support from those companies to bring along key personnel. The exhibitors are excited and so are we. Having the backing of the minister and the support of the whole EgyptAir Group as our main sponsor has been fantastic. There are government-to-government invitations being sent out and I am convinced we will be seeing a great turnout,” he said.



HE Sherif Fathy: “Security – especially cyber security – is one of the biggest threats to aviation.”

■ **EgyptAir will be offering discounted fares to delegates and exhibitors travelling to the summit. There will also be meet-and-greet at Cairo Airport for the EgyptAir passengers. Further details about the event can be found from mark.brown@aviationafrica.aero or on the website www.aviationafrica.aero**

IATA CALLS ON MENA FOR FOUR-POINT FOCUS

The International Air Transport Association's new regional vice president for the Middle East and Africa outlined the region's key priorities as he opened this year's IATA Middle East and Africa Aviation Day in Jordan.

Members of the Jordanian royal family and government ministers were in Amman to welcome the airline industry's trade body – IATA – to the country in October for the Middle East and Africa Aviation Day.

And IATA's recently appointed regional vice president for the Middle East and Africa did not disappoint as he outlined the four key priorities that must be addressed in order for aviation to deliver maximum economic and social benefits across the MENA region.

Muhammad Ali Al Bakri said that aviation currently supports 2.4 million jobs across the MENA region and contributes \$157.2 billion in GDP.

"Aviation has the power to generate significant prosperity. A safe, secure, efficient and sustainable air transport industry pays huge social and economic dividends," he said. "But, despite the vast benefits enabled by aviation connectivity, the MENA operating environment for airlines remains challenging."

Set to expand

Al Bakri said that passenger demand across MENA is set to expand by 5.7% each year on average over the next 20 years, to become a market of 380 million passengers in 2035. He urged the region's governments to address a number of key challenges, so that aviation was able to support this growth:

Infrastructure Air Traffic Management (ATM) is an issue of pressing concern. "Studies show that the average ATM delay in the Gulf is 29 minutes with the potential to double by 2025. And the diplomatic row in the GCC has further exacerbated the problem," said Al Bakri. "Without an increase in the overall efficiency of the ATM systems in the region through improved airspace design, MENA's world-class hubs will be compromised with gridlock.

"We appreciate the many programmes that are in progress – including the GCC air navigation committee, the Middle East ATM enhancement programme and others

– but we must drive these efforts even harder to achieve a real breakthrough.

"Ultimately, cooperation between states to achieve change is paramount. Regional governments cannot allow their geographical fragmentation and political complexity to get in the way of finding a long-term solution."

Rising taxes and charges were a second issue. A recent proliferation of new charges and taxes in the Middle East has added \$1.6 billion in extra costs in 2015 and 2016. "Excessive taxes and charges affect the ability of aviation to meet demand and impede economic growth," Al Bakri said.

"Governments will earn more revenue in the long-term by promoting aviation through lower taxes, than they will by making a short-sighted cash grab with taxes in an attempt to plug budget deficits. Every dollar that a passenger spends in the region creates jobs and spreads prosperity. And every dollar collected in taxes or charges is an incentive for travellers to go elsewhere."

Security was also highlighted.

"Governments have the ultimate responsibility to keep flying safe and secure. But we are in this together. Consultation on security issues among governments and between governments and industry needs to happen as a matter of course not as an afterthought," said Al Bakri.

"The lack of consultation prior to the recent ban on large personal electronic devices caused airlines and passengers major inconvenience and left many unanswered questions. While we welcome that the ban was replaced by alternative measures, airlines have had to bear the brunt of the cost burden of implementing these new measures."

Urge governments

Al Bakri's fourth point was to urge governments in MENA to adopt IATA's smarter regulation framework to avoid unintended consequences when designing or implementing aviation policies.

"Recently there has been a proliferation of regulations across MENA, such as the new consumer protection regulations in Saudi Arabia, and they have placed an undue burden on aviation's ability to act as a catalyst for economic and social development," he said. "Smarter regulation is the solution to achieve positive policies that support the growth of aviation and ultimately boost social and economic development."



Muhammad Ali Al Bakri: "Despite the vast benefits enabled by aviation connectivity, the MENA operating environment for airlines remains challenging."

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Qatar Airways has had significant input into the design of the A350.



QATAR SET FOR ANOTHER GIANT STRIDE FORWARD

The first Airbus A350-1000, the largest version of the A350 XWB twin-aisle airliner, will be delivered to Qatar Airways by the end of the year. But, asks Alan Dron, how will it fare in the Middle East?

As with the earlier A350-900, Qatar Airways will again be the launch customer for the newest variant of the Airbus A350 XWB.

This is unsurprising, considering the degree of input that Qatar Airways had in developing the A350 design. And, even if the political problems between Doha and other Arab capitals remain unresolved by the end of the year, the country's flag-carrier will doubtless crank up its PR machine to demonstrate it remains at the forefront of modern airliner technology.

Qatar Airways' CEO, Akbar Al Baker, is, of course, a notoriously demanding customer and he has not been slow to walk away from aircraft purchases if they do not meet his standards. The A320neo, with its problematic Pratt & Whitney PW1100G engines, is an obvious example. Qatar

Airways cancelled the first four of the type when the engine issues could not be resolved in time.

Similarly, he has this year walked away from four A350-900s because of late deliveries from Airbus.

Qatar's relationship with the A350 XWB has been problematic from the outset. When the carrier was due to take delivery, as launch customer, of the first A350-900 three years ago, Al Baker postponed the handover for more than a week while last-minute difficulties with the cabin interior were sorted out. And the CEO has complained vociferously that delays in delivering A350s have held up plans to roll out new destinations.

At a press conference in Doha in August, Al Baker said the airline had been reassured by the European manufacturer that the first -1000 would be in the Gulf in 2017: "It is now in the certification process

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and Airbus has assured us that we will receive it late, but we will receive it before the end of the year.” Qatar Airways has 37 -1000s on order.

Whether any more will be delivered before 2018 remains uncertain. Asked if more would be handed over before the turn of the year, Airbus said: “It is our customer’s privilege to confirm the delivery dates of the second aircraft.”

Qatar Airways plans to use the -1000 on routes to Asia, Europe and the US, although it has yet to announce the precise routes on which it will initially be deployed.

Flight-test campaign

As of late August, Airbus had three aircraft engaged in an intensive flight-test campaign, with more than 1,250 hours in the air. Type certification for the A350-1000 is scheduled for Q4 2017.

Middle East customers account for around 35% of the A350-1000 order book. At the time of writing, Qatar Airways had signed for 37, Etihad Airways for 22 and Iran Air for 16, out of a total -1000 order book of 212 aircraft, said Fouad Attar, head of Airbus Commercial, Africa and Middle East. “We also have on-going campaigns for the A350-1000 and A350-900 in the region and we are confident that more orders will come soon.”

Overall, the A350 XWB order book had reached 848, from 45 airlines, by the end of summer 2017.

The A350-1000 is seven metres longer than the A350-900, which allows it to carry around 40 additional passengers compared to its smaller sister. It has a 28tonne greater maximum take-off weight (MTOW) of 308tonnes. And Airbus has

already issued data on a new variant – WV001 – that will have a 311 tonne MTOW, with the same 156,000litre usable fuel capacity as the 308tonne version.

The A350-1000 will compete against Boeing’s 777 and, in future, its 777X range. Given the popularity of the 777 in the Middle East and its established position in many of the region’s fleets, it is likely to be a tough battle.

Airbus is pinning considerable hope on the fact that the A350 XWB is a clean-sheet design, with the -1000 the only completely new-generation design in its size category. In a typical three-class configuration (business, premium economy and economy), it will seat 366 travellers with a long-range capability of around 7,950nm (14,800km).

The A350-1000 will have a larger area devoted to premium cabins, reflecting airlines’ increasing desire to maximise high-yield passengers. As a rough rule of thumb, the profit from one business-class passenger can be the same as 10 economy-class passengers travelling on the cheapest, restricted fares.

The manufacturer also claims that the combination of advanced aerodynamics and other incremental innovations, such as the extended use of carbon fibre, gives it a 25% reduction in operating cost compared to “the current long-range competitor”, namely the 777. However, the forthcoming 777X range will provide considerably better operating costs to airlines than its predecessor.

