



ARABIAN AEROSPACE

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

www.arabianaerospace.aero

RAISING THE STANDARD

EGYPT'S FLAG-CARRIER BUILDS A BETTER FUTURE

PAGE 22



BUSINESS AVIATION

The name of the game is change for FBOs

PAGE 48



DEFENCE

What does radar see in its crystal ball?

PAGE 60



TECHNOLOGY

High flying with bio fuel

PAGE 78



thalesgroup.com

THALES
Decisive technology for decisive moments

2 out of 3 aircraft
take off, fly and land using Thales solutions

Published by



TIMES Aerospace Limited
 3-4 Rumsey House
 Locks Hill, Rochford
 Essex, SS4 1BB, UK
 Tel: +44 (0)1702 53 0000
 Fax: +44 (0)1702 53 3088

Regional Office
 PO box: 371391
 Dubai Airport Free Zone
 Building 6EA, Suite 222,
 Dubai
 United Arab Emirates
 Tel: +971 4 603 3364

Website: www.arabianaerospace.aero

Directors:

Mark Brown & Kevin Sammon

Publisher:

 Mark Brown
 mark.brown@arabianaerospace.aero

Display Advertising:

 Dave Winship-Evans
 david.evans@arabianaerospace.aero

Grant Lee

grant.lee@arabianaerospace.aero

Production Coordinator:

 Ethan Cobbing
 ethan.cobbing@arabianaerospace.aero

Circulation Dept:

 Clare Brown
 clare.brown@arabianaerospace.aero

EDITORIAL
Editor-in-chief: Alan Peaford

alan.peaford@arabianaerospace.aero

Editor: Steve Knight

steve@knighttrain.co.uk

Deputy Editor: Marcelle Nethersole

ella@aerocomm.aero

Defence: Jon Lake, Alan Warnes, Beth Stevenson

Air Transport: Alan Dron, Martin Rivers.

Business Aviation: David Calderwood

Helicopters: Paul Derby

General Aviation: Dave Calderwood

Space & Technology: Steve Nichols

Interiors: Marcelle Nethersole

MRO: Chuck Grieve

Propulsion: Geoff Thomas

UAE Editor: Jill Stockbridge

Picture Editor: Ian Billinghurst

Photographers: Tom Gordon,

Mark Wagner, Jeff Holmes

Design: Chris Murray, Allsortz Ltd

Production Editor: Rick Haden

Sub-Editors: Steve Knight, Kathie Jones

Regional Correspondents:

Peter Shaw-Smith (UAE- English); Vincent Chappard

(Francophone North Africa); Shahram Sharifi (Iran)

Contributors: Contributors: Anuradha Deenapanray,

Kevin Riordan, Tom Westcott

Editorial head office:

 Aerocomm Ltd,
 Norths, Rectory Road, Orsett, Essex RM16 3JU UK.
 email: info@aerocomm.aero
 For news stories: news@arabianaerospace.aero

Disclaimer

The views expressed in Arabian Aerospace magazine are not necessarily shared by, nor should they be taken as the views of TIMES Aerospace Limited (the publishers) or Aerocomm Ltd. Any views expressed are those of the individual contributors. No responsibility or liability is accepted by the editor or the publishers for any loss occasioned to any person, legal or physical, acting or refraining from action as a result of any statement, fact, figure, expression of opinion or belief contained in Arabian Aerospace. The publication of advertisements does not in any way imply endorsement by the editor or the publishers of the products or services referred to therein. The entire contents of this publication are protected by copyright, full details of which are available on request. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission from TIMES Aerospace Limited.

Why we must all up our game on global warming

Aviation's environmental credentials have always been questioned. From carbon emissions and climate change to noise and air quality, accusations have been thrown around about our impact on the world.

And, while the manufacturers, airframers and engine makers have rightly trumpeted their successes with weight reduction leading to less fuel being burned, new materials and new propulsion design making aircraft much quieter than the previous generation of jetliners etc, it has fallen on deaf ideas.

This year we have witnessed more vocal protests against climate change and there are cases of people being named and shamed for using private or chartered aircraft. It is time for us to talk more about the changes we are making – but actions speak louder than words.

Ahead of this year's European Business Aviation Convention & Exhibition (EBACE) event I was fortunate enough to fly from London's Farnborough Airport in Textron's latest Citation Latitude business jet – one of 13 aircraft to make the journey to the Geneva show fuelled by sustainable alternative jet fuel (SAJF).

Indeed, of the 58 aircraft on the static display at EBACE, 23 had flown into the show using biofuels. A global coalition of business aviation organisations had gathered ahead of the fly-out to highlight the path forward for continued adoption of SAJF.

The cost of the alternative fuel is currently around three times that of Jet A1 and, although recognising that business aviation, and particularly corporate flight departments, would be prepared to pay a premium for the environmental benefit, there still needs to be a reduction in price.

This will only work if there is more market pressure on the system. Operators should be putting pressure on their fuel suppliers and fuel manufacturers to actually produce more biofuels and have a more



appropriate geographical spread if we are to achieve our industry's carbon neutral future by 2050.

Credit is due to Etihad, which removed single use plastics from its flight to Brisbane on World Earth Day as part of a plan to reduce such plastics by 80% by the end of 2022. The airline said it will remove more than 100 tonnes of single-use plastic from its in-flight service.

It can be done. But we need to talk about it.

Aviation is the most efficient form of long-haul transport, bringing people, business and growth together around the world. We are playing our part in the fight against global warming – we just need to be better at telling people and taking action wherever we can.

Safe landings,
Alan Peaford, editor-in-chief

COVER: EgyptAir chairman Ahmed Adel . PICTURE: BILLYPIX

Advertisers

AAR Corp.	85	FlightSafety International	13	Rabigh Wings Aviation Academy	21
Abu Dhabi Aviation	71	ITW GSE	66	SEGMA	30
Airbus	4	Jewels Doors Limited	42	THALES	IFC
AMAC Aerospace	OBC	Lockheed Martin	7	TP Aerospace	29
Avtrade Ltd	25	Lufthansa Technik AG	9	Turkish Aviation Academy	19, 20
BIDEC 2019	59	Luxivair SBD	82	University of South Wales	45
Bose Aviation	2, 3	MEBAA Show Morocco 2019	39		
CAA International	43	NEXUS Flight Operations	10, 11		
CFM International	17	Services			
Dubai Airshow 2019	89	NH Industries	54		
Falcon Aviation	IBC	Qatar Executive	15		

ARABIAN AEROSPACE
 magazine is a proud
 "Industry Partner" of:



ARABIAN AEROSPACE
 magazine is officially
 supported by:



A close-up photograph of a pilot's hand reaching for a control panel in a cockpit. The panel features various buttons, switches, and a small illuminated display. The background shows the cockpit's instrument panel and a window looking out onto a bright sky.

BOSE

AVIATION

NEW

INTRODUCING PROFLIGHT SERIES 2

Engineered by Bose. Refined by pilots.

With all the features pilots appreciated in the original, the new ProFlight Series 2 now offers significant improvements and updates based on pilot feedback. A new lighter, thinner and more flexible cable and improved tap control for talk-through communication make ProFlight Series 2 Bose's lightest and most advanced aviation headset yet. Like the original, ProFlight Series 2 is FAA TSO and EASA E/TSO-C139a certified.

**Experience the changes for yourself -
learn more at Bose-Aviation.eu**

Connect with us @BoseAviation





WE'VE EXPANDED, SO YOU CAN TOO.



FLY
WE MAKE IT

Introducing two clever ways to grow your business. The A220-100 and A220-300 are the newest members of our single aisle family – covering the market from 100 up to 240 seats and flying up to 4,000nm. And with the very latest in cabin ergonomics your passengers will be as comfortable as your profit margin.

Profitability. We make it fly.

08 **business brief**

A round-up of the region's news.

AIR TRANSPORT

COVER STORY

22 The grand plan

Egypt's large-scale projects like the Grand Egyptian Museum and a new high-speed rail network are fuelling hopes of a happier future. EgyptAir's CEO has big plans for the next few years.

26 Extending its reach

Jazeera Airways is aiming for a substantial expansion with a re-equipment programme.

28 A better experience

Etihad ups its economy service. Its latest seat offers extra comfort and space.

31 Fleet of foot

Emirates stays on its toes with new orders.

32 Starting point

Why Oman Aviation Group sees itself as an economic catalyst and a major part of the country's diversification programme.

35 Sweet smell of success

Jasmin Airways welcomes first E170.

36 Winging in

Lebanese airline Wings is looking for new niches to help strengthen its business.

38 Fighting back

Air transport sector tackling the wildlife traffickers.

GENERAL AVIATION

52 Aiming high

There's a new mood of confidence at Airbus Helicopters as the rotor market embraces fresh technologies.

DEFENCE

55 Turkey's fast show

Alan Warnes reports from the IDEF event in Istanbul where Turkey emphasised its need for speed.

58 Giant step

TAI unveils its new heavy attack helicopter.

59 Helicopter progress

The Turkish Aerospace T70 programme is on track to achieve the country's military certification by February 2020.

60 Staying on track

Leading Arab air forces have enthusiastically embraced active electronically scanned array radar technology for their next generation of fighters.

Continued on Page 6

BUSINESS AVIATION



40 SHIFTING EMPHASIS
The world watches as EBACE goes green.

46 EMERGENCY ASSISTANCE
Nearly 20 years since its launch, UAS International Trip Support is now a vast business spread around the world.

48 BLAZING A NEW TRAIL
Why Jetex boss wants to axe the term FBO.

50 THE ROAD TO MOROCCO
Ali Alnaqbi looks forward to MEBA's Marrakech show.

51 A PLAN FOR SARAH
CEO shares his vision for the company.

EVENTS



67 SHOW OF STRENGTH
Dubai's Airport Show has become the world's biggest airport industry event.

68 THE RECORD-BREAKER
This year's Paris show – the 53rd event – was the biggest ever in its 110-year history.

73 BAHRAIN AT THE READY
Organisers are predicting that this year's BIDECE exhibition will be bigger and better than ever.

62 Rapid progress

The UAE is on track to receive its first GlobalEye swing-role surveillance system aircraft in April 2020.

63 North African fighters

Algeria and Egypt have both ordered the Sukhoi Su-35S multi-role fighter, risking angering the US in the process.

64 Double boost

Two moves by the US could see new aircraft coming to north Africa.

65 Helicopters on display

Egypt orders 20 Leonardo AW149 helicopters, while Oman's NH90 transport helicopters take part in exercise Inferno Creek.

TECHNOLOGY

78 Fuelling the future

Sustainable alternative jet fuel is now an essential need. We take a bio-fuelled test flight.

TRAINING

86 Pilot programmes

With the ever-increasing need for new pilots, training organisations all over the Middle East are weighing in.

WOMEN IN AVIATION

91 Battling subconscious bias

What needs to be done to promote aviation for women – and one success story.

REGULATORY

93 Keeping Dubai safe

Ibrahim Ahli, deputy CEO at Dubai Air Navigation Services, talks about the challenges faced by his organisation.

SPACE

94 History-maker

Hazza Al Mansouri will become the first Emirati in space when he is launched on an eight-day mission to the International Space Station in September.

PEOPLE

95 Appointments

The new men and women stepping up across the region.

96 All In A Day

Talel Kamel – Collins Aerospace VP customer and account management, Middle East and Africa.

AIRPORTS



74 TRACKING IMPROVEMENT

Analysis shows that tracking and technology are key to improved baggage delivery figures and greater customer satisfaction.

76 SMOOTH OPERATION

How DXB's runways enjoyed a complete makeover.

77 POWER-PACKED

Sharjah airport 'greens' its ramp.



80 AT THE HUB OF THE MATTER

Control of the 'big data' generated by modern airliners is increasingly a sensitive issue in the MRO industry.

83 VIRTUAL BECOMES REALITY

The real and 'virtual' worlds are intertwining as new training techniques start to take off.

Powerful partnership. F-16 Block 70 for Bahrain.



For more than 40 years, our enduring relationship with the Kingdom of Bahrain has been anchored in our deep commitment to support the Bahraini leadership in ensuring the safety and security of its people through proven performance, partnership and innovation. Bahrain is now the first customer in the world to procure the F-16 Block 70, the newest and most advanced F-16 production 4th generation fighter, taking our partnership to even greater heights.

Learn more at lockheedmartin.com/f16.

Lockheed Martin. Your Mission is Ours.®





Lounge for young flyers

Air services provider, Dnata, has opened a new airport lounge at Dubai International (DXB) to enhance young flyers' travel experience.

The newest Dnata facility has been designed and launched exclusively for unaccompanied minors, whose safety, security and comfort are ensured by the company's specially trained team at the airport.

Located at Terminal 1, the lounge is decorated in vibrant colours and is equipped with games and entertainment screens to keep the young guests occupied throughout the day. It is open 24 hours and manned by experienced, multilingual staff.

Double Click for a virtual assistant

Dubai-based Click Aviation Network, which offers support services around the world to business aviation operators, was celebrating a double at EBACE – the growth of its Omega artificial intelligence platform and the integration of its recent US acquisition, CharterPad, into the business.

Omega acts as a virtual assistant, providing a solution for every travel need, says Click. What's more, by using artificial intelligence, Omega learns the needs of each user and offers a service that self-customises to those needs, offering live updates about available aircraft, permits, fuel and handling rates, and other details needed for trip planning.

The company is just four years old but now has a worldwide reach, with 14 offices including a new one just opened in Shanghai, and more than 200 employees.

CharterPad, the second largest charter platform in

the US, has not only had a thorough revamp as it integrates with the rest of Click, but is also preparing to launch into Europe. The acquisition not only gave Click an entrance into the US, but also expanded its data on available aircraft.

■ EBACE review – Page 40

Flyadeal cancels 737 Max order

Saudi Arabian low-cost carrier, Flyadeal, has cancelled an order for 30 Boeing 737 Max aircraft.

The airline originally signed the deal with Boeing in 2018. It was worth up to \$6 billion for 30 of the latest version of the 737 – with an option for 20 more.

However, since the crashes of two 737 Max jets, the first in Indonesia in October followed by one in Ethiopia in March, which killed 346 people, the airline has switched the order to Boeing's rival, Airbus, with a new agreement for 30 A320neo aircraft.

Since the crashes, investigators have focused their efforts on the Boeing

aircraft's control system and the company has been working with regulators to roll out a software upgrade.

As yet, there is no date when the Boeing 737 Max aircraft might be cleared to fly again.

Boeing has announced it will be giving \$100 million to help families affected by the two crashes.

A big deal for Rwanda

Saudi Arabian aviation training company, Nexus, and Rwandan training company, Akagera Aviation, have signed a joint venture agreement that will upgrade Akagera's training wing to become a fully fledged academy that will operate under the name Nexus Training Academy.

Claver Gatete, the minister for infrastructure in Rwanda, said: "We have high expectations from this new Nexus Training Academy. This investment fully aligns with the national transport policy with a plan to establish an aviation centre of excellence for the

development of the skills needed to support the growth of the aviation sector in Rwanda.

"This signing will not only ensure sustainable growth of the aviation industry but will also offer valuable employment opportunities to Rwandans."

Of Paramount importance

Saudi Arabian Military Industries (SAMI) and Paramount Group have signed a high-level defence collaboration agreement, in step with Saudi Arabia's vision for the creation of an integrated defence industrial ecosystem.

The multiple collaboration agreement will see the development of technologies and capabilities across the land, sea and air domains, as well as system integration, in support of vision 2030, Saudi Arabia's economic development plan, which sets an ambitious objective to increase the domestic share of military equipment expenditure to 50% by 2030.

Jets for Qatar

Qatar Executive has received two new state-of-the-art Gulfstream jets.

The private jet charter division of Qatar Airways Group added one G650ER and one G500 aircraft to its fleet a couple of weeks ago, bringing the total number of Qatar Executive aircraft up to 18.

Qatar Executive vice president, Ettore Rodaro, said: "These truly advanced jets enable us to offer an unparalleled flying experience to our global clientele, who I am sure will be thrilled when flying on board these aircraft."

Luxury completion

Comlux has announced the delivery of its first VIP wide-body cabin completion on an Airbus ACJ330.

The more-than 200sqm interior allows up to 31 passengers to travel in ultimate comfort in various master suites, lounges, dining area, and first-class seating. The aircraft is also equipped with a gym room and an entertainment area featuring a 52in curved screen.

Can you imagine the future is now?



Open. Modular. Neutral.

AVIATAR is the only operator-focused aviation platform developed with the knowledge and experience of leading airlines and MROs. The independent and fast-growing platform provides digital products and services through a wide range of applications – tailored precisely to your needs. Manage complex operations, increase aircraft availability, improve efficiency, save costs – all in one digital TechOps platform. Become part of a strong community and join us in shaping the future of aviation.

GET IN TOUCH.

E-mail: info@aviatar.com
www.aviatar.com
www.lufthansa-technik.com



AVIATAR

by



Lufthansa Technik

MAKE YOUR CONNECTION.

LOCATIONS AROUND THE GLOBE

DAMMAM

DUBAI

JEDDAH

KIGALI

MONACO

MUMBAI

CHENGDU

RIYADH

BOSTON

NEXUS BRINGS THE WORLD TO YOU

NEXUS delivers an unmatched, world-class aviation experience from start to finish. With a strong focus on service excellence and operational efficiencies, we connect travelers to the world by transforming the everyday customer experience into something extraordinary.

YOUR NEEDS COME FIRST

NEXUS is the premier provider of flight operation services. We offer VIP clients a superior experience in aviation services and cutting-edge security services that adhere to the most stringent international regulations. Our full suite of end-to-end travel solutions was designed to ensure that we are always one step ahead in anticipating your needs, including:



Flight Planning Services



Flight Dispatch Services



Security Solutions



Crew Services



Ground Handling Arrangements



Refueling Arrangements



Landing Permits



Overflight Clearance

nexus
GROUP

nexus.aero

info@nexus.aero

Weather watch boosts safety

Etihad Airways has bolstered flight safety by choosing to deploy SITAONAIR's electronic flight bag (EFB) weather awareness solution, eWAS, across more than 100 aircraft. Developed in partnership with GTD, eWAS is a user-friendly, cloud-hosted application that significantly improves situational awareness and reduces many of the costs associated with weather avoidance. It allows pilots to study areas of turbulence along their flightpaths, preparing them for alternative routing well in advance.

Level 4 for Oman Air

Oman Air has received the level 4 new distribution capability (NDC) certification from the International Air Transport Association (IATA).

NDC is a key project, launched by IATA to modernise airline distribution.

It enhances the capability of communications between airlines and travel agents by enabling an airline to make sales offers directly in real time, which will also permit airlines to both define and price their products in any way they wish.

Big pharma

Emirates SkyCargo has started handling pharmaceutical cargo at a new purpose-built facility in Chicago.

The facility, dedicated solely for pharmaceutical shipments, is spread over 1,000sqm, with scope for additional expansion.

It provides comprehensive protection for pharma cargo through temperature-controlled zones for acceptance and delivery, pharma cargo build-up and



EAT is hungry for further success

Soaring global demand for airline pilots and the increasing popularity of Airbus A320 and Boeing 787 aircraft, have jointly sparked major growth in the pilot training division of Abu Dhabi's Etihad Airways.

"Air travel is booming, and so is demand for pilots and other aviation professionals," said Captain Paolo La Cava, managing director. "The number of passenger journeys on the world's airlines is expected to double within 20 years, and manufacturers Airbus and Boeing are both predicting that total aircraft numbers will also double to accommodate this growth," he said.

La Cava said training for new pilots from an initial stage was a growing activity of Etihad Aviation Training (EAT), which currently has more than 100 cadet pilots and 22 training aircraft, including four Embraer Phenom 100 jets, all based at Al Ain.

■ Captains fantastic, page 86.

break down, storage and direct ramp access.

Developed in partnership with ground-handling company, Maestro, the facility has a capacity of 15,000 tonnes of pharma shipments per annum.

Faith move

The Department of Community Development in Abu Dhabi has officially inaugurated the first multi-faith prayer room at Abu Dhabi International Airport. The room provides passengers of all faiths with a quiet and reflective space located away from the main airport to gather their thoughts and practise their faith.

Bryan Thompson, chief executive officer of Abu Dhabi Airports, said: "As a global hub, we welcome passengers from all walks of life, and our multi-faith prayer room initiative seeks to accommodate the needs of our passengers from all faiths."



Saudia grows A320neo family

Saudi Arabian Airlines (Saudia) has decided to expand its existing A320neo family order from 35 to as many as 100 aircraft, including 35 options.

The agreement was announced at the Paris Air Show by Saleh bin Nasser Al-Jasser, director general of Saudi Arabian Airlines Corporation, and Christian Scherer, Airbus chief commercial officer.

Airbus and Saudia have also agreed to further expand their partnership with the development of technical training, maintenance and other services.

■ Paris report, page 68.

Boeing's testing time

Boeing is to launch its latest round of flight-testing in the autumn to assess new technologies that could address real-world challenges for aircraft operators and passengers – from enhancing safety and sustainability to improving the flying experience.

The company is debuting a Boeing 777 that will serve as the 2019 flying test bed for 50 projects.

"This is the latest addition to our ecoDemonstrator programme, where we look at how crew and passengers can have a better experience and how technologies can make flying safer, more efficient and more enjoyable," explained Mike Sinnett, vice president of product strategy.

"Using the 777 flying test bed lets us learn faster and move forward on improvements much quicker and with greater fidelity in defining their value."

On the right track

The International Air Transport Association (IATA) 75th annual general meeting unanimously resolved to support the global deployment of radio frequency identification (RFID) for baggage tracking.

The AGM also called for the implementation of modern baggage messaging standards to more accurately track passengers' items in real time across key points in the journey.

"Deploying RFID and adopting modern baggage messaging standards will help us to cut mishandlings by a quarter and recover bags that are mishandled more quickly," said Alexandre de Juniac, IATA's director general.

■ Tracking improvement, page 74.

Sharpen Your Skills to Master Level With Advanced Training

FLIGHTSAFETY
IS HERE FOR
YOU



Your Proficiency

Go beyond the basics. Advanced training courses empower you to face challenging situations and make swift, accurate decisions.

Your Development

Gain deeper knowledge. Move past your foundational training to operate helicopters at the topmost level of safety.

Your Achievement

Earn the recognition. Complete our exclusive, broad-ranged Master Aviator program to obtain safety's highest standard.

Advanced Energy Management • Advanced Helicopter Crew Resource Management • Advanced Helicopter Surviving Inadvertent IMC



flightsafety.com • 314.785.7815 • A Berkshire Hathaway company

FlightSafety
international

Emirates' passengers in Pole position

Emirates' passengers bound for the US will soon be able to enjoy Wi-Fi, mobile service connectivity and live TV broadcast, even when flying 40,000 feet over the North Pole and Arctic circle.

In the past, passengers travelling over the polar region could have found themselves without connectivity for up to four hours due to the fact that most satellites that connect aircraft are geostationary, located over the equator. Consequently, aircraft antennae cannot see the satellite when in the far north, due to the Earth's curvature.

Emirates will partner Inmarsat to solve this problem with the addition of two elliptical orbit satellites, thus providing coverage over the North Pole by 2022.



Pilatus deal expanded

Strata Manufacturing has extended its agreement with Pilatus Aircraft to cover a new composite work package for the PC-24 twin-engine business jet.

The new agreement will see Strata manufacture PC-24 flap track fairings and comes exactly a year after the two major manufacturers signed a landmark partnership on the aircraft.

The expanded deal positions Strata as the major supplier of both belly and flap track fairings for the world's first 'super versatile jet'.

Rocket fails

A European Vega rocket carrying a satellite known as FalconEye1 – the first of two that will make up the UAE's FalconEye satellite system – crashed shortly after blast-off from the European spaceport in French Guiana.

French-based commercial space company, Arianespace, said the rocket is believed to have crashed into the Atlantic Ocean north of the space centre. The cause of the failure was being investigated as *Arabian Aerospace* was going to press.

■ First Emirati into space, page 94.

RJ goes Wow

Royal Jordanian (RJ) has selected Bluebox Aviation Systems to provide a wireless in-flight entertainment (IFE) system on board the airline's four Airbus A319 and six A320 aircraft.

Sky Connect, as the new IFE service is called, is deployed on the Bluebox Wow portable wireless IFE system and went live in May.

RJ passengers are able to stream IFE content, such as movies and TV shows, for free to their own personal devices. Content includes music, games and airline information.

Joramco 'first'

Joramco has performed its first C-check on a Royal Jordanian (RJ) Boeing 787 aircraft at its facility in Amman-Jordan.

Joramco CEO, Jeff

Wilkinson, said: "We are delighted to be increasing our B787 capability. The B787 is a key aircraft within our strategic plans and the increased scope of approval has been welcomed by our customers.

"We continue to build on Joramco's success as a leading MRO facility offering a globally competitive suite of services."

Strategic partners

GDC Engineering and Joramco have signed a letter of intent (LOI) to form a strategic, long-term partnership to pursue aircraft major and minor modifications and repairs opportunities for commercial aircraft throughout the region.

GDC will provide engineering and Part 21J certification services, while Joramco will provide engineering, labour, equipment and facilities required to perform modifications and repair services in accordance with European Aviation Safety Agency (EASA) and Federal Aviation Administration (FAA) regulations at its facility in Amman-Jordan.

Dream delivery

Boeing delivered the first 787-9 Dreamliner for Turkish Airlines in June.

The carrier plans to use the aircraft's fuel efficiency, range, reliability and size to operate new non-stop international routes such as Bali, Bogota-Panama, Washington and Atlanta.

"We're thrilled to reach new horizons with the addition of the 787-9 Dreamliner to our fleet flying from our new home at Istanbul Airport," said M. Ilker Ayçi, Turkish Airlines' chairman of the board and the executive committee.



SAMI buys AEC to boost defence growth

Saudi Arabian Military Industries (SAMI) has signed an agreement to acquire 100% ownership of Advanced Electronics Company (AEC).

SAMI's investment in AEC, the Riyadh-based private sector firm, comes as part of its ongoing efforts aimed at increasing local defence manufacturing in the kingdom, in line with the directives of the Saudi Vision 2030.

AEC specialises in engineering, development, manufacturing, repair and technical support across defence, information communications technology (ICT), energy, cybersecurity and high-tech fields.

SAMI chairman, Ahmed Al-Khateeb, said: "Today's agreement marks a significant milestone for us as we advance our efforts to build a strong, dynamic and sustainable military industries sector in Saudi Arabia."



QATAR
EXECUTIVE

القطرية لطائرات رجال الأعمال



FLY IN A CLASS OF YOUR OWN

An unparalleled level of luxury and an exquisite travel experience are your choice.
Welcome to a world where you define your style of travel.

qatarexec.com.qa

Turkish support for Kazakhstan

Turkish Technic has signed a long-term power-by-the-hour services contract with Kazakhstan flag-carrier, Air Astana, to serve its fleet of Airbus A320 family aircraft – both ceo and neo.

Turkish Technic will provide 24/7 support through its internet-based pool web-suite portal, which will allow Air Astana to access all the necessary information needed. The components will be repaired and overhauled in Turkish Technic's state-of-the-art shops based in Istanbul.

Visionary move

Pilatus has selected Gogo Business Aviation's latest in-flight connectivity technology, Gogo AVANCE L3, as a factory option on new production PC-12 NG aircraft.

The PC-12 NG becomes the first single-engine turboprop to have the L3 system installed at the factory and, because it includes Gogo Vision, it marks the first time passengers will have access to Gogo Vision's extensive list of features, including movies and television programmes.

Sealing the deal

Saudi Air Navigation Services (SANS) has formally selected SITAONAIR to elevate the kingdom's air traffic management capabilities, through to 2025.

SITAONAIR will deliver its country-wide, VHF and digital automatic terminal information service (D-ATIS) solutions, benefiting all airlines flying in Saudi Arabia.

The company will establish additional VHF stations, providing coverage in new locations. It will also further optimise datalink



Mi-38 passes extreme conditions test

Specialists at the Mil Moscow Helicopter Plant, a subsidiary of the Russian Helicopters Holding Company (part of Rostec), finished a series of Mi-38 flights in July conducted under the instrument flight rules, as well as in conditions of extremely high temperature and high altitude.

The helicopter made more than 50 flights in the city of Astrakhan, successfully confirming the possibility to operate at ambient temperatures of up to +45 degrees Celsius.

High altitude tests were conducted at Mount Elbrus and results confirmed the Mi-38's ability to fly in altitudes of up to 3,000 metres above sea level.

The Mi-38 helicopter can be used for transporting cargo and passengers, search-and-rescue operations, and VIP transportation.

coverage and services by upgrading both existing stations and its AIRCOMcats D-ATIS gateway server.

The project will specifically aim to ensure coverage in the south-east and north-west of Saudi Arabia for en-route traffic, increasing the availability of VHF/VDL networks at all main airports in the kingdom and beyond.

Transatlantic 'first'

Embraer's new Praetor 600 super-midsize business jet completed its first transatlantic crossing in May powered by sustainable alternative jet fuel (SAJF).

The aircraft arrived in Farnborough, UK, having departed from Teterboro Airport in the US. The first transatlantic flight of the Praetor 600 covered about 3,000 nautical miles with about 15,000lb of fuel, of which 3,000lb was SAJF.

■ The challenge of fuelling the future, page 78.



Mars mission brings Hope for the future

The UAE's Mars mission is planned to begin in less than a year, the nation's space agency and the Mohammed bin Rashid Space Centre has announced. It plans to launch the Hope probe into orbit around mid-July 2020, and it is expected to reach Mars orbit in the first quarter of 2021 – the year of the golden jubilee of the UAE.

This is the first Arab project to explore another planet and the first time a space exploration mission will be able to take a global picture of the Martian atmosphere.

It aims to collect information on Mars' meteorological layers and study the causes of loss of hydrogen and oxygen gases, the two main constituents of water, from the upper layer of the Martian atmosphere.

The probe will be launched from Tanegashima Space Centre in Japan, with a carrier rocket similar to that used for the launch of satellites, and it will take from seven to nine months to reach Mars.

■ UAE to launch first Emirati into space, page 94.

A huge LEAP for Gulf Air

Gulf Air and CFM International have finalised the purchase agreement for 65 LEAP-1A engines to power the airline's new fleet of Airbus A320neo family aircraft.

The agreement, which includes engines for 17 A320neos and 12 A321neos, is valued at approximately \$1 billion at list price.

"We are delighted to expand our long-term relationship with CFM International. We have been operating CFM engines for three decades and we are excited to introduce the LEAP engine into our new fleet of A320neo family aircraft.

"This state-of-the-art combo will definitely be a key asset of our sustainable growth in the near future," said Krešimir Kucko, chief executive officer of Gulf Air.

Beirut ATC boost

Airways New Zealand and the Directorate General of Civil Aviation (DGCA) in Lebanon have officially opened an advanced air traffic control (ATC) simulation facility – future-proofing ATC training in Lebanon.

Airways International, the commercial arm of the New Zealand air navigation service provider, has completed installation of a TotalControl tower simulator and two radar/non-radar simulators at Beirut-Rafic Hariri International Airport after a 12-month project.

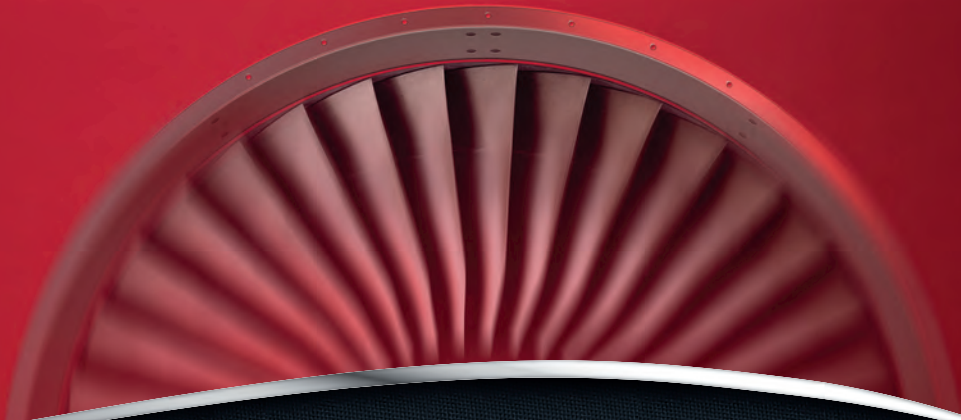
The facility, to be used to train DGCA's ATC controllers and students, using simulated scenarios that mimic the real world, is now fully commissioned after the completion of site acceptance testing.

Reflecting on the past.
Looking to the future.

Our 600+ airline customers have helped CFM define the power of flight and these relationships have been the very heart of our business for more than four decades. Today, we have the power to redefine the future. Extraordinary together.

cfmaeroengines.com

CFM International is a 50/50 joint company between GE and Safran Aircraft Engines



Extraordinary together



Strata moves to a different level

Work is now under way at the advanced composite aero structures manufacturing company, Strata, which is expanding its current manufacturing facilities in Abu Dhabi to take on board the assembly of the Boeing 787 Dreamliner vertical fins.

Under the agreement, Strata will replicate the capabilities of the Boeing Salt Lake City 787 vertical fin assembly line to sub-assemble vertical fins for the Dreamliner family from its Al Ain facility.

“Strata Plus is an important milestone for the company to position it for the next phase of growth,” said Strata CEO Ismail Ali Abdulla.

A new door opens

Spatial, a provider of cabin crew training simulators based in the UAE, has been chosen by Aeroflot to supply two A321 Door Trainers.

The high-fidelity devices will simulate all faults that may ever be encountered on the A321 aircraft door types, including door and handle jams, power assist failures, automatic and manual slide inflation failures, and door indicator malfunctions.

Library booked in

Ethihad Airways has introduced Boeing’s toolbox mobile library, an iPad mobile application, to enable its technical operations team to improve the efficiency of its maintenance engineers and technicians.

The airline’s engineers now have access to maintenance documents for instant reference and use at all times, removing the need to rely on connectivity or hard-copy printouts.



Muscat is named best ME airport for first time

Muscat International Airport has been voted the ‘best airport in the Middle East’ for the first time. The honour was based on travellers’ choice and came at the World Travel Awards presentations.

Oman Airports CEO, Sheikh Ayman bin Ahmed Al Hosani, said: “On behalf of the executive management of Oman Airports, I would like to congratulate all the employees of Muscat International Airport and all the official and

commercial companies and airlines operating at the airport, as well as all our strategic partners who contributed directly to this achievement.

“This award recognises the exceptional efforts and services by all our staff and partners, who demonstrate outstanding dedication to the betterment of Muscat International Airport, as well as all the other airports of Oman.”



CFM celebrates billionaire milestone

CFM, the joint-venture engine maker from Safran and GE, hit a world-first milestone when the company announced that its fleet of CFM56 engines had passed the one billion flight-hours mark – the first ever.

“To figure out what that means, I converted it into years – it’s like one engine has been running for 115,000 years,” said CFM president and chief executive, Gael Meheust.

The engine powers narrow-body aircraft, such as the Boeing 737 and the Airbus A320 families.

Meheust said CFM took 28 years to reach the first half-billion flight hours.

“And the second half-billion took only eight,” he added.

CFM’s focus is now the Leap engine, which is on the Boeing 737Max as well as A320neo, plus the prototypes of the Chinese Comac C919.

“We will deliver 1,800 Leap engines this year and 2,000 next year. So, we’re at something like 40 engines per week,” Meheust said.

Qatar’s signing spree

Qatar’s relations with the US were boosted by a signing spree during a visit by the ruler of the Gulf country to President Donald Trump at the White House. The agreements brought to light previously signed, but unannounced, deals, including \$1 billion of Gulfstream jets for the Qatar Executive fleet and Five Boeing 777F freighters.

Qatar has also confirmed that GE’s GENx engine will power its 30 new Boeing 787-9 aircraft, along with a TrueChoice flight hour agreement to cover the MRO of the engines.

On the move

Jet Aviation will relocate to a new and larger 600sqm facility area within the shared fixed-base operation (FBO) terminal at Riyadh’s King Khalid International Airport. The airport is currently undergoing a massive overhaul to accommodate more traffic.

Jet Aviation expects its new refurbished FBO to be operational by the fourth quarter this year.

Khaled Al-Ghamdi, general manager of Jet Aviation in Saudi Arabia, said: “With the expected traffic growth to Riyadh in the coming years, the additional space is necessary and offers great benefit in terms of passenger and crew comfort.”

Delivery dash

Bombardier has announced that its industry-leading Challenger 350 aircraft is the fastest business jet in history to reach 300 deliveries in the medium and large categories.

“This landmark comes as the Challenger 350 jet was recently recognised by *Robb Report Magazine* as the best of the best super mid-size aircraft for the second consecutive year,” said Peter Likoray, senior vice president, worldwide sales and marketing, Bombardier Business Aircraft.