The sole engine for the A350-1000 will be the most powerful version of Rolls-Royce’s Trent powerplant, the XWB-97. As its designation indicates, it will be capable of producing

97,000lbs of thrust at take-off, compared to 84,000lbs on the smaller A350-900. This makes it the most powerful engine ever developed for an Airbus aircraft.

Although the -97 has many attributes of the -84, it is considerably more than just a ‘tweaked’ version of the smaller engine, says Rolls-Royce. “If you are thinking that this is just an upgraded version of the -84 and so does not require the same amount of development work, testing and proving, then think again,” Simon Burr, Rolls-Royce’s chief operating officer for civil large engines told the company’s customer magazine as the -97 was being developed.

Advanced technologies

“The -97 does, of course, have many attributes that are similar to its sister Trent, but it is also very different in some of the advanced technologies it employs to produce the extra thrust and optimum aircraft performance.

“The Trent XWB-97 will be the highest-thrust engine we have ever certified, using the highest operating temperatures and the most advanced cooling systems we have ever designed in a civil engine. We are working at the leading edge of technology, but that is what you do to produce the world’s most efficient engines.”

The -97 was certified by the European Aviation Safety Agency (EASA) on August 31 this year. Its front fan has the same number of blades and the same diameter (118 inches/300cms) as the -84, but turns around 6% faster. The powerplant’s core has grown to cope with the increased airflow generated by the faster-turning fan.

Additionally, new materials and coatings have

Airbus is pinning considerable hope on the fact that the A350 XWB is a clean-sheet design, with the -1000 the only completely new-generation design in its size category.



Akbar Al Baker:
"We will receive it before the end of the year."

been developed to cope with the higher temperatures produced in the engine.

With these specially tailored Trent XWB powerplants, the A350-1000 will be capable of supporting long-haul routes such as Dubai-Melbourne, as well as for emerging markets such as Shanghai-Boston or Paris-Santiago.

The aircraft features Airbus' new Airspace cabin concept, with nine-abreast seating in economy, as opposed to the 10-abreast that airlines increasingly shoehorn into their aircraft. Airspace aims to maximise features such as shoulder- and leg-room (partly by removing the irritating in-flight entertainment system boxes that used to lurk under many seats), introducing new ambient lighting systems and enlarging overhead bins for luggage.

Cabin noise levels

Other features available on the aircraft will be connectivity for both e-mail and Wi-Fi, while Airbus claims that the A350-1000 will have cabin noise levels eight times lower than previous-generation aircraft.

The aircraft also makes considerable advances in the increasingly important area of environmental acceptability. Airbus claims the A350-1000 produces 25% lower CO₂ emissions and a 40% smaller noise footprint than previous-generation competitors.

Airbus believes that the A350 XWB's common type rating with the smaller A330neo will also prove to be an attraction for airlines seeking to minimise operating costs and having a pool of pilots that can switch between the two types. Attar noted that 86% of A350 customers are also A330 customers or operators.

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ATR props up Iran fleet

ATR is currently turning its turboprops into the backbone of Iran Air's regional fleet as well as enjoying the dividends of its three decades of commitment to Africa and the Middle East. Vincent Chappard reports.

Iran took delivery of its first four ATR 72-600s earlier this year, thus embarking on a new aviation era following the relief of international sanctions.

There's an urgent need to modernise and develop air transport to boost local economies throughout the country and improve regional connectivity, and ATR CEO, Christian Scherer, believes his company has a major part to play.

"By offering a combination of greater accessibility to remote airfields and lower operating costs than any other category of aircraft, turboprops have proved to be fundamental enablers for regional economic growth," he said.

"The whole Middle East region is witnessing growth, even though these countries aren't densely populated. They are investing in air transport development projects. Like other regions, the Middle East is conscious that its economic and social development depends on the expansion of its regional network connectivity."

Earlier in 2017, ATR and Iran Air signed a firm contract for 20 ATR 72-600s (Pratt & Whitney PW127M engines) with options for a further 20.

Deliveries will

extend until the end of 2018.

With a population of more than 80 million and many provinces and small cities, Iran is ready to re-modernise its air transport, which seems to be the best option to enable people to travel as rail and road connections also need to be renewed.

Surveys show that aviation demand in Iran will double over the next 10-15 years. This represents 300-350 new aircraft, including replacements, which count among ATR's priorities.

Iran relies on a strong domestic infrastructure with 60 airports that ATRs are "fully capable of serving" as the ATR 72-600 is ideal for operating in many types of challenging environments, including small airfields, unpaved runways and mountainous regions.

The model will form the core of the Iran Air fleet, while substantially contributing to the expansion and development of the services provided across the country.

"Strengthening the links between all our communities will encourage new business opportunities for everyone," explained former Iran Air CEO, Farhad Parvaresh.

Christian Scherer: "Turboprops have proved to be fundamental enablers for regional economic growth."

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With lighter airframes the ATR offers lowest operating costs in their sector.

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He said every factor had been studied, including technology, fuel burn, efficiency and comfort, in all of the 50-to-100-seaters on the market. “ATR’s came out top in every category.”

Iran is also expected to be the Middle East’s next big tourism destination. The freshly open market will not only develop connectivity domestically but also with neighbouring countries. Parvaresh added that many new routes needed to be studied, while existing ones needed to be developed.

The number of flights serving Tabas, Shahre Kord, Rasht and Noshahr “could easily fill between seven and ten flights” compared to two or three weekly at present.

The carrier plans to use its ATRs to link cities in Azerbaijan, Dubai and Qatar (Doha) as “Iran has close links with many bordering countries”.

Parvaresh is optimistic about the development of tourist routes to, for example, the island of Kish in the Persian Gulf.

Scherer said: “There are historic moments in aviation and this is one of them. We are proud and gratified that our ATR aircraft are providing the solution to Iran’s significant needs in regional connectivity.”

Meanwhile, ATR claims to have the “largest heritage” in Africa (including the Indian Ocean) and the Middle East for short-haul flights, with 120 aircraft in service, 300 routes and more than 30 operators in 25 countries.

According to forecasts, there will be an average annual fleet growth of 4.1% with 300 aircraft deliveries (60 TP50 and 240 TP75) in the next 20 years and 400 potential new routes.

Furthermore, the turboprop fleet in the region will see a 4.1% growth (from 230 in 2015 to 420 in 2035) during the same period.

The manufacturer sees a potential for nearly 2,800 turboprop deliveries worldwide in the next two decades, with 65% of them (1,800 aircraft) creating new routes or reinforcing existing networks.

According to ATR, the turboprop market is flourishing towards the south and east, with China expected to lead a strong growth in the next 20 years. This will reshape the current geographical distribution.

Figures on turboprop activity by region prove this trend: Africa-Middle East, 11%; North America, 12%; Latin America & Caribbean, 13%; Europe & CIS, 24%; Asia Pacific (excluding China), 31% and China 9%.

Today, 200 airlines operate ATRs in 100 countries around the world.

Continuous development

The manufacturer places the continuous development of its aircraft at the core of its business. As well as the new features displayed at the 2017 Paris Air Show, the company is about to receive certification for the new Standard 3 version of its avionics. This will combine a range of standard and optional features, designed to reduce both pilot workload and ease airline operations, ensuring that ATRs remain at the cutting-edge of technology.

The company has gradually established itself as the benchmark for regional airlines all over the world, booking around 75% of all turboprop aircraft sales since 2010, and 35% when compared to all regional aircraft below 90 seats.

Scherer proudly pointed out: “ATR has brought the latest technology to regional aviation during these past years. The ATR-600 features a modern cockpit that is compatible with the evolution in avionics over the next 20 years. It has the widest cabin in this market, offering more comfort than many jets. The aircraft is very quiet and has an unrivalled maintenance and fuel consumption cost in this segment.”

He added: “The ATR is the most modern aircraft in this market segment. We aim at staying the world leader at all levels. We are

always ready to bring on board new technology, upgrade our engines and enhance passenger comfort. From a technological innovation point of view, our main focus is more on reducing maintenance costs.”