“The delivery of the 300th Challenger 350 only five years after its entry-into-service represents another exciting milestone for Bombardier, and underscores the trust our customers place in this industry-leading aircraft.”

AVIATION ACADEMY




LEARNING HUB FOR INTERNATIONAL AVIATION PROFESSIONALS

- IATA TRAININGS
- DANGEROUS GOODS TRAININGS
- CARGO TRAININGS
- GROUND SERVICES OPERATION TRAININGS
- ORGANIZATIONAL DEVELOPMENT TRAININGS
- DIGITAL TRAININGS
- LANGUAGE TRAININGS
- AIR TRANSPORT MANAGEMENT MASTER PROGRAM
- "CONQUER YOUR FEAR OF FLYING" PROGRAM

Turkish Airlines Aviation Academy

E-mail: aviationacademy@thy.com

Phone: +90 (212) 463 63 63 – Extension: 11900

 /TurkishAirlinesAviationAcademy  /AcademyTK  /TurkishAirlinesAviationAcademy



Birthdays celebrations

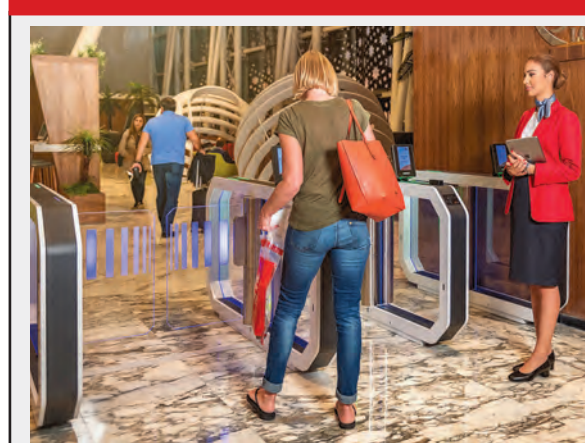
Flydubai is celebrating carrying more than 70 million passengers since its start of operations in 2009.

His Highness Sheikh Ahmed bin Saeed Al Maktoum, chairman of Flydubai, said: "The airline was launched with a mandate to open new markets and make travel more accessible to more people. I am happy to see Flydubai deliver on that commitment, which has seen the airline connect 71 previously underserved cities to Dubai, allowing a population of 1.5 billion easier access to one of the world's leading aviation hubs."

Circumnavigation speed record

Action Aviation chairman, Hamish Harding, astronaut, Terry Virts, and crew made history by beating the world circumnavigation speed record for any aircraft flying over the North and South poles.

The Qatar Executive



Quickfire access: The new gates process information in two seconds.

Pearl gate a shining example of easy access

National Aviation Services (NAS) and the Moroccan Airports Authority (ONDA) have implemented an electronic gate system to access the VIP Pearl Lounge in the Marrakech Menara Airport boarding area.

For access, passengers simply present and scan their boarding passes, their Pearl Lounge membership card, or their voucher purchased on the internet. The e-gate processes all the data on the boarding pass, verifies its eligibility and opens the access to the customer – all in less than two seconds.

This technology will be extended to all Pearl Lounges in Morocco.

According to Hassan El-Houry, CEO of NAS Group: "These new electronic gates will allow us to improve our service in Morocco and double efforts of Moroccan airports to compete with renowned international airports around the world."

Gulfstream G650ER aircraft completed the flight in a record 46 hours, 39 minutes and 38 seconds.

"Our mission, titled One More Orbit, pays homage to the Apollo 11 Moon landing achievement by highlighting how humans push the boundaries of aeronautics," said Harding. "We did this during the 50th anniversary celebrations of the Apollo 11 mission and the 500th anniversary of man first circling the planet. It is our way of paying tribute to the

past, the present, and the future of space exploration."

DAE reports \$1.1bn assets

Dubai Aerospace Enterprise (DAE) has revealed just how strongly the UAE aviation finance business is performing this year.

Announcing its 2019 first half strategic and operational highlights for its leasing division, DAE Capital said it had delivered and committed to deliver more than \$1.1 billion in aircraft assets.

The half-year statement showed there are now 357 owned, managed and committed aircraft in the fleet with 110 customers in 56 countries. These include eight new aircraft purchased in the six months with 20 sold and 24 lease transactions completed. DAE said it has a 99.2% portfolio utilisation.

Virgin listing

Virgin Galactic, which is backed by Abu Dhabi-based Mubadala Investment Company, plans

to go public as part of a merger deal with Social Capital Hedosophia Holdings to become the world's first listed space tourism venture.

The New-York listed Social Capital Hedosophia, a special purpose acquisition company, will take a 49% stake in the combined entity, the companies said.

The enterprise value of the new company is \$1.5 billion and the transaction is expected to be completed in the second half of the year.

Turkish Airlines cadets head for BAA Training

Turkish Airlines has signed a contract with BAA Training for a new cadet programme.

One of the top three biggest independent aviation training centres in Europe, BAA Training will school almost 300 cadets for the airline in three-and-a-half years.

"Being chosen to provide pilot training for one of the leading airlines in the world once again allows us to contribute to the growing aviation market," said Egle Vaitkeviciute, CEO at BAA Training.

"With strategic investments into the infrastructure and our proven experience providing cadet training programmes, we are capable of offering high-standard pilot training and, together, will help build a safer tomorrow for aviation."



AVIATION ACADEMY LEARNING HUB FOR INTERNATIONAL AVIATION PROFESSIONALS

Turkish Airlines Aviation Academy

E-mail: aviationacademy@thy.com Phone: +90 (212) 463 63 63 – Extension: 11900

- IATA TRAININGS
- DANGEROUS GOODS TRAININGS
- CARGO TRAININGS
- GROUND SERVICES OPERATION TRAININGS
- ORGANIZATIONAL DEVELOPMENT TRAININGS

- DIGITAL TRAININGS
- LANGUAGE TRAININGS
- AIR TRANSPORT MANAGEMENT MASTER PROGRAM
- "CONQUER YOUR FEAR OF FLYING" PROGRAM



akademi.thy.com



[/TurkishAirLinesAviationAcademy](https://www.facebook.com/TurkishAirLinesAviationAcademy)
[/AcademyTK](https://www.instagram.com/AcademyTK)
[/TurkishAirLinesAviationAcademy](https://www.linkedin.com/company/TurkishAirLinesAviationAcademy)



Rabigh Wings Aviation Academy

THE FIRST AND ONLY OPERATIONAL
FLIGHT SCHOOL IN SAUDI ARABIA

YOUR PASSION OUR WINGS

BECOME A
PILOT

FLIGHT TRAINING - HIRE AND FLY - PILOT SHOP



Rabigh Airport

- +966 12 233 1772
- +966 12 613 1366
- +966 56 267 4620
- info@rabigh-wings.com
- www.rabigh-wings.com

EgyptAir is betting on a renewed period of development and prosperity after a challenging few years. Martin Rivers and Alan Peaford talked to Ahmed Adel, the flag-carrier's new chairman and chief executive.

Ups and downs on the pyramid of growth

Like any state-owned flag-carrier, EgyptAir's fortunes are tied inexorably to those of its home nation. That has translated to heavy losses and weak demand in recent years as the country was buffeted by successive waves of political and security unrest.

Two devastating air disasters – the bombing of Metrojet flight 9268 and the still unexplained crash of EgyptAir Flight 804 – only added to the airline's troubles.

However, with improved security and renewed investment under President Abdel Fattah el Sisi, optimism is rising on the streets of Cairo.

Large-scale projects like the Grand Egyptian Museum and a new high-speed rail network are fuelling hopes of a happier future – one in which both locals and foreigners can travel across this ancient land without fear of violence or persecution.

For Ahmed Adel, EgyptAir's new chairman and chief executive, preparing the flag-carrier for the next decade is a balancing act between unlocking the country's growth potential and building defences for the next, inevitable crisis.

"The aviation business goes hand-in-hand with the economy and with the stability. In the past two to three years, stability in Egypt has become much, much better," said Adel.

"With the mega projects that are happening in the country, the stability, the security enhancements, we are expecting that there's going to be good growth. The numbers that are coming out of the tourism ministry are very promising.

"But the aviation industry is very sensitive. It's very affected by geopolitical situations."

Despite planning to grow the 72-strong fleet to more than 100 aircraft, therefore, Adel's immediate focus is on a "complete restructuring plan for the future, to make EgyptAir well

placed in the aviation industry and able to compete".

Lifting operational efficiency, streamlining group-wide management structures, and rejuvenating the route network are his top priorities.

The first step was hiring consultancy firm, Bain & Company, to assist with the development of the overarching turnaround plan. Following "quick wins" such as boosting aircraft utilisation, Adel's attention has now turned to an 18-month implementation phase that will see the activities of several subsidiaries folded into the main airline.

More efficient product

"In a nutshell, the strategy that we agreed upon is to make the holding company a lean holding company where all the strategic decisions are made, and to consolidate or merge some of the companies together to have a more efficient product," he explained.

EgyptAir Express, the group's regional arm, will be the first casualty.

Its existing fleet of 12 Embraer E170s will be replaced with an identical number of Airbus A220s between this September and next April. But with the new model being inducted by the mainline carrier rather than the subsidiary, Express is effectively being shut down.

"Instead of two companies with two different boards, [we want] to make the decision-making process under one roof, to start moving forward towards an efficient smart network," Adel said.

In the past, he admitted, rival managers at the mainline and regional subsidiaries have ended up "competing with each other" instead of "working hand-in-hand" to promote the broader interests of the group.

Changes are also expected at Air Cairo,

though precise details have not been finalised and the brand is expected to survive.

Air Cairo currently has an awkward business model straddling both scheduled low-cost carrier (LCC) operations and more traditional charter flights. Its hybrid approach is, in part, a reflection of the Egyptian market's continued reliance on pre-packaged holidays – a sector that has been in decline globally amid the rise of self-booked online travel.

In 2017, Yasser el Ramly, Air Cairo's chairman and chief executive, told *Arabian Aerospace* that he planned to nearly triple the fleet size while pivoting towards higher frequency scheduled operations. To date, however, little has changed at the company beyond the unveiling of a new brand.

Adel tacitly admitted that Air Cairo is not meeting its potential and said the best way forward could be for EgyptAir to take full ownership of the subsidiary.

"We hold a 60% stake in Air Cairo, so we are doing our due diligence now because Air Cairo fits as a low-cost arm, and our strategy is to have a strong low-cost arm," he affirmed.

"We are looking into considering acquiring Air Cairo fully ... If we take the decision to acquire it, we're going to turn it around completely to be an LCC operator, fully scheduled, with all the bells and whistles and the perks that come with being an LCC."

Asked whether the no-frills model is compatible with Egyptian regulations – foreign carriers are obliged to offer a full-service product on routes to the country – Adel said the legal landscape will be assessed before any investment is made.

"We will look into it, because it

Continued
on Page 24

Ahmed Adel:
Striking the balance
between unlocking
the country's growth
potential and
building defences
for the next,
inevitable crisis.



CONTINUED FROM PAGE 22

[Air Cairo] falls under the 159 law not the 203 law of EgyptAir,” he noted. “We want to keep it this way... The 159 law gives more freedom.”

Further opportunities for consolidation have been identified in the cargo division.

EgyptAir Cargo last year became launch customer for the A330-200P2F and currently deploys two of the passenger-to-freighter conversions, with a third expected shortly. When that unit arrives, the airline's last A300F will be retired and type commonality will allow the operation of the freighter fleet to be moved to the main airline.

Responsibility for the EgyptAir Cargo Village will also be transferred to EgyptAir Ground Services, Adel said, citing the latter's specialised expertise.

At a government level, talks are, meanwhile, under way about possible consolidation between the EgyptAir Training Academy and the transport ministry's own pilot cadet programme. Adel believes a merger is now likely, though it is not clear whether the new entity will come under the umbrella of the airline or the ministry.

Turning to the fleet, he admitted that diversity in the types of aircraft operated by EgyptAir is an obstacle to greater efficiencies.

The mainline carrier currently deploys six Boeing 777-300s, three 787-9 Dreamliners, 29 737-800s, four A330-200s, four A330-300s, and four A320s. Another three Airbus freighters, 12 Embraers and seven A320s are operated by EgyptAir Cargo, EgyptAir Express and Air Cairo respectively.

Stated goal

Although fleet rationalisation has been a stated goal of successive management teams, EgyptAir continues to deploy a mixture of Airbus and Boeing metal in both its narrow-body and wide-body fleets.

The flag-carrier is inducting 15 A320neos next year, for example, despite nine of its 737-800s having been delivered by Boeing within the past three years. Likewise, the imminent arrival of three more Dreamliners – expected by the time this article goes to press – comes alongside plans to keep the A330-300s in service for several more years.

The passenger A330-200s and the older-generation A320s are the only models facing imminent retirement, though EgyptAir also recently stopped operating the 777-200 and the A340.

“Our next step, during the second half of the year, is to start looking into the renovation of the next 50% of the fleet, and to grow north of 100 aircraft by 2027,” Adel said, confirming that an earlier target of 127 aircraft by 2025 has been scrapped.

“I wouldn't say it's slowed down. I would say we're looking at it again, because with everything that's happening we don't want to bite off more than we can chew.

“We needed to finish the restructuring plan and then move into the network planning, and then make the decision about the second batch of the aircraft... We're now working on that aggressively.”

“Our next step, during the second half of the year, is to start looking into the renovation of the next 50% of the fleet, and to grow north of 100 aircraft by 2027.”

AHMED ADEL



The chairman would not be drawn on his preferences for future orders, confirming only that the 777-300s will need replacing in the first half of the next decade – followed shortly after by the A330-300s. About half of EgyptAir's 737-800s and all of Air Cairo's A320s will also be more than 15 years old by that timeframe.

Earlier plans to deploy as many as eight freighters – including a pair of A320P2Fs – are no longer active due to challenging conditions in the cargo market.

“We converted three, and then instead of converting the rest we have shifted the strategy [by] increasing the amount of [passenger] aircraft in the fleet, so increasing the belly volume,” Adel explained.

“For example, the cargo [subsidiary] was thinking of operating a direct flight to Chicago. Then, when we opened the Washington Dulles route, they found that there is no need... because the bellies of these [Dreamliner] aircraft would be more than enough to move cargo in and out of the United States.”

Washington became EgyptAir's third North American destination when it was launched in June as a thrice-weekly service, joining New York JFK and Toronto.

Adel wants to grow frequencies to five or seven flights per week “as fast as we can”, but will only do so when demand justifies the move.

Extra capacity is also planned for the airline's twice-daily service to London Heathrow, with a Dreamliner due to take over from the 737-800 that currently operates the afternoon flight.

At the time of writing, the network also included another 18 points in Europe, 18 in Africa, 16 in the Middle East and six in Asia Pacific.

Route launches are unlikely to be a priority

until further progress is made with the restructuring plan. But Adel confirmed that Shanghai remains of interest if suitable landing slots are offered by the Chinese authorities. And Africa is always “on the table”, he said, as evidenced by recent expansion to Douala (Cameroon) and Kigali (Rwanda).

The African network should grow further with the arrival of the A220s, as their range and capacity is nearly twice that of the E170s they are replacing.

But it is the domestic network that stands to benefit most from the new aircraft type. Several of the A220s are likely to be based at the new Sphinx Airport to the west of Cairo, enabling whistle-stop tours of the capital's main attractions.

“With the opening of the Grand Museum there will be an opportunity for one-day visits,” Adel affirmed. “People can come from Europe to the [Red Sea] resorts and then fly for one day without checking out of their hotel – take a tour of the pyramids and the Grand Museum – and go back to their hotel for their diving or sun-and-sea vacation.”

Connecting hub

At home base Cairo International Airport, meanwhile, EgyptAir aspires to have a “seamless, efficient connecting hub that will grow the sixth-freedom” traffic – but not at the expense of more lucrative point-to-point operations.

Adel is also conservative when it comes to the hot-potato subject of open skies, drawing a sharp distinction between unilateral arrangements that work to the advantage of one side and bilateral deals that spread the benefits more equally.

He cited the example of Saudi Arabia, with whom Egypt has “excellent bilateral agreements” owing to strong traffic flows between the two countries.

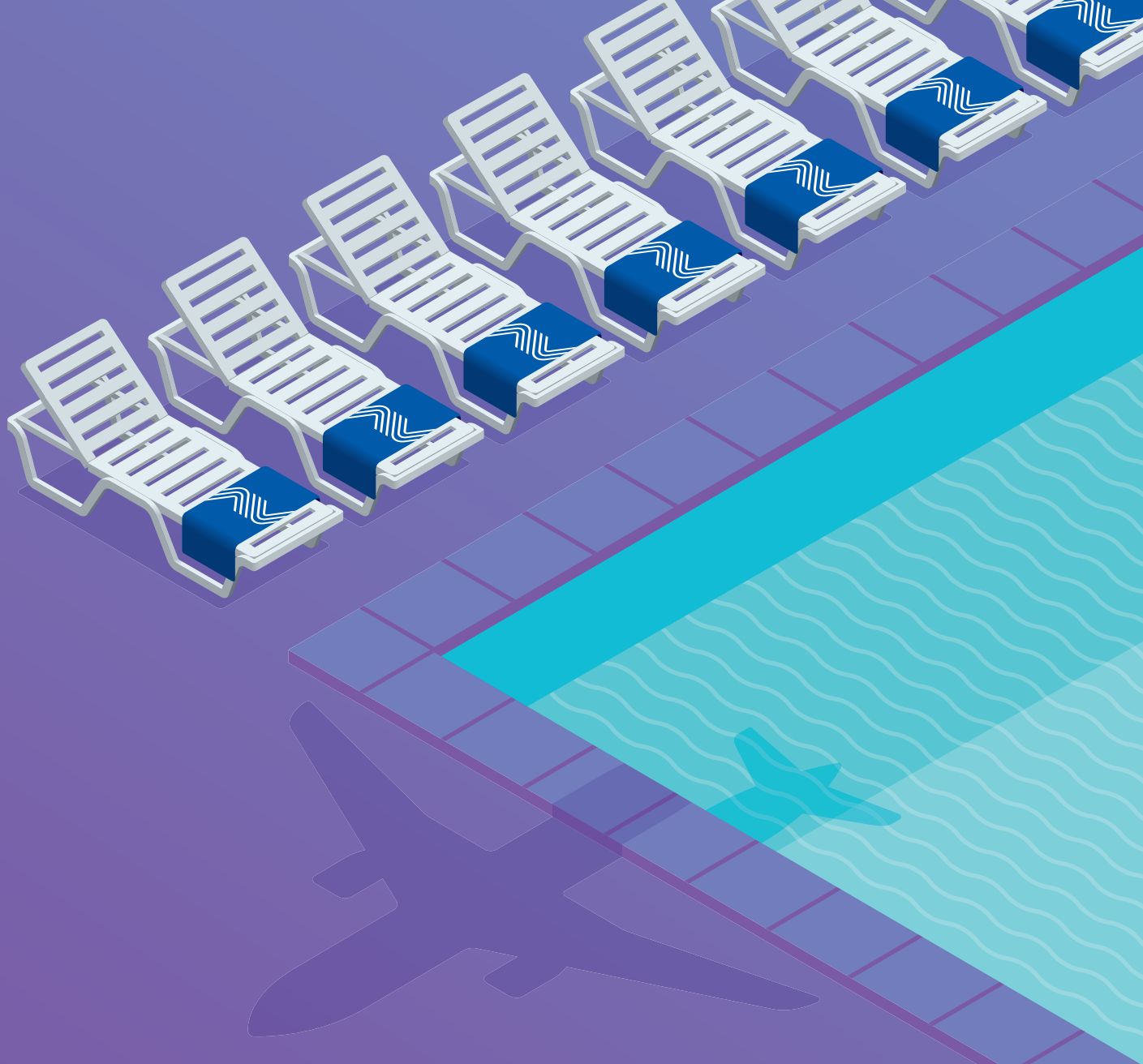
Without explicitly stating it, the chairman implied that such an agreement would not be possible with a super-connector airline like Emirates. Any open-skies deal with the Dubai Government would allow its flag-carrier to hoover up Asia-bound passengers from Cairo in vast numbers, while offering just one travel market in return.

“It has to be reciprocal,” Adel insisted. “This is our position. This is the win-win situation.”

Broader aero-political liberalisation is a question of “when, not if” for Egypt's government, he said, but EgyptAir needs time to prepare itself before the competitive floodgates are opened.

“Economically, you need to look at all aspects. If you look from the tourism aspect, yes, it [open skies] is excellent for today. But what if something happens?”

“All the companies that have the capacity to come [to Egypt] with seven or eight flights a day can close shop within 24 hours. And what's going to happen then? You're going to go looking for your national carrier, and it's not going to be there.”



Relax and enjoy unlimited pool access.

With Avtrade's bespoke contract solutions, you'll enjoy unlimited access to the world's largest component inventory. You'll also get an unrivalled package of flexible support options, whether you prefer fixed hourly rates or ad hoc pricing. So take the plunge and contact our Contracts Team now.



AVTRADE

THE GLOBAL COMPONENT
SERVICE PROVIDER

avtrade.com    

Jazeera Airways' re-equipment programme is allowing the airline to extend its reach beyond its traditional area of operations. Alan Dron reports.

THE JAZ ERA...

CEO Rohit Ramachandran and his team have plans for a substantial expansion of Jazeera's operations, but not at the cost of allowing profitability to suffer in a dash for growth. "We're on the cusp of some major expansion, but it's still growth with a close focus on our P&L [profit & loss], which has historically been the case."

Since 2017, that team "has taken Jazeera away from the status quo and moved it towards a really high-performance operation".

Since its creation, Jazeera has kept its route network closely focused on the Middle East, with some more recent expansion to half-a-dozen destinations in the Indian sub-continent. Now, however, the arrival of Airbus A320neos, with their longer range compared to the airline's existing A320ceos, is opening up new possibilities – notably London.

Ramachandran described London Gatwick as an "interesting experiment, as it's at the extreme edge of the range of the A320neo". However, flying to London on a daily basis would be a popular move, he said, giving Kuwaiti residents an alternative to flying with state-owned Kuwait Airways, which operates into London Heathrow.

Several factors

Ramachandran believes that several factors will help Jazeera compete against the national carrier. Firstly, cost: Kuwait Airways "is a full-service legacy carrier whereas we're a low-cost service. We will be operating the route with brand-new A320neos with 31in pitch, which is very comfortable compared to people's perceptions of low-cost service."

He also feels that Jazeera's own terminal at Kuwait International Airport will attract travellers away from the crowded main terminal. Those factors "will mean there will be a substantial UK-bound segment. There are strong links between Kuwaitis and London; many of them regard it as their second home, not least because of the number of students that live in the UK.

"This is going to be the first low-cost carrier (LCC) connectivity between the UK and the Gulf Cooperation Council countries," said Ramachandran.

Jazeera is frequently described as a hybrid carrier as it offers facilities such as business-class and lounge access, but Ramachandran argues that 'LCC' and 'hybrid' are labels that



More range: Jazeera's new Airbus A320neos will have the range to expand the carrier's route map both west and east.

are increasingly merging into one another.

Notwithstanding that blurring of categories – Jazeera has made some departures from low-cost orthodoxy to take account of local passengers' expectations – "We certainly see ourselves as a low-cost airline."

Jazeera hopes to start its London service in August, although the CEO said this could slip slightly because of delivery delays of the three A320neos from Airbus.

Looking eastwards, the A320neo also gives Jazeera the range to cover most of the Indian sub-continent: "Now that the [Indian] elections are over, we will be engaging through the Government of Kuwait with India to expand the bilateral air agreement."

The current number of available seats between Kuwait and India – 12,000 per week each way – is far too small to cater for the one million Indians resident in Kuwait, said Ramachandran. It explained why at least 50% of India-bound passengers from the emirate had to travel via a connecting flight to another point in the Gulf before heading home.

To back up his call for more capacity to India, the CEO pointed to the load factors on the five routes that Jazeera is currently allowed to operate there; the lowest is 86%.

"I think a very strong case exists for carriers on both sides to increase the number of seats available. With the number of carriers in India and the number of new aircraft they've ordered,

it makes perfect sense."

What India had to do, suggested Ramachandran, was stop protecting national carrier Air India from competition. If it was allowed to do so, Jazeera would "gladly" launch 10 new routes into India, plus five into Pakistan. As things stand at present, the two new routes to the sub-continent that Jazeera is due to launch this year are to the Nepalese and Bangladeshi capitals of Kathmandu and Dhaka respectively.

Even without its hoped-for expansion eastward, Jazeera is rapidly increasing its passenger throughput: "The most amazing statistic I can share with you is that, compared to last year, with just the addition of the equivalent of 1.5 aircraft, we've grown the number of passengers carried by 50%.

"How did we do that? We've dramatically increased load factors and had a huge increase in aircraft utilisation."

Extra passengers

In recent years, Jazeera's load factor was 68-69% – a level at which it still made money – "whereas now we're just under 80%". And those extra passengers were providing a respectable yield, he added.

Traffic is continuing to rise. In Q1 2019 Jazeera flew 530,000 passengers, an increase of 126,000 compared to the same period in 2018.

"The Kuwaiti economy is doing well and Kuwaitis have the highest propensity to travel



“ This is going to be the first low-cost carrier connectivity between the UK and the Gulf Cooperation Council countries.”

ROHIT RAMACHANDRAN

All these factors have come together, creating a more productive eco-system for the aircraft. Despite these moves to make the aircraft more productive, there is limited interest in trying to make Kuwait more of a hub, to further increase the number of passengers carried.

“Connecting traffic traditionally is against the low-cost carrier bible because it adds complexity and cost. We limit connecting traffic to around 15% of overall traffic. It will never be much more than that because we don’t want to fall into the trap of the complexity of connecting traffic. But connecting traffic does help us in periods of lower demand,” said the CEO.

“For example, if Kuwait and Saudi Arabia are slower, we can turn on the taps from India and Pakistan for Umrah and Haj traffic.”

A major factor in Jazeera’s recent expansion, believes Ramachandran, is Jazeera’s own terminal at Kuwait International Airport. Jazeera realised several years ago that, if it wanted to control its own destiny, it had to create its own space at the airport.

“To the best of our knowledge, Jazeera is the first airline in the world that has designed, funded and built its own terminal,” he said.

Dedicated terminal

The dedicated terminal marked its first anniversary in late May and has three gates (two of them equipped with jetways), its own business-class lounge and an annual passenger capacity of 3.5 million.

The terminal contributes to Jazeera’s bottom line and the airline is now in discussions with “a couple of like-minded airlines” that may wish to use its spare capacity.

Meanwhile, over-capacity in the marketplace – Jazeera’s chairman, Marwan Boodai, has previously accused rivals of dumping seats into the Kuwaiti market – continues.

“One low-cost airline from Dubai operates 11 or 12 flights a day. Another flies five times a day with wide-bodies into Kuwait,” which has an ‘open skies’ policy. “Clearly, there’s no justification for that level of operation,” said Ramachandran.

“However, this year, some rationality seems to have prevailed. Carriers seem to be a little more careful. That could be a by-product of higher fuel prices.”

The LCC mentioned above has also had its Boeing 737 MAX fleet grounded and flight restrictions caused by Dubai International Airport’s runway renovation may also have had a limiting effect.

I’ve seen anywhere in the Gulf. The weather here is so bad for several months of the year that people just want to travel.

“We’ve made the commercial organisation in the airline far more aggressive. We were largely a Kuwait-centric sales organisation where 80% of traffic on any route was generated from Kuwait. Now, we’ve positioned sales teams in every major market in which we operate.”

Similarly, Jazeera has increased the utilisation of its nine A320s from less than 10 hours a day to 14.5. That has come about, said Ramachandran, through a combination of more aggressive network

planning and a better engineering organisation.

“It’s easy to manage maintenance when your aircraft are only doing nine to nine-and-a-half hours a day. It’s much more difficult to do that when they’re doing 14 hours.”

The new, higher number of hours flown daily is helped by the fact that, in the Middle East, airlines such as Jazeera have the ability to operate around the clock. There are few airport curfews.

Pilots are also engaging more aggressively with air traffic control, asking for the most efficient routings so the airline can get the maximum usefulness out of its aircraft.



Linda Celestino:
Reducing waste and offering "real food" for passengers.

BE MY GUEST, SAYS ETIHAD

The UAE national carrier has taken a hard look at its service offer for passengers on its narrow-body fleet – and is set for change.

Alan Peaford
reports.

It is rarely a great passenger experience sitting in the economy section of a narrow-body aircraft, even when it is one of great award-winning airlines.

But Etihad, the Abu Dhabi-based carrier, has been reviewing its operations on its A320 family – from seats to food – and is focusing on new technology and new ideas to change that whole experience.

It unveiled a major economy-class transformation programme at the ArabianTravel Market in Dubai in April, starting with the cabin upgrade and refurbishment of 23 narrow-body Airbus A320 and A321 aircraft.

The retrofit programme, which includes new personalised wireless streaming entertainment to smartphone and tablet devices, is scheduled for completion this month. The airline is also introducing a new and improved economy dining concept on all its flights as part of a wider programme of enhancements to its in-flight catering.

Against a backdrop of a new advertising campaign, 'Go Your Own Way' Etihad outlined how greater personalisation of the service on board will give passengers, or 'guests' as they are called by the airline, greater control, choice and value.

"As part of our 'choose well' promise, we are empowering our guests with more control of their travel experiences, through on-board digital transformation, improved choice and redesigned cabins and products," said Etihad's group CEO, Tony Douglas, who led the launch party. "We are bringing the leadership and innovation to economy travel which we have long established in our award-winning premium cabins," he said.

The airline began by removing in-flight entertainment

screens on the 23 aircraft in favour of wireless streaming. Passengers will be encouraged to use their own devices to use the new wireless in-flight entertainment system, giving them access to more than 300 hours of free TV shows and movies.

To view a wider range of content – including premium TV programming such as HBO – passengers can download the airline's new E-Box Stream app prior to travelling.

The retrofit also includes ergonomic 'extra-spatial' design seats from UK-based Acro. These are fitted with fast-charging USB points, as well as an adjustable phone and tablet holder.

Etihad's vice president of product and guest experience, Jamal Al Awadhi, said removing the seatback screens saves 18 tonnes of weight for the airline.

"This is what we call the evolution of economy. We've evolved the economy proposition and that touches not only seats, but the food and beverage proposition as well," he said.

According to Linda Celestino, Etihad's vice president of guest services and delivery, the whole overhaul of the food service has been two years in the making, with six months of trials at staff restaurants in the airline's Abu Dhabi headquarters.

"We needed it to be more attractive, and taste better – no more mass-produced strawberry mousse," Celestino said. "We have 7,000 people at the office and that helped shape what we wanted."

In-house branded products and style

Celestino's team had to visit some 106 outstations where food is produced to get them on board with the new in-house branded products and style.

New trays that have brought about a 60% reduction in plastic waste will allow for larger main courses on flights of more than three hours, and there is cutlery that is 85% lighter. Desserts will now be served separately with after-meal coffee to reduce clutter during the main meal.

"The culinary experience is still complementary. On every sector you still have a great core complementary product, but you now get the additional option of choosing something extra, like popcorn to watch a movie," Celestino said.

Big food and beverage brands such as Starbucks, Bateel and Perrier will be offered at an extra cost.

Reducing waste and, in particular, reducing plastic is a mission for Celestino.

Etihad has vowed to reduce single-use plastics by 80% by the end of 2022. To celebrate World Earth Day the airline replaced 95 single-use plastic items for its ultra-long-haul flight from Abu Dhabi to Brisbane.

"This is part of our sustainability charter," she said.

Buzz, Etihad's current supplier of amenity products, collaborated with the airline to provide sustainable amenity kits, eco-plush toys and award-winning eco-thread blankets. Buzz pioneered and produced the blankets out of recycled plastic bottles. ■

TPAerospace

WHEELS AND BRAKES

IT'S THAT SIMPLE

TPAEROSPACE.COM



Hosted by



وزارة الدفاع
MINISTRY OF DEFENCE



AIR FORCE AND AIR DEFENSE



DIAC2019

9th DUBAI INTERNATIONAL AIR CHIEFS CONFERENCE

November 16, 2019

JW Marriott Marquis Hotel, Dubai, UAE

Building a More Agile and Adaptive Fighting Force: Balancing the Hi & Low-tech Solutions

Gold Sponsor

Raytheon

Associate Sponsors



SAAB

MBDA

MISSILE SYSTEMS



BOEING

Gala Dinner Sponsor

LOCKHEED MARTIN



The World's Most Prestigious Gathering of Air Chiefs, featuring:

- 40 + air force chiefs
- 50 + air force delegations
- 500 + attendees

- 10 carefully crafted briefings
- 6 hours of networking sessions

Sponsorship Opportunities

DIAC offers a range of sponsorship opportunities for companies to position themselves before key international customers and making a high-impact with decision-makers. Be a Sponsor now for the **Exclusive Gala Dinner at The Meydan Hotel on November 16, 2019**. For further information on sponsorship and exhibition inquiries contact SEGMA by telephone +971 4 399 8355 or email [contact@segma.co].

Media Partners :



DEFENSE & AEROSPACE REPORT



Organized by



For more information visit

www.segma.co/diac2019

Wide-ranging: The A350-900s will be used to fly further afield on the Emirates route network. But the carrier faces the problem of how to replicate the capacity of the substantially larger A380 at slot-constrained airports.



Emirates stays fleet of foot

Emirates' decision to reduce its orders for Airbus A380s overshadowed the fact that the Dubai carrier simultaneously placed orders for two other types in the manufacturer's portfolio. Alan Dron ponders how they might be used.

When Emirates drastically cut its future orders for its flagship A380 from 52 to 13 in February 2019, it signalled the end for the airliner that, arguably, has done most to make the carrier a globally recognised brand.

Lost in the tidal wave of press coverage of the A380's impending demise was the fact that the airline simultaneously signed a 'heads of agreement' with Airbus to purchase 40 A330neos and 30 A350-900s.

Those substantial orders will re-shape the Dubai-based airline's fleet over the next decade.

Ironically, in 2014, Emirates cancelled an order for 70 A350s (50 -900s and 20 of the larger -1000 model). If that order had proceeded, the first aircraft would be arriving in Emirates' fleet this year. The first examples of the new order will now start to appear on the apron at Dubai International Airport in 2024.

At the time of the 2014 cancellation of the A350, the airline wanted to focus on expanding its A380 and Boeing 777-300 fleets – although even then, Emirates' president, Sir Tim Clark, was urging Airbus to develop an 'A380neo' with new engines.

Suitable business case

It was Airbus' inability to make a suitable business case for such a development that led Emirates to shrink its order for the type in February 2019.

On the decision to purchase A330neos and A350s, Emirates Airline and Group chairman and chief executive, Sheikh Ahmed bin Saeed Al Maktoum, said: "Emirates' fleet strategy to operate a young, modern, and efficient all-wide-body fleet remains unchanged.

"The 40 A330neos and 30 A350s that we are ordering will complement Emirates' fleet mix, support our network growth, and give us more flexibility to better serve seasonal or opportunistic demand. Both the A330neos and A350s will play an important role in our future fleet and network plans."

That flexibility will come at the price of increasing the

complexity of the airline's maintenance and support processes, as it will have to cope with four types in its fleet rather than only two (A380 and Boeing 777).

The airline evidently believes that added cost is a price worth paying.

Emirates said details of how the aircraft would slot into the airline's route plans had not yet been decided.

However, a statement at the time of the signing, said that the A330neos – Emirates has opted for the A330-900 model rather than the smaller -800 variant – will be delivered from 2021.

They will be deployed on Emirates' regional destinations, and also enable the airline to serve smaller airports and, thereby, open new routes and connectivity for its global network.

Earlier-generation

This will be a return to the fleet for the A330. Emirates operated a fleet of 29 earlier-generation A330-200s from 1999 until 2016 that were also used for regional services.

The A350s will supplement Emirates' long-haul operations, providing the carrier with added flexibility in terms of capacity deployment on eight to 12-hour missions from its Dubai hub.

UK-based aviation consultant, John Strickland, believes that the new aircraft will be used for a combination of replacement and growth. "Having aircraft of this size will give them more flexibility to tap into markets that are a bit smaller," he pointed out.

Strickland said that Clark had explained earlier this year that when the first A380s start to reach retirement age in a few years, the airline will face challenges at slot-constrained airports, as replacement aircraft will not be able to carry the same number of passengers to destinations where runway capacity is limited.

However, at non-constrained airports, the A350s could substitute frequency for capacity.

At least some of the reasoning behind the new aircraft was to enhance feed into Emirates' Dubai hub, Strickland said. ■

A shining light: The new Muscat International Airport represents an investment of more than \$4.5 billion.