The increasing usage of turboprops on regional routes helps to reduce aviation emissions. “With a lighter frame, optimised flight speed and an engine developed for shorter routes, ATR-600 series aircraft offer the lowest fuel consumption and operating costs in their segment,” said Scherer, adding that they were the “greenest solution in the market”.

More than 400 turboprop freighters are expected to be operating by 2035. The demand for these platforms is increasing around the world with a higher demand for express service deliveries. “The rise in demand for cargo services will be triggered by emerging economies. The current freighter fleet is 27 years old on average and requires prompt replacement in different forms,” said Scherer.

The regional aviation market has evolved rapidly during the past decades, from a geographical and technological point of view and a business model perspective. This trend has revealed the potential of secondary and tertiary airports.

ATR forecasts show that demand in emerging countries is expected to grow eight times faster than that of mature economies. “There is a strong potential for the most populated countries to enhance their regional network and link the most remote communities,” believed Scherer.

According to ATR, the regional market remains one of the most buoyant sectors in the commercial aviation market.

The Africa-Middle East region has much potential and December’s Dubai Air Show is yet another “excellent opportunity”.

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The MAX 10 will be capable of carrying up to 230 passengers.



Boeing's official launch of the 737 MAX 10 was the big civil aviation story of this year's Paris Air Show. The aircraft garnered a healthy crop of orders but, asks Alan Dron, will it win fans in the Middle East?

BOEING TO THE MAX?

Design changes to the MAX 10 compared to other members of its family line-up include a 4.31m (170in) longer fuselage compared to the MAX 8 – which already looks like becoming the most popular member of the five-strong range – and a 1.68m (66in) stretch compared to the second-largest model, the MAX 9.

The longer fuselage allows the MAX 10 to carry up to 188 passengers in a typical two-class configuration, or up to 230 passengers in an all-economy layout.

It also has a new, extended landing gear to accommodate the longer fuselage and prevent tail scrapes on rotation for take-off.

Boeing claims that the MAX 10's increased passenger capacity will make it the most profitable single-aisle airliner on the basis of lowest seat-mile costs.

Like the rest of the MAX range, it will be powered by the CFM International LEAP-1B engine, which has had a smooth introduction to service, unlike the Pratt & Whitney PW1100G that is one of the two engine options on the MAX's direct competitor, the Airbus A320neo family.

The latter's problems, including a slow restart process and excessive wear on the engine's combustion liners, led to a backlog of engineless A320neos piling up at Airbus's Toulouse assembly facility and several delivered aircraft standing idle at airlines.

Qatar Airways made headlines late last year when its CEO, Akbar Al Baker, very publicly cancelled four of its order of A320neos and signed a letter of intent for up to 60 MAX 8s.

According to the US company, the various aerodynamic and propulsion improvements make the MAX family at least 14% more efficient than their new generation (NG) predecessors and give them around 5% advantage in terms of both trip

cost and seat-mile cost against the A320neo family. "On those days when you don't fill up the aircraft, that's when trip costs become very important," explained Keith Leverkuhn, vice president and general manager of the 737 MAX programme.

The Middle East and North Africa (MENA) has not been a rewarding area for single-aisle Boeing products in recent years. The vast majority of narrow-bodies in the region are Airbus A320s.

Indeed, the only major 737 operator currently in the Gulf is low-cost carrier Flydubai, which has a fleet of 58 737-800sNGs and which placed an order for 11 more,

together with 75 MAX 8s, at the 2013 Dubai Airshow.

The first of its MAX 8s was delivered in August this year, making it the first airline in the Middle East to operate the type.

"I don't think there's any question that the MAX 8-sized aircraft will remain at the heart of the market for some time to come," said Leverkuhn. "It's an incredibly versatile machine and I think they recognise the range and capacity of the 8 puts it in the sweet spot of the single-aisle market. But the airlines have said that, as growth continues, there are routes that can take advantage of a larger aircraft.

"Airlines said to us, 'It has to be an efficiency machine', given the ever-increasing pressures on revenues and costs."

Flydubai was a very important partner for Boeing, said Leverkuhn, who also pointed to the considerable coup in gaining Qatar Airways as a customer for the MAX.

Precisely what Qatar's intentions are for the MAX are uncertain. It would make little sense to have both the Boeing and Airbus single-aisle rivals in its fleet. It is thought that at least some of the MAX 8s will be destined to re-equip



Keith Leverkuhn, Boeing's MAX programme general manager, believes that the 737 MAX series will have a good future in the MENA market, despite earlier versions of the 737 being relatively rare among the region's airlines.

CONTINUED FROM PAGE 127

Italy's Meridiana, in which Qatar plans to take a 49% stake.

That acquisition was given the green light by the European Union in March and completion of the deal is expected imminently. Al Baker has said he would not expect an airline with which Qatar Airways was associated to operate with an elderly fleet of the sort currently used by Meridiana, so the likelihood is that MAX 8s will be leased to the Sardinia-based airline.

There have been suggestions from both Airbus' sales boss, John Leahy, and some aviation analysts that the MAX 10 will cannibalise sales of the smaller MAX 9. Certainly, a substantial proportion of the 245 orders and commitments for the MAX 10 announced at Paris were conversions from the smaller MAX 8 and 9, or earlier NG variants of the aircraft.

Leahy predicted that many of the MAX 10's orders would be conversions from earlier commitments for smaller members of the range and argued that the MAX 10 would not be a competitor for Airbus' A321neo and, particularly, its longer-ranged A321neoLR.

This was also the conclusion of one of the world's largest lessors, Avolon, which, in August, released its analysis of the MAX range.

Strengthened the overall family

The Ireland-based lessor commented that the MAX 10's launch had strengthened the overall MAX family and had "already doubled Boeing's market share in the large narrow-body segment".

However, it added: "The 737 MAX 9 no longer serves as the lowest unit cost family member and is severely affected by the launch of the MAX 10. With only slightly improved unit cost over the MAX 8, it is unclear what role remains for the [MAX] 9, which is expected to have a very limited future."

Of the other members of the MAX family, it described the smaller MAX 7 as "a niche product when performance and range is required. A change in pricing strategy could stimulate further demand."

Leverkuhn naturally demurred from Avolon's analysis of the MAX 10's effect on the 9: "The way we think about the 10 is that it's not a substitute for the 9; the 9 has a range advantage over the 10. I think there are going to be a lot of airlines that will do that calculation of the 9 versus the 10."

Boeing says that, when fitted with a single auxiliary tank, the MAX 9 has around 550km (300nm) extra range over a similarly outfitted MAX 10, but the 10 has an extra two rows of seats

Why 8 is the magic number...

Avolon, the world's third-largest lessor of airliners, ran the rule over the MAX range in August and came up with the following conclusions:

- **The MAX 8 remains the heart of the MAX family.** The aircraft has maintained its cash operating cost advantage over the A320neo on a per-seat and trip basis. This aircraft is, and will continue to be, particularly attractive for the low-cost carrier market, which is focused on seat-mile cost as a key performance metric.
- **To regain market share from Airbus, Boeing launched the MAX 10.** The reaction has been positive, strengthening the MAX family and doubling Boeing's share of the large narrow-body market.
- **There is potentially strong placement demand for 737 MAXs ordered so far as 54% of 737 new generation (NG) operators, who have previously ordered new aircraft directly from Boeing, do not have commitments for any of the current 737 MAX variants.**

- **The shift away from smaller variants such as the MAX 7, could be counteracted by a change in pricing strategy, which could stimulate further demand for the MAX 'baby'.**
- **The value proposition of the MAX 9 has been affected by the launch of the MAX 10.** It is unclear what role remains for the aircraft, but it is likely to have a limited future.
- **Boeing has secured only three customers in three years for the 737 MAX 200 (a sub variant of the MAX 8) making it questionable from an investor's perspective.** The greatest interest has come from Europe's largest low-cost carrier, Ryanair, which has ordered 110, plus 100 options, of the higher-capacity version.
- **While the A321neo will remain the seat cost leader in high-density configurations, the MAX 10 is a much-improved competitor over the MAX 9.** At the Paris Air Show, Avolon signed a memorandum of understanding for 75 MAX 8 aircraft, together with an option for a further 50.



for those airlines that want to get the biggest bang for their buck on heavily-trafficked routes.