*The Oman Aviation Group wants to make it clear that it is not a flying business. It is an economic catalyst and a major part of the country's diversification programme. With a rebranding, and the launch of its new logo, the group is defining how the aviation sector will drive economic development and diversity in the sultanate. CEO, Mustafa Al Hinai, spoke to **Jill Stockbridge** about the group's plans and strategy.*

The future starts here for OAG

A little more than a year after it was formed, the Oman Aviation Group (OAG) has relaunched and rebranded, with a new logo (right), a tighter focus and a clear strategy as to the role it will play in developing and diversifying the sultanate's economy.



In revealing the revitalised group, chief executive officer, Mustafa bin Mohammed Al Hinai, defined the mission: "OAG is responsible for developing and empowering the aviation sector in the sultanate. We are responsible for building bridges between aviation and other sectors, as well as between Oman and other countries."

As well as the bright new logo, the group revealed its new slogan – It Starts Here.

Al Hinai explained: "It applies to different areas. The passenger to Oman's journey starts by using Oman Air. For OAG, it means change starts here and investment starts here. It is part of the identity of OAG. Our international message is that we are making it happen and it starts here, with a national aviation system that allows us to

promote Oman. In the coming five years we want aviation to be a centre of the economy, to help overcome the fluctuations in other parts of the economy. Our focus is to significantly contribute to Oman's Vision 2040 by developing the sector's business potential and promoting it globally."

Since its inception in February 2018, the government-owned group, which consists of Oman Air, Oman Airports and Oman Aviation Services, has chalked up some impressive achievements. These include attracting more than 20 new foreign investors, creating between 6,000-8,000 new jobs in the sector, and generating OMR96 million (\$250m) of sector-related economic efficiencies.

Some of these efficiencies have come through the establishment of joint service centres to consolidate support services for the three companies, which alone has achieved around OMR6.4 million (\$16.62m) in savings.

The internal tender committees in the three companies were unified under the group, with

Eye for detail:
Oman Air ground
operation services
run things as
efficiently as possible.



**“In the coming five years
we want aviation to be a
centre of the economy.”**

MUSTAFA AL HINAI

initiatives to reduce the spending through unifying technical licencing, insurance, maintenance, purchase and legal services.

In addition, the group aims to control the general expenditures of Oman Airports and raise its revenues, as well as working with Oman Air to reduce fuel costs.

There have been some cheering figures for the companies under OAG's remit. Oman Air boasts a 14% spike in passenger numbers over the last year, now reaching 9.6 million. Oman Aviation Services has reported a 19% increase in sales to OMR30 million (\$77.92m), with a 14% increase in luggage, and having handled 8% more cargo and 5% more passengers in the same period.

OAG has also overseen the development and opening of Muscat International Airport, offering a brand new, world-class terminal with 96 check-in counters and more than five times the previous floor space, which it sees as a contributor to the 27% increase in revenue growth for Oman Airports.

Strained political relations

However, the ongoing strained political relations and restricted direct air travel between neighbouring Qatar, the UAE and Saudi Arabia may have contributed handsomely to these figures, with Oman maintaining cordial diplomatic ties throughout the Gulf.

Speaking after the launch, Al Hinai set out the main strategies that he believes will enable the aviation sector to become an economic catalyst in the country. “Our first strategic objective was developing a transformation programme for Oman Air. It now has an inner model, the destination model. This is in addition to the traditional conventional model of passenger movements.”

Al Hinai acknowledged that Oman Air needs to run as a commercial entity, but emphasised that this is not the only factor defining the growth strategy. He explained: “Any national carrier needs to think about the wider economy. With Oman Air, we are driven by economy, not just commerce. Where our economy has to grow, we look at the gross domestic product (GDP)

Continued
on Page 34

CONTINUED FROM PAGE 33

contribution of Oman Air; rather than how much the net profit of the route will be.

“If Oman Air loses OMR15 million, OMR20 million or OMR100 million, but the multiplier back to the economy is OMR400-OMR500 million, I will not look at the bottom line, I will focus on the top line, because that will create jobs and open new industries. The multiplier impact is much bigger.”

He added: “If you think about the bottom line, you are not a government, because the government should always be looking at the multiplier impact on the economy of their entities.”

The second strategy is to exploit the existing airports, by exploring their potential from both an operational and commercial perspective. Al Hinai said: “We have invested more than \$6 billion into the airport infrastructure in the country. This has been spent across all the airports in Oman, but the major part of the investment was in Muscat International Airport, which represents an investment of more than \$4.5 billion.”

The third strategy is to build more transparency into the aviation services.

Al Hinai said: “We kept the Oman Aviation Services as an independent company, separate from Oman Air. The company provides ground-handling, catering, duty free, cargo-handling, and hospitality.”

He continued: “These three strategic objectives were designed to address the gap in the Oman aviation sector. We said, if we address our gap, how can we promote our growth as a country, and we came up with two main initiatives. One is to maximise the sector impact, by associating Oman’s aviation sector with associated sectors, such as fisheries, agriculture, logistics, tourism, so all these sectors can they be enabled.”

Sustaining the sector

The second initiative was related to sustaining the sector. “Once we have addressed the gap, and grown the sector, how can we sustain it? The Oman Aviation Group has been created to run the operations of the sector overall in an efficient and remote way to make it sustainable,” he added.

In order to develop the strategies to close the sector gap and support the growth of different economic sectors, the group went back to basics, by asking suppliers what they needed.

Al Hinai said: “The aviation sector aims to link the aviation supply chain to the supply chain of other industries to create another value chain. So, we started talking to the farmers and the fishermen. We asked them, ‘Today, if you want to promote your product outside of Oman, what do you require from the aviation sector? How can you ship your products out of Omani airports, rather than other airports? How can you ship your Omani products through Oman Air, not other airlines? What do you require exactly?’ And each and every time we found three main challenges facing us – time, quality and cost.

“Whether the product can reach the destination market on time, whether it has the right quality and the cost is very efficient.”

Quality was not seen as an issue. Oman ships high-quality fish around the world, and its farms are approved by European and Asian farming units.

The group found that the bigger challenges were in logistics and in packing and labelling – how the products are processed so that they can be positioned in international markets. What is needed is processing facilities; proper labelling facilities; and a gateway for Omani products into OAG’s operating markets.

Al Hinai and the development team have launched several initiatives to address this. “We have almost 50 offices outside Oman – mostly airline offices – so we are going to extend these facilities to become promotion offices. We will keep studying the international markets to understand exactly what they need – such as fresh, live or frozen fish. We can build a very strong knowhow of the Omani markets, but we need to have a logistic component within our airports to facilitate the industries.”

The initial proposal was a logistics gate, in association with the airports, but OAG found that this created interest from foreign direct investors wanting to come to the country, manage the products, and build their own distribution centres.

Al Hinai said: “We found that when these companies come to the country, they don’t want to pay customs two times. They want to be incentivised and they want incentives that will keep them sustainable in our market. So, the second decision was to create free zones around our airports, with the free zones and the logistics complementing each other.

“However, you cannot make your city or airport just logistics and industry. You require an ecosystem, which has to include offices, a hospitality component and retail outlets, so that those who work in the airport cities can live in the airport cities. It is our mandate to integrate all these different components.”

The final plan is to develop airport cities around the three major airports – Muscat, Sohar and Salalah. Each will have five gates – the commerce gate, hospitality gate, logistics gate, free zone and aviation gate, creating a new urban development.

The team has further plans for the former Seeb International Airport terminal in Muscat. Al Hinai said: “We will set up a very specialised gate for aviation; within this gate, we will have an aviation edutainment centre, and an innovation centre for everything aviation-related. We have three institutes, one under Oman Air, one under the civil aviation authority and one under Oman airports. We will consolidate all three together and have the first aviation school in Oman, which will cover anything related to ground services, the airports, the airline and to the in-flight services, but not to flying, which will still be handled by the Omani Aviation Academy in Sohar Airport.”

Future plans include integrating the ports with the airport cities, and all the transport links in between to improve the sea-to-air chain.

The group has already launched a fully fledged study into Oman’s air cargo strategy and model –

including ports, airports, and how to integrate road transportation, along with other future transportation systems in the country.

For the development team, Africa offers great potential as an emerging market. Establishment of a logistics hub in Africa needs lots of feeders, and building an air corridor between Oman and Africa is one of the group’s key initiatives.

These plans require a good deal of finance and, as well as attracting foreign direct investors into the airport city developments, the group plans to raise around \$6 billion from local and international banks. Al Hinai said: “We have approached the banks and it is still in the early stages. We hope to have the first tranche in June 2020.”

The quest for international investors is in line with the group’s long-term strategy to operate without government subsidies. It is currently totally independent from government finance and wishes to finance future growth externally. Continued internal restructuring of the operating assets aims to increase efficiency further and reduce costs.

With Oman Airports having previously been involved in discussions about the sale of a partial stake in the management company, privatisation has been raised as a possible future option.

Sector developer

Al Hinai made clear: “Privatisation is something we are looking at and will have a clear idea about in the next three years. We can divest or invest as we wish. We are working as a sector developer, not an operator. It is an option for us, but we need to make sure of what added value those privatisations will bring. At the moment we have other initiatives that are our mandate, and we don’t want to lose our focus. We have to focus on delivering our current mandate.”

Al Hinai concluded: “Today the importance of the Oman Aviation Group is not only to think about flying. Flying is only one element of the aviation ecosystem. We have to be industry-oriented in nature. We have to think what is the future of air traffic sustainability in the country. Is it only maintaining travel, or is it travel and tourism, or is it travel and tourism and cargo?”

“So, our position is to focus into the travel, tourism and air cargo, which is the overall logistics, and this will complement all other sectors in Oman. We must see how we can bring them under one umbrella. That’s why, when we define ourselves, we are an economic catalyst rather than a flying business only.”

HE Ahmed bin Mohammed Al-Futaisi, Minister of Transport and Communications, who attended the brand’s relaunch, said: “Oman boasts a world-class infrastructure that is increasingly attractive to international investors, which also enables us to position the sultanate as an aviation hub with worldwide appeal.

“Aviation is a key sector for economic growth, and having a clear vision to further develop it will have a positive impact other related sectors, like tourism, logistics, as well as agriculture and fisheries.” ■



Touchdown: The first Jasmin Airways E170 was welcomed with huge applause at Enfidha Airport.

Right: Ali Ben Amara: "We hope to move to low-cost in November 2019. We are currently setting up a platform."



Jasmin on the scent of success with first E170

There was much joy and relief on June 20 when the first E170 for Tunisian private airline, Jasmin Airways, landed at Enfidha Airport. CEO, Ali Ben Amara, told Anuradha Deenapanray, that the company's philosophy is based on excellence in air transport.

Ali Ben Amara and his team will finally be able to implement their development project focused on differentiation and complementarity.

They've been waiting impatiently to welcome 'Amen', the first of the two E170s leased from CIAF Leasing (Egypt).

The second aircraft was due to be delivered as *Arabian Aerospace* was going to press and the first charter flight was scheduled for mid-August.

"I am in a mindset geared towards development and progress, not a competitive one. We will operate charter flights from Enfidha and Djerba. Jasmin Airways will do what Tunisair doesn't do and vice versa," said Ben Amara.

A pilot, like his father, Ben Amara has grown up amidst aircraft. He has an open, pragmatic vision on air transport. "We want to be competitive and send a positive sign and image to the market through a new management model. We want to meet international-standard requirements with fully adapted aircraft. We have made a thorough market and pricing survey to offer the best deal to our clients," he said.

Optimistic about liberalisation

He remains optimistic about the liberalisation of the Tunisian sky, plus the rest of Africa, in the wake of the single African air transport market (SAATM) agreement. "In five years, we will have a fully open sky in Tunisia."

Jasmin Airways chose the E170 because it suits its business plan perfectly. The airline will serve eastern and western Europe, Italy, Bilbao and Prague to start with.

"For now, we need an aircraft with a range of between 50 minutes and two hours maximum," explained the CEO.

"We can ensure financial profitability with an Embraer aircraft on the routes that Jasmin Airways will serve. We shall start with the E170 and a third aircraft will be delivered shortly (leased from Finnair). In four years, we will have the E190-E2 to consolidate and diversify our network.

"We hope to move to low-cost in November 2019. We are currently setting up a platform."

Ben Amara is also an instructor and runs the Airline Flight Academy. The company was created by his father in 2013 after the revolution, which led to political instability in the country.

"We have a school for pilots, mechanics, air traffic controllers (ATC) and a university (ESAT) which trains engineers," said Ben Amara. "We have experience and we offer a school of excellence by exporting training. Subsequently, our students have the ability and the opportunity to work elsewhere."

Quality training

He insists on "quality training", especially with technological innovation in the industry.

"The philosophy of Jasmin Airways is simple. We offer a complete training with three years' experience. Pilots will have 1,000 flying hours on an Embraer aircraft with a three-year contract on Jasmin Airways," he said.

MRO is also an essential topic. Ben Amara is discussing a partnership with EgyptAir for a maintenance line in Tunis-Carthage.

The Jasmin Airways CEO also thinks it's time for a new approach in air transport within the continent to develop intra-African connectivity.

"We need an efficient integration and cooperation between companies and suppliers regarding aircraft leasing, insurance, maintenance and a common fuel management system for the economic benefit of airlines. We should work together to set a pool for each of these activities," he said.

Ben Amara supports a more liberalised economy, more private sector and foreign investments, better infrastructure, good governance, political stability and sustained peace to enable countries in the region to fully unlock their potential. ■



*After a few turbulent years, Wings of Lebanon is looking for new niches to complement its success in the leisure charter market. **Martin Rivers** talked to the airline's chief executive, Naji Majdalani (left).*

FIXED WINGS

As a charter carrier with just one aircraft on its registry, Wings of Lebanon rarely gets the media attention that is afforded to larger, better known airlines in the Middle East.

The company has found itself in the spotlight only twice in recent memory – and management would happily forget both instances.

In 2016, a Boeing 737 carrying the Wings name was photographed at Ben Gurion Airport in Tel Aviv, Israel. The sighting sparked outrage in a country that officially remains at war with the Jewish state, and whose leaders are deeply paranoid about Israeli intelligence operations.

Then, last year, Wings had its European Union licence suspended after regulators flagged a series of apparent shortcomings in its flight-training and aircraft maintenance processes.

Ripple effect

Despite creating a “big ripple effect politically and socially” in Lebanon, chief executive, Naji Majdalani, said the mishap in Tel Aviv was relatively easy to recover from.

Officials quickly realised that Wings had not, in fact, flown any of its aircraft or crew to Israel. The aircraft at the centre of the scandal was operated by Tailwind Airlines, a Turkish wet-lease provider, and only bore the Lebanese branding because of an earlier, discontinued, contract with Wings.

“That’s forgotten now,” Majdalani said cheerfully. “The previous management explained everything. They explained that it wasn’t really

our aircraft, it wasn’t us operating, and even Tailwind issued an apology letter to the authorities here and to the company. So, it was solved.”

Last year’s EU suspension had the potential to be a bigger problem for Wings, undermining the airline’s safety reputation and throwing its network into chaos just as the peak summer season began.

But those headwinds, too, have now passed. The European Aviation Safety Agency (EASA) gave Wings back its third-country operator (TCO) permit in May – the first such reinstatement since the TCO system was introduced – in what amounted to a clean bill of health for the new management.

Wings took advantage of the regulatory scrutiny by successfully completing an International Air Transport Association (IATA) operational safety audit (IOSA) this year.

Majdalani blamed the EU suspension on poor practices by some former employees who had left the company when it was acquired by Nakhal, Lebanon’s biggest tour operator, in 2017.

“EASA judged us on whatever happened from 2009 to 2017,” he explained. “It was a bit of a blow for us buying a company and then losing the TCO. Some of the destinations were hit hard because we didn’t have enough [wet-leased] aircraft to fly to Europe. But this helped us improve quite quickly and now we’re actually stronger than we were before.”

Although the past year has been challenging

for the company, he believes IOSA certification will lay to rest any lingering safety concerns and allow management to focus on growth.

“Going through IOSA was a major change... IOSA is quite difficult to obtain,” he noted.

“There’s a lot of requirements, so we had many consultants coming in to help us improve and change. And there was also a culture change that came with that, and a learning curve for how to operate. It’s an extra layer that we wanted to have to improve the quality and the safety of the airline, and we’ve succeeded in that.”

Describing Wings as the “operational” arm of Nakhal, Majdalani said decisions about route development rest solely with the parent company.

Package holidays

Its package holidays fill most of the airline’s seats, though third-party travel agencies are accommodated through block space agreements and ad hoc charters.

Despite not using direct sales channels itself, Wings also has a presence on the global distribution system (GDS) through its partnership with Hahn Air.

Year-round flights are currently operated to Sharm el Sheikh in Egypt and Adana in Turkey, while Antalya and Dalaman in Turkey are served for eight months of the year.

However, it is the European network that generates by far the most business, with a surge in flights to western, central and south-eastern



• The European Aviation Safety Agency (EASA) gave Wings back its third country operator (TCO) permit in May – the first such reinstatement since the TCO system was introduced – in what amounted to a clean bill of health for the new management. •

Europe during peak seasons. Demand is so high in the summer that Wings typically deploys two or three additional aircraft on a wet-lease basis.

This summer, for example, Egypt's Nile Air is operating two Airbus A320s and one A321 from Beirut on behalf of the Lebanese carrier.

"It's always narrow-bodies [that we wet lease]. It can go from a 319 to a 321 depending on what's available and what type of business we're operating," Majdalani said. "If we have some pilgrimage business we'll get a 321 because it's a high-capacity market so we need the bigger aircraft. But, typically, 320s and 737-800s are the major ones we are using."

Although the strategy provided welcome flexibility during last year's disruption – wet-leased aircraft are registered to their operating entity and so were exempt from the EU suspension – Wings is keen to induct more of its own metal.

The company re-fleeted with a 2008-build 737-700 shortly after Nakhal acquired it from Lebanon's El Hajj family two years ago, and management are now actively looking for another aircraft.

"We are thinking of soon adding an extra aircraft," Majdalani confirmed, giving a probable delivery date of around the end of the year. "It will be next-generation for sure. I have got a -700 and -800 on the table offered to me, and we are still debating which way to go."

The arrival of a second unit will allow Wings to cut expenditure on wet-lease contracts as well as standardising the on-board experience.

A larger fleet will also give Nakhal the option of adding year-round flights to Berlin (Germany) and Stockholm (Sweden) – markets that will help the company expand into diaspora traffic.

"Eventually the business model has to be kind of a hybrid model, because we are so small and we are a tour operator and we are in a difficult country [geopolitically]," Majdalani said.

"So, we are trying to look at niche markets where we have Lebanese people [living abroad], or even Syrian people who want to use Beirut as a gateway to Damascus. That's something we're trying to develop as a niche for the winter, aside from the current destinations we are flying as leisure."

In an effort to hedge against the "huge seasonality" of the leisure market, Wings also wants to grow its reputation as a provider – rather than a customer – of wet-lease operations.

Regular activity

The company has occasionally offered aircraft, crew, maintenance and insurance (ACMI) services in the past, but Majdalani wants this to become a regular activity to boost utilisation rates in the winter. "It will be a kind of start for us in the ACMI market," he said. "We're launching to the entire market. I'm already working to wet lease our aircraft for October onwards."

New opportunities for transfer traffic will also be explored now that Wings has been added to the IOSA registry – a step that allows it to sign interline agreements with IATA members.

"There's a lot of leisure passengers coming to

Beirut and wanting to connect with us to some of our destinations, for example the Greek islands," the chief executive noted. "They come in on flights from Kuwait or Dubai and they connect on our network. IOSA will be key to growing that interline business."

Although inbound tourism from Europe would be a "very nice" segment to add to the mix, management are realistic about the "reluctance" of many Europeans to visit the Levant, given its security challenges.

One thing working to their advantage, however, is Lebanon's benign competitive environment.

The country's only other active airline is Middle East Airlines (MEA), the flag-carrier, which has adopted a conservative growth strategy under the stewardship of chairman, Mohamad El Hout.

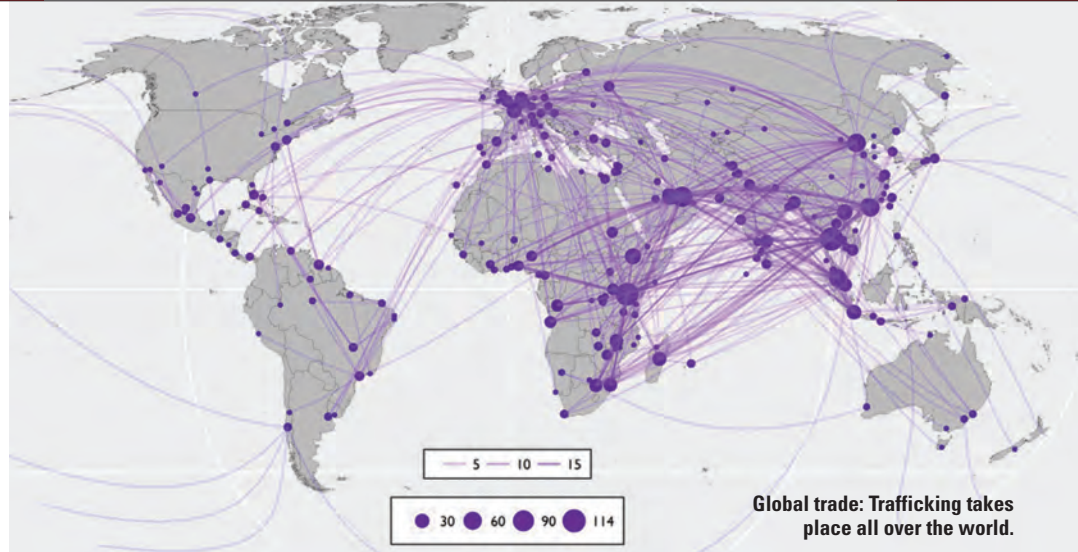
MEA has no plans to enter the charter market and cooperates closely with Wings by providing maintenance services and carrying Nakhal's customers on its network. Asked about the charter airline's fleet expansion, El Hout said he "would like to see their activities growing and growing".

It is a sentiment that is shared wholeheartedly on the Nakhal side.

"We enjoy a very good relationship with Middle East Airlines," Majdalani affirmed.

"The national carrier flies to certain destinations and we fly to other destinations. We have a different business model altogether, so, honestly, we don't see them as a competitor. We try to act more as a kind of sister company." ■

The illegal trade in wild animals and animal products amounts to around \$23 billion a year, much of it operating around the air transport sector. Now, however, the fightback has started, as
Anuradha Deenapanray
reports.



Routes to beat the wildlife smugglers

The USAID ROUTES Partnership, an organisation that specialises in disrupting wildlife trafficking, and the Center for Advanced Defense Studies (C4ADS), a non-profit research organisation, have come together to launch the first-ever data dashboard on wildlife trafficking in the air transport sector.

Illegal trafficking is one of the largest threats to the survival of some of the world's most endangered species.

Wildlife and derived products are transported around the world through airports and using airlines and this smuggling, therefore, is a major challenge for the global aviation industry.

The new dashboard enables transport companies, enforcement personnel, government agencies, and stakeholders, to filter and view information on wildlife trafficking incidents in the sector over the past 10 years.

The analysis relies on the C4ADS air seizure database, which features the most comprehensive collection of illegal wildlife trade seizures and includes instances in more than 130 countries.

"Before companies and agencies can take action to combat wildlife trafficking they have to understand how it affects their regions, businesses, and supply chains," explained Patrick Baine, data cell lead at C4ADS. "The ROUTES dashboard makes this first step easier than ever."

Michelle Owen from ROUTES added: "Wildlife traffickers move undetected through airports and airlines around the world every day, draining ecosystems and communities of their natural resources. This dashboard shines a spotlight on their patterns and behaviour, enabling the air transport community to access relevant data that can help prevent these dangerous criminal activities."

ROUTES has recently launched the 'spring into action' initiative, outlining five steps that air transport companies can take to raise awareness and engage stakeholders on this issue.

Since Qatar Airways joined the USAID ROUTES Partnership in October 2017 and signed the United for

Trafficking via the Middle East

Recent examples of the animal trafficking trade include:

- 300 live lizards and insects sent from Dubai to Moscow;
- 4,226 insects, 27 spiders, and seven scorpions seized coming from Perth, Australia, to Abu Dhabi;
- 18 rhino horns sent from Mozambique to Malaysia via Qatar (the sixth seizure within a single month);
- 330 endangered tortoises sent from Madagascar to Malaysia via Abu Dhabi;
- 109kg of European eels sent from Madrid to Hong Kong via Abu Dhabi – European eels are shipped as young animals (1kg = 3,000 eels);
- Four Falcon eggs sent from Brazil to Dubai;
- 26kg of ivory products sent from Abidjan to Hong Kong via Dubai.

Wildlife Transport Industry Declaration at Buckingham Palace, London, in March 2016, it has implemented several initiatives to raise employee and passenger awareness, and improve detection.

The Qatari airline is further strengthening its commitment through an industry-leading training programme focused on preventing illegal wildlife trafficking. The e-learning package, developed by the airline to enhance employee awareness on the issue, targets the roles which are most likely to encounter illegal activities.

The training programme aims to familiarise employees with the effects of wildlife crime, the common routes and methods used to smuggle wildlife, and how to report and respond efficiently to these illegal practices. The training package will also be available to customs and security staff at Hamad International Airport (HIA).

According to Qatar Airways Group chief executive, Akbar Al Baker, the new programme marks a significant milestone in its strategic approach to preventing wildlife crime across its network. "Qatar Airways has a zero-tolerance policy towards illegal trade of endangered wildlife and is actively engaged in stopping illegal wildlife transportation in its tracks. We remain committed to providing our staff with the tools they need to combat this illegal activity," stressed Al Baker.

ROUTES Partnership has been instrumental in developing the training programme and the awareness campaign. It has also helped the airline to share intelligence and best practice within the industry. ■



Animals in danger: The list includes rhinos, elephants and reptiles.

MEBATM

SHOW
MOROCCO

25-26 SEPTEMBER 2019

MARRAKECH MENARA AIRPORT, MOROCCO

POINT CAMERA
TO REGISTER



**THE DESTINATION
FOR BUSINESS AVIATION**

WWW.MEBAAMOROCCO.AERO

*The European Business Aviation Conference & Exhibition (EBACE) is not just for Europe – it's a world event these days – and it is embracing the global challenges like the environment and new technology as **Dave Calderwood and Alan Peaford** report. Pictures by **Billypix**.*

IT'S GREEN FOR GO AS TIMES CHANGE



Athar Husain Khan: Warned that to achieve targets there needed to be greater involvement by industry and governments.

EBACE is traditionally focused on new metal from the global airframers but, while there was still interest in the debutant business aircraft, the central theme of the annual Geneva event was about change.

The environment and the need for the industry to be “greening up its act” lay at the heart of the show, with calls to not just be more committed to emission reduction targets, but also to be seen to be more active.

Recent protests against climate change pinpointed aviation – and the business aviation community has been tasked with playing its part to negate that criticism.

Of the 58 aircraft on the static display, 23 had flown into the show using biofuels. Spectacularly, 13 of them flew in a loose convoy to the show from TAG's Farnborough Airport near London.

A global coalition of business aviation organisations had gathered ahead of the fly-out to highlight the path forward for continued adoption of sustainable alternative jet fuels (SAJF) and European Business Aviation Association (EBAA) secretary-general, Athar Husain Khan, warned that to achieve

targets there needed to be greater involvement by industry and governments.

Khan said: “Uplifting this fuel was no easy task. Market availability still leaves a lot to be desired. Costs are more, but decreasing slowly. We need regulators to step in and help industry take steps towards a carbon neutral future.”

The cost of the alternative fuel is currently around three times the cost of Jet A1 and, although recognising that business aviation and, particularly, corporate flight departments would be prepared to pay a premium for the environmental benefit, Khan said there still needed to be a reduction in price.

“We need a bit more market pressure on the system,” Khan said. “I would expect and hope that operators will put a bit more pressure on their fuel suppliers and fuel manufacturers to actually produce more of the fuel and have a more appropriate geographical spread.

EBACE also focused on other alternatives than fuel, with manned and autonomous urban air vehicles on display and featured in the keynote addresses.



Triple celebration: The new Praetor 600 super-midsize business jet overcomes three hurdles.
PICTURE: EMBRAER.

PRAETOR CERTIFICATED AS IT MAKES EURO DEBUT

Embraer's new Praetor 600 super-midsize business jet celebrated triple type certification by the European Aviation Safety Agency (EASA), the US-based Federal Aviation Administration (FAA), and Brazilian regulator, ANAC, as the aircraft made its European show debut.

“It is the most disruptive and technologically advanced super-midsize business jet to enter the market, paving the way to begin deliveries now in the second quarter,” said Michael Amalfitano, president & CEO at Embraer Executive.

It is capable of flying beyond 4,000 nautical miles in long-range cruise speed or beyond 3,700 nautical miles at Mach .80 from runways shorter than 1,550 metres. It is also the first super-midsize jet with full fly-by-wire technology, which powers the active turbulence reduction that not only makes every flight the smoothest but also the most efficient possible.

AMAC's fifth hangar

Cabin completions is a highly specialist activity, requiring not just engineers but people adept in everything from carpentry to upholstery, and barriers to entry are high.

But, over the past decade, a ‘new kid on the block’ has swept into a leading position from a base at ‘completions world central’ in Basel, Switzerland through to the USA.

The company is AMAC, one of a tiny handful of companies in the world entrusted to design and install interiors on green corporate jets from Airbus and Boeing.

During EBACE, AMAC announced plans to open its fifth hangar at Basel in the second quarter of 2020. The company will use the facility largely to service and carry out warranty work on Bombardier aircraft after the manufacturer last year appointed it as an authorised service centre.

More immediate is work on the first Airbus ACJ320neo. The green aircraft arrived in Basel in January and is due for delivery to launch customer, Acropolis Aviation, later this year. The company is also working on the completion of its second Boeing 747-8, having handed over its first -8 in 2014.

“When it comes to expansion, we've never stopped,” said group chief operating officer Bernd Schramm.



Convoy: 13 aircraft flew in a loose convoy to the show from TAG's Farnborough Airport, near London, using biofuels.

QATAR EXECUTIVE DETAILS GLOBAL EXPANSION PLAN

As Qatar Executive's reputation spreads worldwide, so the private jet charter division of Qatar Airways Group used EBACE to announce an expansion plan with new offices to support demand.

The Doha-headquartered operator plans to open offices in Shanghai, China; Moscow, Russia; and London, UK this year.

At the show it said it is receiving two new additional certifications following audits in April for international standard for business aircraft operations (IS-BAO) and Wyvern Wingman.

Ettore Rodaro, executive vice president, Qatar Executive, said there may be surprise that the operator had not previously attained the audits which focus on, among other critical subjects, the safety management system (SMS) implemented in Qatar Executive's operations.

"We had never thought of it," Rodaro said. "Everybody says we've got a five-star service, we have phenomenal quality, but were then asking if we had failed [the audits]."

"The US corporation that wants to charter us, the first question they ask is about the audits. It became essential to have the certification. It is the attention for the detail that makes the difference. We did it and are now qualified by both IS-BAH and Wingman," he said.



Ettore Rodaro: "Everybody says we've got a five-star service and we have phenomenal quality."

The expansion to Shanghai, Moscow and London will further enable the company to offer its bespoke and personal service to business and leisure clients on a global scale, regardless of where they are located.

"Qatar Executive has been experiencing 30% year-on-year growth in the Asia-Pacific market," Rodaro said.

Qatar Executive currently operates a fleet of 16 state-of-the-art private jets, including five Gulfstream

G650ERs, three Gulfstream G500s, three Bombardier Challenger 605s, four Global 5000s and one Global XRS. In 2019, it is set to receive an additional five G500s.

The operator – which celebrates its 10th anniversary this year – was initially all-Bombardier. "It is changing," said Romero, "the new Gulfstreams are coming. I estimate over the next couple of years we will likely become all-Gulfstream. But you never know."

Pilatus stunned by order book response

Business jet manufacturers will be looking with envy at Pilatus, whose first foray into the turboprop aircraft world has been met with a demand that its chairman, Oscar Schwenk, described as "overwhelming".

The Swiss company re-opened the order book for the Pilatus PC-24 at EBACE and found new and existing customers eager to put their deposits down for the \$10.7 million, eight-passenger twin.

Schwenk opened the order book again five years after the initial batch of 84 aircraft sold out within 36 hours. Deliveries from this order round are due to begin at the latter end of 2020.

By the end of the show, half of the 80 available on this tranche had been sold.

Schwenk says Pilatus has delivered 30 PC-24s since the Williams International FJ44-4A-powered aircraft entered service in 2018, and the company is on track to produce 40 units from its Stans headquarters in 2019. "This will increase to 50 aircraft in 2020 and 60 in 2021, which is full volume," he said.

The PC-24 has achieved European and US steep-approach certification, allowing owners and operators to perform landings under strict conditions, including using the steep approach angle and short runway at London City airport.

In demand: Customers are eager to put deposits down for the \$10.7 million, eight-passenger Pilatus PC-24.



[@Jewers_Doors](https://twitter.com/Jewers_Doors)
 jewersdoors.co.uk
 +44 (0)1767 317090
 jjewers@jewersdoors.co.uk

World renowned door solutions for all your airside requirements.

MRO # FBO # GSE # Emergency Services



GDC TECHNICS DELIVERS TWO OF THE BEST

Two Boeing 787 Dreamliners that are the most sophisticated VVIP aircraft ever built have been delivered to a secret head-of-state customer by GDC Technics, the Texas-based aircraft completions and engineering specialist.

GDC chairman, Mohammed Alzeer, said: “These B787 deliveries are a testimony to the success of our strategy focusing on developing new, innovative, engineering and production techniques.

“We were able to achieve a 20% lighter weight than industry estimates, providing our client with an operational advantage and fuel savings throughout the life of the aircraft. Combined with state-of-the-art technologies and a custom interior, these aircraft allow for the ultimate VVIP in-flight experience.”

Brad Foreman, appointed CEO in February this year, added: “We equipped the B787s with the latest connectivity and passenger comfort capabilities, including ARINC 791 Ka-band antennas (an industry first on a VVIP B787), Iridium antennas, satcom antennas, forward-looking cameras, therapeutic O2 discharge ports, quad cameras, downward zoom cameras,



Sophisticated: The GDC Technics B787 aircraft.

tail fin cameras and satellite TV antennas.

“Along with quieter cabins, additional humidification systems were provided to enhance the passenger experience during long-haul flights.

“In addition, the two B787s were completed with live television capabilities, a first for any VVIP B787.

“These two aircraft are absolutely unmatched in the industry.”

GDC also recently announced a new ownership structure and shared strategic vision with new partners, Oriole Capital Group, Trive Capital, and Saudi operator, MAZ Aviation.

Well connected

Satellite company Inmarsat has upgraded its Jet ConneX Ka-band business aviation in-flight broadband solution to make it one-third faster and provide customers with unlimited data. The new JX-Pro package, unveiled at EBACE, is available to both new and existing Jet ConneX customers.

Air-bus fresher

VIP passengers on the ACJ320 family can breathe a little easier thanks to a new agreement signed at the EBACE show. CTT Systems signed with Airbus Corporate Jets to optimise a humidification system for the ACJ320 family which, the airframer says, will further improve efficiency and performance.



New! UK CAA training courses in Bahrain



Delivered in Bahrain in cooperation with Gulf Aviation Academy

A comprehensive portfolio of public access courses developed by active UK CAA aviation regulators in accordance with EASA and ICAO Standards and Recommended Practices.

• Safety & Risk Management

Risk Monitoring and Safety Performance | 3-4 December 2019
Advanced Safety Management – Evaluating Effectiveness | 8-9 October 2019
Effective Fatigue Risk Management Systems | 3-5 September 2019

• Airports

Aerodrome Operations | 24-26 November 2019

• Airworthiness

Non-Destructing Testing Oversight | 27 August 2019, 11 December 2019
EASA Part SPA | 22-23 October 2019
EASA Part M Continuing Airworthiness | 12-13 November 2019

• Regulation, Compliance & Monitoring

Audit Techniques | 22-26 September 2019

For more information please visit: www.caainternational.com/training

To book a course, please contact the Gulf Aviation Academy

T +973 17357777 W gaa.aero



Benoit Senellart: “We want to have the B.koya aircraft built by 2022 and to be on the commuter airline market by 2024.”

MAEAM makes a B-line for regional electric market

French start-up, Multi Access Electric Air Mobility (MAEAM), launched a new “disruptive” aircraft programme at EBACE. The sister company to light aircraft designer, Lisa Airplanes, unveiled a hybrid-electric aircraft capable of carrying 19 passengers for regional charter or airline. MAEAM calls the concept ‘B.koya’, a nod to Lisa’s two-seat amphibious aircraft Akoya, which was on display at the innovation zone.

“It’s the same technology as proven on our two-seater,” said founder and chief executive, Benoit Senellart. “We want to have this aircraft built by 2022 and to be on the commuter airline market by 2024.