The company adds that the MAX 10, with a 5,955km (3,215nm) range, will cover 99% of the world's single-aisle routes.

A typical area of interest to US airlines, said Leverkuhn, was from the West Coast to Hawaii; the MAX 10 could handle it, but the longer-range MAX 9 was better suited to the sector if there was bad weather that the aircraft had to fly around. "The 10 becomes a very nice augmentation to the family by letting the range drop off."

The rivalry between the MAX 10 and the A321neo involves a battle of statistics. The A321neo has outsold the MAX 9 (by a factor of around five to one, as of summer 2017) and has been seized on by many airlines that see it, and its long-range variant, the A321neoLR, as the solution to several problems, one of which is a replacement for the Boeing 757.

The Airbus aircraft allows carriers to launch single-aisle services on routes previously outside

their range, such as transatlantic routes from the UK to the US eastern seaboard.

The A321neoLR gains its extra mileage, said Leverkuhn, through two auxiliary fuel tanks in the cargo hold. Those not only took up valuable payload space and gave rise to centre of gravity considerations when loading the aircraft, but "are not the maintenance crews' friends" because their positions made them awkward to access.

Some analysts have suggested that Boeing should simplify its MAX range by concentrating on the MAX 8 and 10 models. They feel that the MAX 10 will inevitably steal orders from the MAX 9, while the MAX 7, as the smallest in the range, will tend to suffer the same problems as previous holders of that position, the 737-500 and -600.

Shift away from smaller models

The shift away from these smaller models over the years has been partly driven by the rise of low-cost carriers, whose obsession with controlling costs make the unit price of the smaller aircraft less attractive, while the greater capacity of larger versions in both the Boeing and Airbus narrow-body ranges makes them more cost-effective.

Leverkuhn is confident that the MAX family will become a more familiar sight in the MENA region: "We're going to continue to see inroads in the Middle East and Africa region with this model, as we continue to replicate the sales we've had throughout the rest of the globe. We're very optimistic."

BOEING MAX RANGE / PAYLOAD TABLE

	MAX 7	MAX 8	MAX 9	MAX 10
Dual-class:	138	162	178	188
Single-class:	150	174	204	204
High-density:	172	200	220	230

Strata Manufacturing, Etihad Airways and German company, Siemens, have come together to create the Middle East's first 3-D printing service for aircraft cabin parts. Alan Dron reports.

Alliance takes interior design to a new dimension



A major aspect of the future plan will be the training and development of UAE nationals.

Additive manufacturing – frequently called 3-D printing from its ability to build intricately shaped components layer by layer by melting metal or plastic with incredible precision – is expected to be a transformative technology in the next decade.

Earlier this year, a grouping of two UAE companies – Strata Manufacturing and Etihad Airways – plus German engineering giant, Siemens, was formed to create a pilot project to design, certify and manufacture aircraft interiors.

Under the partnership, the pilot project developed 3-D printing capabilities for aircraft cabin interior products for Etihad.

Siemens employed its expertise in digitalisation and 3-D printing to assist in the selection of materials, testing and the preparation of processes; the design team at Etihad Airways Engineering successfully managed to certify the parts, while Strata qualified the printing process itself and carried out the actual printing in its Al Ain facility.

Strata and Siemens are currently investigating the development of a strategic roadmap over the next three years for the further industrialisation of 3-D printing.

“Through our R&D team, Strata managed to coordinate this effort with our partners to establish these unique capabilities in 3-D printing in a record time,” said Ismail Abdulla, Strata’s CEO. “Our goal is to deploy 3-D printing on practical applications to provide value-added solutions for us and for our customers.”

A major aspect of the plan will be the training and development of UAE nationals in the skills that will be necessary for the wider use of the technologies.

“We see great opportunities for 3-D printing as a disruptive force in manufacturing, and expect it to play a key role in a globally competitive, increasingly digitalised industrial landscape in the Middle East,” said Assem Khalaili, executive vice-president, industry customer services, at Siemens Middle East.

“We are proud to be working with Strata and Etihad to advance 3-D printing and strengthen local manufacturing here in the region.”

“Five years ago, 3-D printing was not adjusted for mass production,” explained Bernhard Randerath, Etihad’s vice-president, design engineering and innovation. “It was more or less a prototyping tool. In the last three years we have had a massive revolution in seeing how fast we can do 3-D printing and the really brilliant quality we can achieve. The problem is that everything we need to do on an aircraft needs to be certified.”

Early in 2017, Etihad embarked on an exhaustive process to gain certification for 3-D printed parts on its aircraft and achieved certification approval during the Global Manufacturing and Industrialization Summit in March.

This will allow the three companies to start the manufacture of cabin components using the 3-D printing process. This will also allow Etihad to start replacing cabin components that require updating.

Plastic frame

The initial part to be produced in this way, a plastic frame that surrounds media screens on Etihad’s aircraft, can be manufactured on demand, cutting production time and eliminating the need for shipping or a locally-stored inventory.

The additive manufacturing technology also removes the requirement to design and build tooling for the manufacturing process, allowing future design updates to be modelled virtually and printed swiftly using existing equipment.

The monitor frame was selected for the pilot project because of its complexity and appearance requirements. The 3-D-printed parts can be employed in Etihad Airways aircraft immediately.

“With Strata’s capabilities they can do really fast prototyping,” said Randerath. “We prototype it, then put it in the aircraft and know within minutes if it fits.”

At present, the 3-D printing system is being used for minor components, but the intention in future is to use the process for much larger pieces of the cabin, such as toilet units.

Strata hopes to expand the applications of this technology and deploy it on practical applications that will allow the development of local knowledge-building that will lead to future innovations benefitting the broader aerospace industry.

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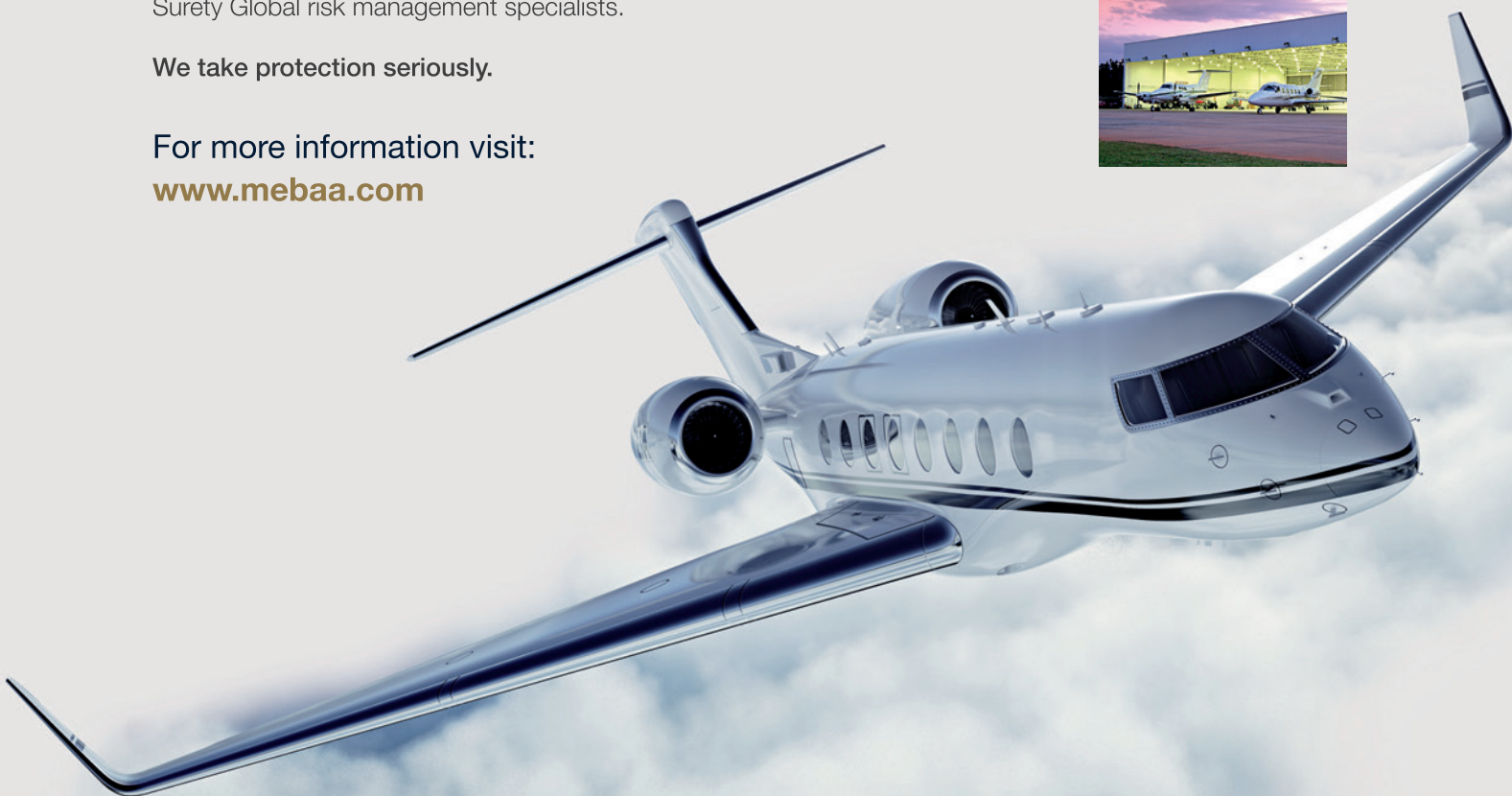
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CROWD-SOURCED DATA HELPS KEEP AIRCRAFT FLYING