“It opens a new segment of market. Inner-city urban air mobility has a lot of people looking at it – but few in the regional market. And its landing capabilities are very different.”

B.koya will have a turbine-driven hybrid-electric propulsion system with twin tail-mounted fans. Like Akoya, it will have hydrofoils for water landings and optional skis for snow landings.

It will have 125kt (232km/h) cruise speed, 162nm (300km) range with batteries only, and 1,620nm range when supplemented with the turbine. With a 4,000kg maximum take-off weight it can land on grass, needing only 1,000 feet (325m) of runway.

Senellart’s team will initially market B.koya to business and leisure aircraft buyers and operators. But “the larger market” will be the regional airline sector, he said, noting B.koya’s water-landing ability will enable it to quickly connect city centres – or to yachts or small islands.

Advances in electric systems and vertical take-off and landing (VTOL) design are “quicken[ing] the pace of innovation”, European Business Aviation Association secretary-general, Athar Husain Khan, told attendees in a keynote opening session. “Nowhere is it more prevalent than in business aviation,” he added.

Khan urged the industry to work towards “improving the perception of business aviation” by embracing sustainable fuels and other steps to address environmental sustainability.

Another Keynote speaker and Volocopter chief executive, Florian Reuter, insisted that his company’s eVTOL aircraft will be able to help alleviate congestion in the world’s major cities.

The German company has developed the 18-rotor, two-passenger Volocopter 2X.

“No matter where we go, we realise we have a problem,” he said. “Cities are faced with severe mobility challenges.”

Electric propulsion systems

Recent advances in distributed electric propulsion systems, battery density and autonomous technology have converged to make eVTOL aircraft viable, Reuter added.

Other eVTOL types highlighted at EBACE included the Ehang 184, made by Chinese company Ehang in partnership with Austrian composites company, FACC. This air-taxi is likely to be the model to launch in Dubai in 2020. The companies have built and flown their prototype and are working towards European certification, said FACC marketing and communications representative, Tamara Leitner.

The beauty of eVTOL aircraft lies partly in their simplicity. Unlike helicopters, many do not need complex and heavy components such as cyclics, collectives, gearboxes, swashplates and transmissions.

Another electric revolutionary on show was Pegasus’ in-development eight-passenger hybrid-electric business jet.

The South African design will have a GE Aviation turboshaft directly driving two tail-mounted forward-thrust fans and powering four lifting fans built into its wing, said Pegasus chairman, Reza Mia.

Pegasus expects to achieve first flight within 18 months and certification up to five years later. ■

Falcon’s X-factor

Dassault has completed the critical design review for its Falcon 6X and frozen the detailed design of the new ultra-wide-body twinjet, as manufacturing of major parts begin for assembly of the first aircraft in early 2020. Speaking at EBACE, the French manufacturer said the 6X is on track for first flight in 2021 and will begin deliveries in 2022.

Direct approach

Honeywell Aerospace unveiled new route optimisation technology to cover Eurocontrol routes, to be incorporated into its GoDirect flight planning service. This will “ease the burden” on pilots and dispatchers operating in the congested Eurocontrol region by enabling them to access more efficient routes, the company said.

University
of South
Wales

دبي الجنوب
**DUBAI
SOUTH**

Launch Your Aviation Career

- Study at the University of South Wales Dubai
- Gain a recognised British Bachelor degree
- Taught by industry experts
- Accredited by the KHDA

Apply online: southwales.ac.uk/dubai



“Since being at USW Dubai, I’ve found the facilities to be remarkable. They’re approved by EASA and the GCAA, which means they are of high quality.”

Aziz Ul-Quayum,
Aircraft Maintenance Engineering Student

UAS International Trip Support has been called the ‘emergency service’ for commercial and business aviation operators all over the world. Jay Ammar Husary, executive vice-president and one of the founding family, talks to Dave Calderwood.

UAS boldly going where no one has gone before...

Nearly 20 years since its launch, UAS International Trip Support is now a vast business spread around the world.

It was founded by four aviation enthusiasts in Dubai, who saw not just an opening for a global flight services company but a necessity, serving places that no one had gone before.

The company grew fast from 2000 to 2015, with headquarters in Houston, Johannesburg, Hong Kong and Dubai, and regional offices in the promising locations of Lagos, Nairobi, Beijing and New Delhi.

In addition, there’s a ground presence in 23 global locations and an international team of more than 50 nationalities speaking at least 42 languages and available 24/7. It means UAS can provide seamless, end-to-end trip support, executive travel and charter solutions to the world’s most challenging destinations.

Biggest change

In 2016, the biggest change in UAS’ history came with a partnership with Deer Jet, part of the Chinese conglomerate HNA Group. As well as accelerating growth of UAS, both companies are benefitting from each-other’s expertise.

Now UAS has such capability and global spread that it’s become the first point of call for many operators, in both commercial and business aviation, as Jay Ammar Husary explained.

“We’ve been called an ‘emergency service’ and a lot of our clients use us specifically for that service,” said Husary. “For a lot of those companies, we are in their manuals as the contingency contact number. If you have a diversion, whether it’s a weather diversion or a

“We saw a necessity in the market that was not being covered by individual companies. We said, why not cover all these services under one roof?”

JAY AMMAR HUSARY

technical diversion, whatever, and you have 100 passengers on board, these people need hotels, need food, transportation... the operator contacts us.

“And we respond at very short notice. We have our own travel department, which can arrange hotels, airline tickets, concierge service, and part of the department provides risk mitigation as well – security and intelligence briefs.

“We saw a necessity in the market that was not being covered by individual companies. We said, why not cover all these services under one roof? Of course, we have a great management team that thinks on their feet all the time, and we have great staff who are very flexible and keen to go that extra mile.”

Husary was on his way to the International Air Transport Association (IATA) conference in Madrid immediately after we met at the European Business Aviation Convention &

Exhibition (EBACE), pointing out that UAS covers both business and commercial aviation.

“We are one of the most unique trip support providers in the world for that reason,” he said. “So, not only do we deal with the Fortune 500 companies and royalty flights, we also deal with commercial, cargo, passenger, military and all other aspects of aviation.

“The difference between commercial and business aviation is big. At UAS we have two separate teams, one for business aviation, one for commercial aviation, because the requirements differ greatly in terms of regulations, in terms of arrangements, in terms of equipment, in terms of many other operational aspects as well. If you know how to do commercial aviation, it doesn’t mean you know how to do general aviation, so that’s why we have separate teams.

Specialised training

“But there is some overlap. When we hire people, they get specialised training on the segment they are going to work on, and general training on the other segment.

“There’s also some operational overlap. We may have a client with 747 or Antonov, or another aircraft on the ground (AOG) somewhere, and they need a spare part, so we charter a jet for them to move that spare part from one place to another so they can fit it and go on their way.

“It works the other way, too. Sometimes we have customers with business jets who are travelling with extra luggage – sometimes very extra luggage – so we charter a commercial aircraft to move the rest of the luggage from



point A to point B.

“So, we are also in the charter business – that’s why we are called a one-stop-shop.”

Although Husary is reluctant to name airlines and business aviation operators UAS works with, for contractual and confidentiality reasons, one he can talk about is Deer Jet, as a co-owner of the business.

“The partnership with Deer Jet is going fantastically well. We’ve benefitted a lot from the synergies. For example, we support all their fleets and we do all their trip support, we take care of their flights globally, we also support Hainan Airlines as well, all part of HNA Group.”

As an example of how UAS works on the ground, Husary talks about the burgeoning market in Africa.

“We have a headquarters in Johannesburg and we have a supervisory network all across Africa, providing a lot of services. Suppose a customer wants to go to Cameroon... there’s only one handler there and the service quality is not necessarily the best, so we have our own UAS staff on the ground to take care of everything. It’s just like operating to Dubai. The UAE standards are applied everywhere across the network.

“We’re planning to invest more and more in Africa. We see a necessity because many of the major players are not focused on that region.

“When we go to a place where the infrastructure is not great, we try to make it as good as possible. Believe it or not, the minor things matter more than the major things, like having somebody meeting you at the airport when you arrive, dressed in a suit with a UAS badge. The customer is already feeling comfortable that there’s someone from UAS taking care of their flight.

“This comfort factor plays a huge role in the entire operation. Of course, you face the lack of equipment here and there but we make it manageable.

Risk mitigation

“Part of what we provide is risk mitigation for a lot of our customers who are Fortune 500 companies. Let’s say a CEO of company X wants to go to somewhere. Their flight dept contacts us and we provide an intelligence brief with risk assessment, sometimes take it further and survey the hotel, survey everything from a security aspect. We give security tips not only based on official advice but also on our own assessment.”

This attention to detail is being recognised, not just in business coming the way of UAS, but also in industry awards. Just a few days after EBACE, UAS was given the ‘innovation in business aviation industry’ award at the 2019

annual Sapphire Pegasus Business Aviation Awards.

It’s the fourth such award for UAS. In 2018, the company won the title of service provider of the year, while co-owner/founder and executive president, Mohammed Husary, scooped the lifetime achievement award.

Antonia Lukacinova, founder of the Sapphire Pegasus Business Aviation Awards, said: “UAS was a popular winner, with industry peers voting online and industry judges praising the company for its commitment in rolling out innovative solutions for its clients.”

One of those solutions is an aviation technology suite called UAS evolution that’s designed specifically for business aviation needs and to make operations most time and cost-effective. Another is a venture with Honeywell to provide global connectivity to the business jet fleet of Hongkong Jet with UAS LinkEvolution. It provides flight services and communication combined with Honeywell GoDirect cabin services for passenger connectivity.

And, if that wasn’t enough, Omar Hosari, CEO of UAS, as well as co-owner/founder with his brother, was named one of the best 100 Arab CEOs in 2018.

UAS may now be jointly owned with Deer Jet, but the company values its dynamism. Its DNA, is firmly rooted in the family. ■

*Adel Mardini isn't content with launching a new brand of luxury fixed-base operations. He wants to lose the term FBO, expand into aircraft sales and maintenance, and even new tech, as he explained to **Dave Calderwood**.*

MARDINI TURNS UP THE GAS...

You could say it's typical of Adel Mardini, president, CEO and founder of Jetex Flight Support, to issue a challenge to the rest of the business aviation industry to come up with a new name to replace the term 'FBO'.

After all, Mardini is the man who disrupted the whole FBO business back in 2005 with the launch of Jetex, introducing it with a blaze of bright orange – still the company's trademark – into a market traditionally more comfortable with dark, sedate colours.

But there's method, as always, in Mardini's reasoning.

"The description of an FBO labels it as a gas station for aircraft," said Mardini, just before this year's European Business Aviation Convention & Exhibition (EBACE). "But, since its origin in 1918, it [the FBO] has progressed to becoming a relaxed and stress-free setting for busy travellers.

Transient pilots

"Towards the end of WW1, civil aviation was virtually unregulated and consisted of mainly transient pilots, operating military surplus aircraft that landed wherever they could. This prompted pilots to set up temporary camps offering aircraft maintenance and flight training, which, by 1926 when aviation regulations were put in place, then became what we now know 100 years later as an FBO.

"As FBOs formerly provided only operational support, there was a gap in the experience that

the upmarket clientele, who use private jets, were receiving. FBOs now offer an assortment of services that include gym facilities, games rooms, high-class food and beverage, concierge, movie theatres etc. And not forgetting a fleet of cars to transport travellers comfortably over the tarmac to their jet.

"FBOs are not just gas stations any more. They are places where you can spend time and have an experience, whether you're a customer or flight crew.

"The hospitality industry didn't shy away from producing unique names for places to stay. Whether guests visit a hotel, motel, bed-and-breakfast or hostel, they know the standard to expect from each. Why can't we do the same for our global FBOs?"

"So, we are challenging our colleagues in the industry to change the name from FBO to something we can all agree on."

Mardini understands the luxury experience FBOs can provide better than most. His flagship facility is at Dubai South and is an other-worldly experience for anyone arriving at Al Maktoum Airport, whether from landside or airside. The normal hustle and bustle of the airport is left behind as you enter a world of calm, quiet – a perfect temperature and with service levels off the scale. Not surprisingly, it has won acclaim from all quarters and just recently a Sapphire Pegasus Award for outstanding design.

Inspiration for Jetex's FBOs comes from the hospitality industry, particularly hotels.



"When you go to any five-star hotel, you spend at least a few minutes within the lobby," said Mardini. "This is what we want to achieve with our FBOs. We want passengers to spend a few minutes here before we drive them out to their aircraft."

That few minutes can easily be extended with facilities such as a full-scale conference room, showers and rest rooms, duty-free shopping, lounges with huge, high-definition screens and concierge support for ongoing travel or requests. Not to mention the Rolls-Royce cars to ferry you across the apron to your waiting jet.

Proven popular

This model has proven popular, with Jetex now operating at 56 locations in 26 countries around the world. The latest is at Kansai International Airport, its third location in Japan, and location for the G20 Summit meeting of global leaders.

"We have been operating in Narita and Haneda Airports since 2015 and believe Kansai to be a strategic addition based on the impressive 31.5% growth over the last 18 months," said Mardini.

Jetex now has more than 400 employees worldwide and three operational hubs. As well as the main HQ in Dubai, there's also a centre in Miami for the Americas, both north and south, and in Beijing for China. Where Jetex doesn't have an FBO, it has affiliates and agents to arrange flight support for those locations.

You might think that running a still-growing



“The description of an FBO labels it as a gas station for aircraft...We are challenging our colleagues in the industry to change the name from FBO to something we can all agree on.”

ADEL MARDINI

global network of FBOs (we’re using that term because a new one hasn’t been selected yet) might be enough for Mardini, but no. At last December’s Middle East Business Aviation Association (MEBAA) show, Jetex and Hondajet announced an agreement for Jetex to become the Middle East’s exclusive dealer for the innovative aircraft.

And, just in time for EBACE, Jetex signed an agreement to establish a new line maintenance facility in Dubai for Bombardier aircraft. It will initially offer unscheduled maintenance services but will build towards scheduled maintenance operations in the coming months.

Technical engineers

The technical engineers supporting the line station are certified for all Challenger series and Global series business jets, including Bombardier’s flagship Global 7500 aircraft.

“It’s a significant milestone for Jetex,” admitted Mardini. “The agreement came after a year of work with Bombardier. This, and the Hondajet agreement, put us at a different level in the industry.”

Quite a few eyebrows were raised at the Hondajet agreement. After all, Middle East customers tend to like large-cabin, long-range jets such as Global, Gulfstream and Dassault Falcon aircraft. But, again, perhaps typically of the man, Mardini sees opportunities.

“Hondajet is a good product for businessmen in the region who want to fly their own jet from,

say, Dubai to Riyadh, or Jeddah to Dubai,” said Mardini.

Clearly, the \$5million six-seat Hondajet has much lower operating costs than a large jet, with five living zones and a galley good enough to produce five-star meals. There’s also the more discreet ramp presence of the Hondajet and the kudos from having an aircraft that’s just a bit different.

Whatever, Mardini’s faith seems to be paying off with six interested buyers already.

Perhaps, more extraordinary, is Jetex’s involvement with US start-up Wright Electric, which is proposing all-electric short-haul aircraft. Jetex’s interest is in private aviation, rather than competing with low-cost carriers such as EasyJet, but both are investing in the production of a Wright Electric aircraft.

With an estimated range of 540km (335 miles), a passenger could fly from Jetex FBOs in Dubai to Muscat or Malaga to Casablanca on a single charge. That’s some way off yet but, in the meantime, Jetex will implement the charging infrastructure and full support for electric jets throughout its global FBO network, starting in Dubai.

“We are constantly building a new reality in the aviation industry. First, by setting a high standard of service and now by setting a new standard for innovation,” said Mardini. “We envision having the aircraft and infrastructure at all of our FBOs throughout our global network.”

Jeffrey Engler, CEO and founder of Wright

Electric, summed up Jetex well. “We knew right away Jetex was the kind of company we wanted to work with,” he said. “They have an innovative mindset and don’t like to settle for the status quo. They are as excited about new technology as we are.”

Despite the constant global expansion, moves into new fields of operation and involvement with new tech, Mardini remains firmly rooted in the Middle East. He sees it as a worthwhile market – mainly Saudi Arabia and the UAE – though there is activity elsewhere, such as Oman, which has recently opened a new airport.

Oil price

The return of the oil price to around \$80 a barrel has helped bring stability to the market, he notes, as have initiatives taken last year by the Executive Council of Dubai to scrap 19 fees related to aviation and to halve municipal taxes. The council is chaired by Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai, who said that Dubai is a global hub for the industry and its hard-won position in this sector needed to be strengthened.

“The impact of these economic reforms is very positive and will stimulate business volumes,” said Mardini. “We owe it to Dubai for their facilities and support from officials from the government and civil aviation authority.”

The business aviation industry owes a lot to Mardini and his Jetex creation, too, for its fresh and dynamic way of doing business. ■

September 2019 will mark the third year of the Middle East and North Africa Business Aviation Association (MEBAA) show in Morocco, and its growing success is proof the country is becoming a major business aviation centre. **Marcelle Nethersole** reports.

Ali Alnaqbi: "Business aviation is growing and Morocco is leading the way with an expanding wealthy elite."



MEBAA'S 'THREEPEAT' CONFIRMS HUB STATUS

Ali Alnaqbi, MEBAA founding and executive chairman, is unequivocal: "2019 is a good year for business aviation."

He and his team at Tarsus F&E are looking forward to welcoming visitors to the third edition of MEBAA Morocco, which will take place on September 25-26 at Marrakech Menara Airport.

The event's growing success is proof the country is becoming the business aviation hub in northern Africa.

"The show was developed with the full intention of giving north Africa the chance to access the growing business aviation industry in the same way that the MEBAA Show in Dubai does for the Middle East. And it is certainly working," explained Alnaqbi.

"The business aviation sector in Morocco shows promising potential," he added. "Around 70% of private jet usage is for business purposes, while the remaining 30% is for pleasure. With figures such as this, it's hardly surprising that the industry has such positive implications."

The number of registered aircraft in the MENA region is predicted by WINGX to increase to 1,200 by 2020, with business aircraft movements predicted to reach 175,000 in the same timeframe.

Alnaqbi said the success of the event shows the importance of business aviation in the region.

"When you look at the driving factors you see that

business aviation is growing and Morocco is leading the way with an expanding wealthy elite," said Alnaqbi.

"The Moroccan Office National Des Aéroports (ONDA), which is an event partner, reports the country's airports manage 50% of north Africa's business jet movements. Combined with government support, it makes sense that the MEBAA Show Morocco is growing."