Aircraft manufacturers and suppliers are starting to use crowd-sourced data to detect wear, schedule preventative maintenance and avoid costly failures.

Steve Nichols
reports.

The current thinking is, that by pooling sensor data across an airline, or even across an aircraft type, problems can be detected before they become a major issue.

The 2017 Connected Aircraft eEnablement Conference, held recently at Heathrow in the UK, heard how engine manufacturers now view the importance of gathering masses of data.

For example, Skywise from Airbus, which was launched at the Paris Air Show in June, brings together aviation data from multiple sources across the industry into one secure cloud-based platform.

These airline sources include work orders, spares, components aircraft/fleet configuration, on-board sensor data and flight schedules.

Jaime Baringo-Ezquerro, head of digital business development, Airbus, said: "What could we achieve if data from every Airbus aircraft could be gathered together? We have already build this capability within Airbus and within a few weeks we were able to see double-digit improvements in productivity."

Benchmarking your data

Airbus digital transformation leader, Eric Peyrucain, added: "By benchmarking your data against other operators, airlines can see how they are performing, or they can use other companies' data collaboratively to predict failures."

Airbus says Skywise includes 24,000 parameters with 100% availability of the data.

Boeing is also in partnership with Microsoft to adopt a "cloud computing" approach to capturing aircraft data.

The collaboration aims to improve commercial aviation by enhancing factors like predictive aircraft maintenance, fuel optimisation, and airline systems.

Alex Montgomery, cloud application lead, Microsoft, said: "Boeing's partnership with Microsoft will accelerate

innovation in areas such as predictive maintenance and flight optimisation, allowing airlines to drive down costs and improve efficiency.

"We need to think about supporting predictive failures, based on historical data. Increasingly, we are seeing machine learning and analytics being moved to the aircraft, to be closer to the problem.

"Now is the right time. With the unlimited capacity of the cloud and powerful analytical algorithms, airlines can now exploit the data they are capturing."

Engine manufacturers Rolls-Royce and GE are also looking at how big data can monitor engine performance and reliability.

Mike Chester, solution manager, operator solutions, digital, Rolls-Royce, spoke about how his company is using eEnablement for engine health monitoring.

It can gather thousands of data points from each flight and compare these with known norms to look for data points that are out of the ordinary and suggestive of a problem or impending failure.

Rolls-Royce has developed a predictive maintenance app that studies a number of parameters from the fuel, avionics, and hydraulic systems to look for potential problems. The app was developed and delivered in just 12 weeks.

Can't afford to get it wrong

"The complexity of aircraft data means we can't afford to get it wrong," Chester said. "We have to be as accurate as we can. At Rolls-Royce we still need an engineer with dirt under his or her nails, who knows what a 5/16th socket is. But we also need analysts and scientists, who can interpret complex data and use machine-led algorithms to look for problems."

Steve McFeely, chief engineer connectivity, Boeing, said: "It is predicted that more than 50% of organisations globally will use advanced analytics and proprietary algorithms to cause disruption of entire industries by 2018.

"For example, the Boeing 787 had an 80x increase in the number of data parameters over a 737. The 777X will show a 100x increase.

"The goal is to ensure that every aircraft that leaves our factory is connected, but the key is to ensure that they are cyber-protected."

John Nelson, operations manager at General Electric, said that getting real-time information off an aircraft was possible but you needed a "fat connectivity pipe" to the ground.

"The aircraft communications addressing and reporting system (ACARS) is still going to continue be used for some time," he added.

He said using data from the aircraft once it has landed was still the way to go, at least for the time being. He said GE had been working with a major undisclosed Middle East customer that operated its aircraft in harsh environments.

"Better predictability over future problems has helped bring a 45% decrease in disruptions and 12 additional days of aircraft utilisation," he said. "This reduces the maintenance burden considerably."

Rolls-Royce engineers working on a BR725 engine.





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Hi-tech investment can eliminate security stress

Emirates Airline president, Sir Tim Clark, explains to Steve Nichols why airports must make massive investments if they want to make passengers' lives more bearable.



“Biometrics means that you should be able to check-in at home and that’s it. You would be recognised as you walked in the airport, either by face recognition or your fingerprints, and tracked all the way through your journey.”

SIR TIM CLARK

Emirates Airline president, Sir Tim Clark, believes many airports around the world are simply not up to standard and has called for much wider use of technology to improve the passenger experience.

Speaking at the 2017 Airline Passenger Experience Conference in Long Beach, California, Clark said most passengers found the whole experience stressful, pushing up their metabolic rates enormously.

“That’s why passengers are so hungry by the time they’ve got through check-in and security,” he said. “Why do you think so much food is sold and consumed in airports, even though people have probably only just had their breakfast?”

Clark said future airport design was the biggest single constraint to what Emirates wanted to do.

Drawing on the airline’s experience of the 157 destinations to which it flies, he said: “Airports today, with rare exceptions, are just not up to standard – you have congestion at the kerb side, check-in, immigration, security and then the departure lounge.

“It’s not a pleasant experience at all – but it doesn’t have to be that way.”

Clark said technology could make the whole process better right now, if only airports would adopt it.

“Biometrics means that you should be able to check-in at home and that’s it. You would be recognised as you walked in the airport, either by face recognition or your fingerprints, and tracked all the way through your journey.

“Technology allows you to deal with all the touchpoints. No more taking your jacket and shoes off as you pass through security. There are scanners that can sniff and detect particles at the atomic level, so why don’t we use them?”

“There should be no need for multiple checkpoints either.

And, if you do need to be stopped and checked, a robot could do it instead of a human.

“Believe me, this is all technologically possible today. Whizz people through the system faster and easier and they then have more time to spend their money before they get on the aircraft,” he joked.

He said that most airports were physically constrained in terms of their available space. Getting rid of masses of check-in decks and security points would free up space to make more room for passengers – and make more space for shopping and food outlets.

“The beauty is you have lots of people captive and if you don’t maximise the value of those people you are nuts, whether that be through food and drink or shopping,” he said.

“Currently, it is a dreadful experience. If you want to create more value for people, organisations just have to bite the bullet. In the Emirates we do as much as we can, certainly with our premium passengers, but many airports need to do more and spend more.”

Greater insight

And, he said, data technology was letting Emirates have an even greater insight into its passengers’ wants and needs. He said technology provided the company with answers and allowed it to be much smarter about what it could do.

“We can now see in real-time what seats are the most popular and why. For example, a lot of our customers prefer seats near the galley or the toilets. These data points mean we can price seats accordingly and offer add-ons and upgrades that suit them.

“The business-to-consumer environment also allows us to play with that a lot more. You can present passengers with options and products that are meaningful to them.

“In the past, we never had this level of market analysis in real-time. Back in the 80s we had a degree of stability. But technology has completely up-ended that.

“The perception and drivers that humans have are changing. And the airline world has to change with them,” he added.

Clark also said that technology had a part to play in the air too. “Before too long we will have aircraft with no windows. Composite fuselages will be lighter and more fuel efficient, meaning we’ll be able to fly higher and faster than ever,” he said.

“But that doesn’t mean passengers won’t be able to see out of the aircraft. We will have screens across the inside of the cabin that will show them what the outside view looks like. Or we can project any other images we want.

“The trick is make sure you are brave enough to take those kind of technological decisions,” Clark concluded.

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The Middle East airline market has often been divided by the “haves” and the “have nots” but now a website that acts like eBay for used aircraft seats could solve a problem for smaller, cash-strapped carriers. Victoria Moores has been finding out more.



Thomas Bulirsch: “We want to make this invisible market a bit more visible.”

Right: Aviationgate seats in their new home.

SAVE ME A SEAT...

Sooner or later, most airlines want to upgrade their aircraft interiors. But what happens to the old seats? “They end up as hidden capital in a warehouse,” explained Thomas Bulirsch, founder and CEO of aircraft interior remarketing site aviationgate.com.

“If an airline doesn’t promote [advertise] the used seats, they can lose their potential value and, instead, become a burden and a cost factor. The longer you keep the seats, the more they cost and one day you could end up having to pay for them to be scrapped. Turning this cost into revenue has to be a good thing.”

The aviationgate.com website was created two years ago as a portal for airlines to sell these seats and help set them up with a new home. The team manages the listings and helps arrange seat refurbishment and certifications to get them flying again. There is no fee for listing seats on the website; aviationgate.com only charges a fixed commission once the seat is sold.

We are in a niche

“Nobody is really doing the same thing as us. We are in a niche; the concept is quite unique,” Bulirsch said. “We want to make this invisible market a bit more visible.”

Bulirsch believes the Middle East and African markets have huge potential. “We are just not very well known yet. We have 110 different seat models online, available in a few days in ‘as-removed’ condition. The price is a lot lower than a new seat; it can sometimes be a lot less than half the cost,” he said.

For smaller airlines, high costs and long lead times are not the only issue; it’s capturing the attention of the seat

manufacturers in the first place. “The big guys focus on larger requirements and economies of scale. A lot of customers in the Middle East and Africa are not a focus area for the big seat original equipment manufacturers (OEMs). They are not willing to deliver low quantities of seats; it’s just not possible to go to an OEM for one or two shipsets. For us, scale is not a problem. We are happy to work with lower quantities.”

Older models

Aviationgate.com lists seats for a wide range of aircraft types, including older models, which could be hard to find elsewhere. It can customise the seats and bring them up to standard by refurbishing them, renewing the covers and fixing or changing plastic parts.

The company is also able to fit in-flight entertainment (IFE) systems, as it removes these and refits them too, with space to overhaul three narrow-body shipsets at once and store seats if needed.

The supply chain is just the seller, the website and the buyer. “We deal with people directly from our office. We don’t have middlemen in between making the products a lot more expensive. We have defined processes behind everything. This is not a grey market, or someone unknown selling seats from a warehouse. We have all the traceability documents and certification available to make the process of buying used seats a lot more secure.”

Finally, there is that potential revenue stream too. “Lots of airlines use us not only to source seats, but also to sell them. We are constantly looking to buy surplus seats. I would even put that in the category of ancillary revenues,” Bulirsch said.

*Liebherr-Aerospace is one of the world's leading aerospace systems original equipment manufacturers (OEMs) with an unblemished reputation for quality. As **Chuck Grieve** reports, this is much due to hard work, continuous investment and a long-term vision.*

SMILES AHEAD - THAT'S

The floors in Liebherr-Aerospace's factories in Germany and France look clean enough to eat off. The air is fresh. The vast array of machinery emits a low, steady rumble. Workers greet visitors and each other with a nod and smile.

Welcome to the future of manufacturing and precision engineering.

Liebherr, the family-owned group with interests ranging from aerospace and construction to hotels and household appliances, is a progressive organisation with the inclination and means to take a long-term approach to business and customer relationships.

Its aerospace division, established in 1960, is one of the world's leading suppliers in this competitive sector, designing, developing, manufacturing and servicing integrated on-board systems.

It concentrates on five areas: air management, flight control and actuation, landing gear, gears and gearboxes, and electronics.

In each area, said Josef Gropper, managing director and chief operating officer (COO) for production, purchasing and asset investments: "We are one of the few worldwide companies able to provide full systems to our airframer customers."

Liebherr systems fly on wide-bodied aircraft, commuter aircraft, regional jets, business jets, military aircraft and helicopters of almost all major airframers. "We are on board most of the major



Josef Gropper: "We're preparing the next generation of aircraft."

JEBEL ALI MAKES LOGISTICS SENSE

Liebherr-Aerospace's logistics centre in Jebel Ali Free Zone (JAFZ) is one of more than 20 operations in 10 countries worldwide, including a new liaison office set up in Bangalore last year.

Until 2008, when it established a representative office in Dubai, Liebherr-Aerospace supported Middle East customers from France and Germany. The success of that first office, plus the positive response of customers, prompted the company to open its JAFZ logistics centre in 2015. The centre stocks parts and line replacement units of Liebherr-manufactured components in 840sqm of climate-controlled space. OEM Services, the component support company partly owned by Liebherr-Aerospace, handles storage and logistics.

Charles Thoyer-Rozat, Liebherr-Aerospace executive vice-president, customer services, said the move was "an important milestone" in the company's strategy of developing "enhanced support" for airline customers, mainly those operating Airbus, Bombardier and Embraer aircraft.

With the growth of traffic, the region had become an important hub between Europe and Asia for major carrier customers. "We could see that a mere office would not be sufficient in the long term. Moreover, we wanted to improve the availability of components to

secure the daily operations of our customers."

The local inventory of new and refurbished components enables Liebherr to supply customers significantly faster – often in just a couple of hours – than when spares were flown in from Europe. The company monitors demand for replacement and repair of components, acknowledging that a local repair capability for selected components might be an advantage in the future.

"We are dedicated to being a trustworthy partner for our customers," said Thoyer-Rozat. "We aim for long-term relationships. Our decentralised corporate structure allows us to react rapidly and flexibly to the needs of the market, transforming ideas into effective solutions. Our aim is to achieve technological progress in the best interests of our customers."

The Dubai operation is "a perfect example" of the benefits of Liebherr's philosophy of investing in people and process.

As an indication of what the future may hold for Liebherr-Aviation in the Middle East, it is contracted with Royal Jordanian to repair and overhaul the landing gear – for which Liebherr is the OEM – of the airline's fleet of Embraer 175 and 195 jets. Work will be carried out in at Liebherr's site in Lindenberg.

aircraft programmes launched over the last 20 years," he said.

In terms of volume, the Airbus A320 is the most important of the many current programmes for Liebherr. Going forward, the company's focus is also on the Boeing 777x, Bombardier C-Series, Embraer E-Jet, and the Rolls-Royce UltraFan programmes, the latter signalling a move into the aero engine market.

In addition, Liebherr-Aerospace offers extensive customer services based on a worldwide network with repair and maintenance services, technical support, documentation and spare parts logistics.

Liebherr-Aerospace contributed €1.3 billion (\$1.5bn) to total group sales of €9 billion in 2016. That represented an increase of nearly 5% in turnover for the division. It employs 5,400 people, mainly on its four manufacturing sites in Germany and France.

If there's a secret to its success, it could be the company's huge investments in research and development (R&D) and testing. Last year, the aerospace and transportation division invested about €70 million (\$82m) in R&D: more than 17% of revenue and "far above the industry average".

Assembly and testing

One result, Gropper said proudly, is Liebherr's 100% record for delivery of systems to Airbus. So rigorous is Liebherr's attention to detail in manufacturing, assembly and testing that it is one of a small number of system suppliers whose components are delivered directly to the Airbus assembly line.

Each of Liebherr-Aerospace's four manufacturing sites in Germany and France has benefited from the investment and continuous improvement that is the company's hallmark.

At Lindenberg, in southern Germany, a major expansion begun in 2012 to cater for growing demand has increased the manufacturing plant's footprint 20% to more than 160,000sqm. It employs 2,700 people, including 127 apprentices, "which is important for us", said Gropper.

The just-completed modernisation and extension has given Lindenberg a new assembly line, new surface treatment facility and new automated logistics line. Test and qualification work is now carried out in a new dedicated hall.

The second German site in Friedrichshafen has evolved into the company's centre of excellence for manufacturing gears and gearboxes. Here, too, investment is transforming an older factory with the latest five-axis turning and milling centres and a

THE LEIBHERR MOTTO

reorganised manufacturing flow.

In France, the recent refurbishment of the assembly hall at Liebherr-Toulouse, the company's centre of excellence for air management systems, included a reorganisation of workflows and workstations. Increased automation and new man-machine interfaces feature in the new heat exchanger manufacturing line.

Thirty minutes from Toulouse, at Campsas, existing workshops have been extended and refurbished, and a new machine hall added to make the site a centre of excellence for precision machining of parts for the air management systems.

Despite its size, Liebherr remains a private company; the descendants of the founder, Hans Liebherr, are active in its management. Their involvement, said Gropper, encourages long-term thinking and a high level of investment in technology. It is what drives the company's embrace of 'industry 4.0' with its emphasis on automation, seamless human-machine interface, paperless working and sustainability.

Quality testing

Evidence of this is clear in all the Liebherr-Aerospace factories. In Lindenberg, for example, radio frequency identification (RFID) is being introduced in 2018 for order tracking and management. That work dovetails with sophisticated part labelling for Airbus and Boeing. Quality testing of the labelling system is under way on Airbus types.

Hans Liebherr's belief that keeping important processes in-house was vital to maintaining quality remains part of the company's philosophy. Its precision machining operations feed its assembly lines; sophisticated testing is done alongside where possible.

People are important to Liebherr, and it pays dividends in quality management. By reorganising shop floor management, integrating traditional white and blue-collar roles and responsibilities – involving machine minders in redesign of assembly lines, for example – and breaking down silos with cross-functional meetings, the company has increased its ability to detect potential issues and deal with them quickly.

Liebherr-Aerospace refuses to stand still or rest on its laurels. Its relentless R&D includes two additive manufacturing (AM) development cells, in Lindenberg and Toulouse, where teams of researchers study the possibilities of titanium, aluminium and inconel alloys. Working with Airbus, they have created critical parts (in this case,



Precision engineering is the hallmark of Liebherr.

a flight control actuator) and installed them on the A380 – a world-first. The focus now is on industrialising the process alongside work to determine other parts where a market need would support serial AM production.

The company is also involved in the European more electric aircraft (MEA) initiative. Prototypes of fully electrical air conditioning systems flew on an ATR regional turboprop and A320 in 2016. It signals Liebherr's intention to become a centre of excellence for on-board electronics, an area where the aerospace division benefits from group capabilities through Liebherr-Elektronik.

In its original OEM role, Liebherr-Aerospace has been "accompanying" its customers in the incremental steps they've been taking over the last few years to enhance the performance of their products.

"Together with them, we're preparing the next generation of aircraft that will rely on disruptive technologies," said Gropper. "Our technologies will be there to make their next-generation aircraft a reality."

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MAPA is ready to roll out to new markets.

RJA ACADEMY PUTS MOROCCO BACK ON THE TRAINING MAPA

Has a Jordanian offshoot company got the answer to North Africa's aviation training woes? Vincent Chappard spoke to senior officials at the Morocco Aviation Private Academy to find out.

Since the Moroccan national school for pilots closed at the end of 2014 and, following Royal Air Maroc's decision to outsource crew training at the expense of the RAM Academy, Morocco and North Africa have been facing a lack of aeronautical training in the region.

Now the Royal Jordanian Air Academy (RJA) has decided to seize the opportunity to establish itself in Morocco in line with its development strategy.

The country will, thus, be a springboard to reach the African francophone market.

"After 52 years of existence, RJA wanted to spread to North Africa," explained Captain Mohammad Khawaldeh, who is now the founder and CEO of the Morocco Aviation Private Academy – a 'sister' company to RJA.

MAPA deputy director, Captain Driss Rhazi, added: "It is the ideal period to launch our academy. We want to make the MAPA a centre of excellence to meet the demand of Moroccan and African youth.

"It benefits from the expertise, the human and material means of Jordan to deliver ATO/EASA and EASA PART 147 certified training in Africa."

The Moroccan academy aims to be a regional leader in the training of pilots and mechanical engineers by attracting trainees from all over Africa.

It was established in the summer of 2016 at Benslimane International Airport (between Casablanca and Rabat). According to Rhazi, it is an ideal location as the airport has a low traffic density and an airspace with unconstrained flights.

MAPA has a fleet of eight Diamond aircraft and two workshops for training technicians: one for type P1 (engines and airframes) and another for on-board instrumentation and avionics. It also has seven training classes, including three computer-based training (CBT) facilities with a capacity of 24 trainees per class.

The MAPA has obtained the required approvals from the Moroccan authorities and the International Civil Aviation Authority (ICAO) to train pilots and issue pilot licences. The academy is now in the process of EASA Part 147 certification.

"We hope that by the end of 2017 we will have our first class. We will open two classes for pilot and engineer courses in the coming months," said Khawaldeh.

In addition to initial or integrated training courses, the MAPA offers modular training private pilot licence (PPL) or multi-engine pilot sessions.

Its promoters have studied the market and are confident about the needs of the aviation sector for pilots and mechanical engineers. The academy relies on the experience and support of the RJA to make itself known in the region.

"We are going to deploy our training all over the African continent," said Rhazi. "We intend establishing partnerships with airlines, in particular African ones, to enable our trainees to pilot their aircraft."

The MAPA hopes to be a centre of excellence in aeronautical training at the national and regional level, especially in Africa in the coming years, and to be responsive to the needs of African youth.

Q&A WITH CAPTAIN MOHAMMAD KHAWALDEH

WHY MOROCCO WAS THE PERFECT CHOICE

Q: Why has MAPA been set up?

A: The market is very promising and the need for pilots and engineers will increase. Morocco was the best choice because of the existing regulation, space and human workforce availability. We are transferring our know-how from Jordan into Morocco. The MAPA is not a branch but an investment by the Royal Jordanian Academy. It is a complete entity.

Q: What are your development prospects?

A: Initially, we are looking for the Morocco market but we



have in mind 14 to 15 countries around Morocco and central and western Africa.

The aviation sector is growing and there will be a need for crew and air ground crew. Also, North African countries like Algeria and Libya would

need such facilities to train their pilots and their engineers.

Q: What does the future hold?

A: Aircraft fleets in North Africa are getting bigger and will continue to grow in the next decade. There will be a need for crews, pilots, technicians and engineers. We offer both French and English training in our academies. In Jordan, we have private investors from Saudi Arabia and Bahrein. We are also looking for investors in Morocco for MAPA. As the number of students grow, we will increase our Diamond fleet and capacity.

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A DEGREE OF PROGRESS FOR THE UAE

The UAE's aerospace potential has been boosted by the news that a British university is to begin aerospace engineering degrees.

Mohammed Ali Ahli reports.

Britain's University of South Wales (USW) is to deliver degrees to aerospace engineering students as a key partner at the UAE's new Dubai South development – the planned city of a million people around the new Al Maktoum International Airport – giving further strength to the UAE's ambition to grow a skilled workforce in the sector.

The university is working with Dubai Aviation City Corporation (DACC), the parent organisation of Dubai South.

Khalifa Al Zaffin, executive chairman of DACC, said: "We are witnessing the start of a critical chapter in Dubai's journey to become the aviation capital of the world. A fundamental part of the aerospace super system that we are building is the gathering of several leading, international institutions at Dubai South – organisations that can offer specialised vocational education.

"We are also grooming and supplying talent to the region's fast-expanding aerospace industry. The presence of USW at Dubai South brings a world of exciting career options right to the doorstep of our region's youth."



ON THE NOSE: USW has developed sector leading skills.

USW will accept its first students in Dubai South from September 2018 in a facility at the development's existing business park. USW's initial academic offering has received approval from the Knowledge and Human Development Authority [KHDA].

The USW courses initially on offer will include the BSc (Hons) aircraft maintenance engineering, the BSc (Hons) aircraft maintenance engineering top-up degree, plus a foundation course, through which a student can gain the right qualifications to move on to the degree programme.



Professor Julie Lydon, vice-chancellor of the university said: "Having worked with some of the major players in the aviation industry, we have developed sector-leading skills with an international reputation. Dubai South is where key aerospace markets are going to be. USW will also be able to build on strong relationships so that other courses developed in South Wales can be made available to global organisations operating at Dubai South."

The Al Maktoum Airport will eventually be the world's largest, handling an estimated 220 million passengers and 16 million tonnes of cargo each year close to Jebel Ali Seaport and adjacent to the Dubai South Logistics District.



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Experienced CEO for Joramco

Dubai Aerospace Enterprise (DAE) has appointed Jeff Wilkinson as chief executive of its subsidiary company, Jordan Aircraft Maintenance (Joramco).

Wilkinson was most recently CEO at Abu Dhabi-based Etihad Airways Engineering, where he was responsible for several core business functions including airframe and component maintenance services, supply chain management, design engineering, continuing airworthiness management organisation (CAMO), line and light maintenance.

Before joining Etihad, Wilkinson played a key role as head of base and line maintenance (BSL) for Swiss International Airlines, and worked with multiple leading industry MROs.

Welcome return for Saeed

Abdul Khaliq Saeed, the former president of Abu Dhabi Aircraft Technologies (ADAT) before it was acquired by the Etihad Group in 2014 to become Etihad Airways Engineering, has returned to become CEO of the Etihad business.

For the past three years, the industry veteran has been CEO of Abu Dhabi-based, Turbine Services & Solutions (TS&S).

ETIHAD GROUP CEO ROLE FOR DOUGLAS



Etihad has appointed Tony Douglas – a former top executive in Britain's Ministry of Defence – as its new group chief executive officer.

He will make his move in January 2018. Douglas will work with the board and leadership team to expand and implement a range of strategic initiatives.

He said: "Etihad is a force in global aviation that must continue to adapt and evolve on its own and with industry partners. It is an economic and employment engine for the UAE and the region. With new infrastructure and attractions like the expanded airport, Louvre Abu Dhabi, and Abu Dhabi Global Market, Etihad has a central role in supporting the UAE's position as a global hub of transportation, tourism, commerce, and culture."

He has also held senior positions within Mubadala Aerospace, Jet Airways, and Gulf Air.

Gulf Air appoints deputy CEO

Gulf Air appointed Captain Waleed Abdul Hameed Al Alawi as deputy chief executive officer, in August.

Captain Al Alawi has more than 37 years of experience in various aviation-related positions and holds an MBA in aviation management from the City University of London, UK.

The appointment follows the sudden resignation of the airline's CEO, Maher Salman Al Musallam, in June.

RUITER GOES PANASONIC



Panasonic Avionics has appointed Adri Ruiters as its new vice president of global operations.

Ruiters will be responsible for key global operations activity, including operational strategy, programme management, supplier management and global manufacturing.

"It is with great pleasure that I take up this important role at Panasonic and I'm excited to be part of an organisation that is world-renowned for its in-flight entertainment and connectivity technology. I look forward to working with the team to drive operational excellence within the business," said Ruiters.



EAG support role for Al Mulla

Etihad Aviation Group (EAG) named Mana Mohamed Saeed Al Mulla (above) as chief group support services officer in September.

Reporting directly to the group CEO, he is responsible for a range of support functions including IT services, procurement and supply management, and property and facilities management.

Ray Gammell, EAG's interim group chief executive officer, said: "We are delighted to welcome Mana to the leadership team. His appointment brings a wealth of relevant operational and business experience and he strengthens our group leadership."

Double boost for SR Technics

MRO service provider SR Technics, which has offices in the Middle East, has appointed Jianfeng (Jeff) Hu as deputy CEO and Yujie (Jessy) Zheng as deputy CFO.

Jeremy Remacha, SR Technics CEO, said: "Both bring a wealth of experience in the aviation industry, which will be a great asset in developing our business further. On behalf of the leadership team, I would like to wish Jeff and Jessy all the best in their new roles."

AHMED LEAVES AIR ARABIA FOR SALAM AIR



Captain Mohamed Ahmed has taken over as CEO of Omani low-cost carrier SalamAir.

He succeeds former Flynas CEO, Francois Boutellier, who, with his leadership team, was forced to quit in the summer.

Ahmed comes from Air Arabia in Sharjah where, as group director of operations and maintenance, he played a key role in the start-up of the airline and most of its subsidiaries, including setting up five new air operations across the Arab world.

He was credited with delivering successful operational, commercial and financial results.

Engineer Khalid bin Hilal al Yahmadi, chairman of SalamAir, said: "His wealth of knowledge and experience in the industry will play a pivotal role in the airline's growth and development journey."



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Julian Donald *Marcelle Nethersole speaks to BAE Systems' regional managing director, Middle East.*

1

■ Can you tell me a little about yourself and the background of BAE Systems Middle East?

BAE Systems and its legacy companies have been operating in the Middle East for many years.

I moved to the Middle East in January, where we have had a presence for more than 50 years. My role is regional, so I travel frequently around the GCC.

I have been with BAE Systems since 1997 in a number of roles, ranging from group mergers & acquisitions director in head office to naval base operations director in Portsmouth.

It is important for me to be here in the Middle East with my team because we have the technologies, defence and security solutions to help our customers meet the growing challenge of keeping their people, national security and critical infrastructure safe from attack from increasing asymmetric hostile forces.

We need to be here in the region to engage with our customers during the procurement process and to provide after-sales support as required. We work closely with our customers and are keen to support them with aspects of their economic growth agendas, for example, with our community investment programmes, which are designed to promote science, technology, engineering and mathematics (STEM) disciplines in schools.

2

■ What is new for BAE Systems in the Middle East?

A key focus is our interest in developing new partnerships with local industry. We have several partnerships in place already, some for a number of years, but we are approaching how we operate in this space with a fresh determination.

We view local partnerships as integral to meeting the needs of regional customers, with on-the-ground expertise helping us to deliver technologies and solutions that provide value to customers on a long-term basis.

This is especially important in the region, with Middle East governments increasingly moving towards developing their own indigenous defence industries, so being able to collaborate effectively and deliver knowledge and technology transfer are of growing importance.



6

■ What other aerospace opportunities are there for BAE Systems?

We offer a significant number of air sector technologies, many of which add value to customers' existing platforms.

These include offering technologies which are focused on a range of key areas for both rotary and fixed-wing aircraft – protecting the aircraft from threats with the advanced threat infrared countermeasures (ATIRCM) and common missile warning system (CMWS), as well as providing flight-critical information and enhancing pilots' situational awareness for mission effectiveness through head-up display and helmet-mounted display technologies.

We also offer space industry technology, such as our radiation-hardened microprocessors and our intermediate frequency modem system (IFMS) deep space communications tech. These have enabled a wide variety of civil, commercial, national and international space missions for the past 25 years, which we're very proud of, including the European Space Agency's Rosetta Mission, several missions to Mars and NASA's Juno spacecraft.

3

■ Are there further prospects in the region for Typhoon?

We are continuing to pursue a number of significant opportunities around the world for Typhoon and are confident we will sell more to the international market.

However, just as important is recognising that Typhoon's eight existing customers will operate the aircraft for many years... and we are well placed to continue to expand our support activities for the aircraft. These are very significant and in excess of the value of the initial manufacturing.

4

■ How do you market the Hawk against other aircraft (such as Boeing T-X contender)?

Hawk is the world's most proven and successful advanced jet trainer aircraft, with more than 1,000 aircraft ordered by 18 customers across the world, so we feel that the statistics speak for themselves. The jet, made famous by the RAF's iconic Red Arrows display team and also the Saudi Hawks display team, is the flying classroom that has trained more than 20,000 pilots for life in fast-jet cockpits, delivering proven capability to the training pipeline of air forces across the world.

5

■ As MD, what does a typical day involve for you?

I have a team of country directors based in our offices across the Middle East and my role here is supporting them to deliver our business development agenda for the region and providing reach back to our lines of business based primarily in Europe and the US.

That inevitably means a lot of travel, a lot of meetings and a lot of variety in my day.



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