The 2019 event is already expecting 2,000 trade visitors across the two days of the show. This will include heads-of-state, corporate aviation end-users, private buyers and high-net-worth individuals; plus many companies from within the business aviation supply chain.

"We are currently expecting up to 70 exhibitors, including companies that have exhibited previously. This includes Air Ocean Maroc, XJet and Milano Prime, as well as first-time names including AMAC Aerospace," said Alnaqbi.

There will also be a line-up of aircraft on the static that was yet to be announced as *Arabian Aerospace* was going to press but Alnaqbi said: "I can assure people, it will be fantastic."

In addition, the MEBAA Conference Morocco takes place the day before the show opens, on September 24, featuring key business leaders and roundtable discussions to share industry knowledge.

Innovations, big data, technologies

Key topics to be discussed include: innovations and the future of business aviation; the impact of big data in the industry; new technologies, such as blockchain and cyber security; airports and infrastructure; and the African market influence in Morocco.

Morocco is not just geographically ideal as a business aviation hub for travellers but also for companies that have opened up across the country.

"There are now around 200 aviation companies present in Morocco," said Alnaqbi.

"These include: Bombardier, Safran, Boeing and Airbus, and the Moroccan Government has identified the growth potential in the aerospace and business aviation industries and has focused on creating an environment for manufacturers to establish themselves."

Morocco's 2020 aerospace goals include bringing in 100 new investors, creating 23,000 new jobs and generating \$1.6 billion in new revenue, and ONDA announced a plan for a dedicated business aviation airport – Tit Mellil in Casablanca – to be operational by 2025.

Alnaqbi said the strategy to attract business aviation was further enhanced when ONDA awarded Jetex, with its hub in Dubai, and Swissport Executive Aviation fixed-base operation (FBO) contracts for nine facilities.

"It has caught the attention of industry leaders – Khader Mattar, Bombardier's vice president of sales for Middle East and Africa, mentioned that Dubai started with one FBO in 2001 – now there are six," he said. "Morocco is clearly seeing the demand for business aviation in the region." ■



Khalid Serghat: "We want to develop our offer with greater flexibility in these regions and expand our fleet to adapt to all types of journeys."

Sarah sallies forth

Sarah Airways specialises in VIP private transport and medical evacuation – a growing market in Morocco. Founder and CEO, Khalid Serghat, shared his vision for the company with Vincent Chappard.

Sarah Airways took off in Morocco under the leadership and full ownership of Khalid Serghat in September 2018.

"I wanted to launch a decade ago but conditions were not favourable at that time. Today, the environment has changed, the market has grown, the need is there," he explained.

The final decision was taken during the first half of 2018, followed by the purchase of a first aircraft, a Cessna Citation VII.

Serghat then formed his team. "We established our roadmap in coordination with the DGAC of Morocco. We started to operate in September 2018. Our second aircraft, a Citation III, entered into service late in 2018," he said.

The airline focuses on VIP transport and medical evacuation segments and operates mainly in Europe, Africa and the Middle East. "We want to develop our offer with greater flexibility in these regions and expand our fleet to adapt to all types of journeys, wherever there's a demand," said Serghat.

Based at Mohamed V International Airport in Casablanca, Sarah Airways also caters for rapid delivery of parcels for import and export.

It also plans to take delivery of a third aircraft, a Hawker 900XP, which will have a greater range. This will enable the airline to provide for more international and direct flights, particularly to New York and Dubai. It works mainly with private customers, government and insurance companies in these regions.

The airline's financial results are positive after 10 months of operation. "We have achieved almost 95% of the objectives in our business plan, with more than 150 flights," said Serghat.

Sarah Airways intends to consolidate its market share in Morocco and enhance its offer, while maintaining and capitalising on its competitive strength – punctuality, quality of service and value for money. It will also tap more international customers to fly further.

One of the main pillars of the airline's development strategy is training. Serghat is fully aware that the success of Sarah Airways depends, above all, on the quality and professionalism of its staff, its pilots, its crews and maintenance teams. Consequently, training is an area where he is investing time and resource to ensure optimal fleet operation.

The airline has five mechanics and three crews; a fourth is currently finishing its training.

Morocco counts itself among the pioneers for the setting up of a medical hub and emergency evacuation. The country has a good infrastructure. For Serghat, it is a solid and fully expanding market with a real growth potential.

Enhance competitiveness

Even though Moroccan authorities are supporting increasing development within the aviation industry and related businesses, there is, believes Serghat, a need to enhance competitiveness in this thriving sector, through greater "support and flexibility" to the country's operators and supply chains.

Over the past decade, Morocco has emerged and consolidated its place as a significant platform for the aerospace industry with a high-skilled workforce, competitive labour costs, a favourable business environment and diversified trade agreements. The kingdom has bet on its geostrategic position, at the crossroads of Europe and the Middle East, to enhance the attractiveness and the competitive edge of this sector.

The Moroccan Space & Aeronautics Industries' Group (GIMAS) was set up to fuel the growth of the industry. Morocco has also invested massively in training through the Aerospace Training Institute and the Institute for Aeronautics and Airport Logistics (ISMALA) to feed companies with required high-quality skills.

Serghat wants Sarah Airways to play a major role in this growth. His goal is to reach a fleet of eight aircraft within the next five years and to become a real driving force in Morocco and the wider region. ■

There's a new mood of confidence at Airbus Helicopters as the rotor market embraces new technologies and new opportunities. Dave Calderwood reports.

A breath of fresh Airbus in the Middle East

Airbus Helicopters is gearing up to expand its sales and activities in the Middle East, working with established partners in key locations and from its own base in Dubai.

A combination of new models, such as the medium twin H160, and thoroughly modernised older helicopters, added to an expected upturn in demand in the region thanks to the oil price recovering, and an opening up of new sectors, gives Airbus Helicopters' boss, Bruno Even, confidence that the company can mirror its dominance in other markets around the world.

Globally, Airbus Helicopters has a 54% share of the helicopter market. This is thanks, in part, to its full range of aircraft, from the best-selling single-engine H125 through a strong mid-range that includes the highly versatile H135 and H145, right up to the heavy Super Puma H225 family.

Wide spread of models

This wide spread of models means Airbus Helicopters can compete in each of the biggest sectors – oil and gas shuttles, search-and-rescue (SAR) operations, emergency services such as medevac, pilot training, and corporate and personal VIP flights.

It's also pitching for the developing tourism market, where types such as the new H160, expected to be certified in late 2019 or early 2020 and with an order book already building, offer a comfortable and fast way to explore often difficult terrain.

First though, Airbus Helicopters is fine-tuning its service and support network, aware that this is key to keep customers – operators – flying and happy.

"The moment an Airbus helicopter is delivered, providing the customer with the necessary support and services to carry out their operations efficiently, safely and cost-effectively, is our duty and obligation," said Even, who became CEO of Airbus Helicopters in February 2018.



Bruno Even: "Customer loyalty is a fundamental part of our company's strategy."

"Customer loyalty is a fundamental part of our company's strategy. It means that we must remain focused on improving customer satisfaction, moving from being a product-centric helicopter manufacturer to being a customer-centric provider of end-to-end solutions.

"Customer loyalty is about helping our customers achieve mission success; about helicopters that are easy to operate; about proximity and understanding their requirements and their challenges."

Getting closer to customers isn't always easy

in the Middle East, where the sheer distances, sometimes hostile terrain, and political tensions can get in the way. Airbus Helicopters' way of working through this is to partner with key operators in different states.

So, on the horizon is a new technical office in Pakistan. Airbus Helicopters is already working with the Falcon Aviation Services maintenance centre in Abu Dhabi and cooperating with AMMROC for helicopter overhauls.

It's expanding its regional industrial base, relying on Eurocopter Kingdom Saudi Arabia, its largest subsidiary located in Saudi Arabia, where more than 120 engineers and technicians are dedicated to maintenance, overhaul and modernisation.

Strong and positive

"Airbus has enjoyed a strong and positive presence in the Middle East," continued Even. "Over the years we have initiated a number of strategic partnerships in the region that have contributed to the development of the industry by providing the best of expertise, services and products. It's always been our strategy to be closer to our customers. As of today, we count more than 1,000 employees in the region across all our divisions."

The Saudi connection is important to the manufacturer as many of the emerging opportunities are in the kingdom.

"We see continuous opportunities in emergency medical services and SAR missions and, with Saudi Arabia looking to open its skies to commercial operators, tourism and passenger transport could see the sharpest immediate growth," said Even.

"We are very proud of our long-lasting relationship with Saudi Arabia and we look forward to continue developing our partnership and engagement by exploring industrial collaboration opportunities in the kingdom.

"By 2020 we will have around 80 helicopters flying [in Saudi Arabia]. Last year ARAMCO

Ton-up: The CityAirbus has already made more than 100 flights.



signed for five H145s and, with the kingdom looking to open its skies, we see plenty of potential for our range of high-end civil products, such as H145, H160 and the H175.

“The H145 has shown itself to be very durable and versatile and is particularly suited to operations in hot climates. And the NH90 NFH is the best maritime helicopter on the market and well adapted for a multitude of missions.

“The Middle East is also, rightly, focused on new technologies and innovation, which Airbus Helicopters offers through products such as H160, H175, and the development of urban air mobility technology.”

This last reference is to the various electric vertical take-off and landing projects, known as eVTOLs, currently either in development or proposed. Airbus has two such programmes, the CityAirbus air taxi, and Vahana, both already flying but, like others in the field, still a few years away from certification and entry-into-service.

Shot in the arm

Uber, the US taxi company that kickstarted the eVTOL frenzy with its Elevate air taxi concept, recently admitted that existing helicopters are a better bet than eVTOLs in the short term, which is a surprise shot in the arm for the newly formed Airbus Corporate Helicopters (ACH) division. ACH made its debut at the Middle East Business Aviation Association (MEBAA) show in December 2018.

“There is substantial interest in Airbus Corporate Helicopters for both the ACH145 and the ACH160. Whether for private owners or large corporations, ACH offers its customers fully tailored interiors – including special collaborations with Hermes and Mercedes-Benz – as well as global support and full service and maintenance,” said Even.

“Furthermore, Airbus is the only original equipment manufacturer offering a dedicated platform for private and business aviation, which is a major differentiator.”

THE FUTURE IS... ELECTRIC

If the CityAirbus looks too futuristic to be true, think again. It's already made more than 100 flights.

It's one of the new breed of air taxi eVTOLs, with a multicopter configuration that features four ducted high-lift propulsion units.

Eight propellers are driven by electric motors at around 950rpm to give a low acoustic footprint.

Airbus intends it to be flown autonomously – without a pilot onboard like a drone – but that suggests between

fixed routes, at least to begin with.

Cruise speed of the four-seat CityAirbus will be approximately 120kmh with up to 15 minutes of autonomy. Of course, for now the limiting factor is range (distance) or endurance (time), and that's because of the heavy weight of batteries that need to be carried on board. As the energy density of batteries increases – a race that's moving forwards furiously – then that range can increase.



Clean-sheet design: The H160 is bristling with new thinking.

MEET THE NEW CONTENDER

Much is riding on the success of the latest helicopter to come from the European manufacturer, the H160.

It's the first clean-sheet design since the company rebranded itself from Eurocopter to Airbus Helicopters back in 2014, and will fit into the highly competitive medium size, twin-engine segment, up against Leonardo's hugely successful AW139.

Key figures for operators are a maximum take-off weight of 5,670kg with a useful load of 2,000kg, range of 420nm and a cruise speed of 150kt.

The aircraft is powered by two Safran Arrano 1A engines, giving a total of 1,280shp. It can seat up to 12 passengers.


First configurations are expected to be as support for offshore oil and gas platforms, and as corporate transport, but Airbus Helicopters notes that bigger helicopters are also being chosen for the emergency services sector.

The H160 bristles with new thinking. There's a new idle mode, which creates no downwash when the aircraft is parked rotors running, making it quieter and easier to be around. The new Blue Edge five-blade rotors do not flap, thus reducing noise – 'stealth mode' as the company calls it. And the cockpit features the latest version of the Airbus' own Helionix high-tech flightdeck.

NH
90

SAVING LIVES

PROTECTING HEROES

 NH Industries

AIRBUS



LEONARDO

www.nhindustries.com



Eye in the sky: The huge Aksungur UAS made its public debut at IDEF 19. It is being developed as a multi-role platform – for surveillance, maritime patrol and attack.

PICTURE: TURKISH AEROSPACE.

Turkey came out fighting at this year's biennial International Defence Industry Fair (IDEF), held in Istanbul from April 30 to May 3. Alan Warnes was there.

Turkey hot to trot

Turkey's aerospace industry, harnessed by the Undersecretariat for Defence Studies (SSB), is in a rush.

The Turkish Government wants its military to be operating the latest indigenously designed weapons, and at the same time to offset the cost by exporting the non-international traffic in arms regulations (ITAR) systems.

The need is even more urgent with the US officially ending Turkey's involvement in the F-35 Joint Strike Fighter programme.

More sanctions are likely to come after Turkey, a NATO country, would not back down from acquiring and taking delivery of Russia's extremely capable S-400 surface-to-air (SAM) missile system.

At IDEF, Turkey's President Recep Tayyip Erdogan spoke of how important Turkey is to the Joint Strike Fighter programme. "The F-35 is doomed to fail if Turkey is expelled," he told an invited audience, adding: "Turkey is accelerating its steps to manufacture its own fighters, which will be the backbone of our air forces in the future. Most of all, we are moving very fast to producing locally manufactured air defence systems."

He later pointed out that four Turkish companies (Turkish Aerospace, Roketsan, Aselsan and Havelsan) were among the top 100 companies in the world's defence industry, indicating his country would continue to support the policy of small and medium-sized companies in the area.



Fahrettin Öztürk: Tasked with getting all the newly developed platforms quickly into serial production.

It wasn't too surprising that all four companies took up more space than any others at the event – they have so many products to show off!

Turkish Aerospace was launching the new Anka-Aksungur unmanned aerial system (UAS) and multi-role heavy combat helicopter (MHCH) at the event. In addition, it had the T129 ATAK armed reconnaissance and attack helicopter, Hurkus trainer, Hurkus C counter insurgency (COIN) turboprop, Hurjet jet

trainer/light combat aircraft, T625 Gökbey helicopter and Anka S UAS.

Also in evidence was a large scale model of the new Hava stand-off jammer (SOJ) jet, which is a Bombardier Global 6000 enhanced with a lot of Aselsan and Havelsan equipment. Turkish Aerospace is the systems integrator of the four Hava SOJs.

The Turkish Air Force has ordered and is now working on upgrading the first two Global 6000 executive jets. Under an agreement signed between SSB and Aselsan in August 2018, the first one should be delivered in 2023, with the final delivery taking place in 2027. "If successful, it will be the most complex jammer/electronic warfare aircraft in the world today," a TAI source said. Work on the first example started on January 3.

Developing, manufacturing and selling so many platforms to the local customer, as well as allies, must be a demanding job. The man responsible for that is president and CEO, Temel Kotil, who was very active around the stands, talking and shaking hands with people.

Having realised the need to speed up the process of getting all these platforms into the market place, he has appointed Fahrettin Öztürk as the vice president, research and development.

It's a new role that Öztürk admits is challenging. "I am head of a newly created division and my job is to handle the research and development process and get it to serial production quicker," he explained.

Continued on Page 56

CONTINUED FROM PAGE 55

Undoubtedly, Turkey's indigenous new-generation fighter, the TF-X, will be taking up much of his time. "Our partnership with BAE Systems is going well. We are in phase one – the conceptual design and selection of major systems," he said. "Then we will put [a model] through wind tunnel tests. We are using all the available wind tunnels around the world and will select the suppliers within six months."

Öztürk, who has been with Turkish Aerospace for more than 20 years, continued: "In phase two we will start the detailed design, manufacturing and integrating of all the systems. We are expecting TF-X will have its first flight in 2026."

While the new fighter is a big part of Turkey's future, Öztürk has a lot of other projects to consider right now.

"The Hurjet [launched at Farnborough last year] is doing well and my team, working with the Hurjet prototype team, have started manufacturing the parts. The first flight will be in late-2022."

When it comes to the prototypes, Öztürk said: "There will probably be four or five in different configurations, but not all will fly. There will be static rig tests, dynamic ground tests and one could be used for wind tunnels, checking systems and performance before flight. This is the minimum, there could be more."

Prototype production

A mock-up of the Hurjet advanced jet trainer/light combat attack was shown at IDEF 19 with Tubitak SAGE HGK-82/83 bombs and Gökku air-to-air missiles on the wingtip rails. Tubitak SAGE is the research and development arm for the defence industries, tasked with engineering and prototype production, which starts with fundamental research and conceptual design.

The programme for the Hurjet advanced jet trainer/light combat attack was unveiled at IDEF 17, covering the Merlin beyond-visual-range air-to-air missile (AAM) and Peregrin within-visual-range (WVR).

Since being launched, the Turkish Air Force has been carrying out the missiles' captive carriage trials and opted to call both versions, rather confusingly, the Gökku.

The aircraft will be at the centre of the military's celebrations when the Turkish Republic celebrates its 100th anniversary in 2023. Originally it was hoped the T-FX would make that date, but it is not expected to fly until 2026.

Two new launches this year were the 10t class MHCH, albeit in mock-up form, and the twin-boom twin-engine Anka Aksungur UAS.

Turkish Aerospace believes the MHCH would benefit the Turkish Land Forces and, at the same time, take the company into yet another new area.

A Turkish powerplant will power the large helicopter. A company official said: "TUSAS Engine Industries (TEI) is working with us to develop a new engine and transmission."



Unveiled: A second Aksungur UAS platform, seen at the Turkish Aerospace stand, was fitted with six hardpoints, with a double rack carrying four laser smart micro munitions.



Heavy: Another new launch at IDEF was the 10t MHCH, which Turkish Aerospace believes would be an ideal alternative to the Apache.

PICTURES: ALAN WARNES.

Turkish Aerospace sees the MHCH as the ideal alternative to the Boeing AH-64 Apache.

Öztürk said: "We want it to be more manoeuvrable than the Apache, more functional and armed with more Turkish-designed weapons. Of course, we need collaboration with other countries, as we do in each project, because more partners bring better marketing options."

Also making its debut was the Anka Aksungur medium-altitude long-endurance (MALE) UAV, with a set of wings spanning a huge 24 metres. Its first flight, on March 20, lasted four hours and 20 minutes, and a second in April for two-and-a-half hours.

The twin-boomed UAS is powered by two locally developed TEI PD 170 turbo diesel engines, which flew for the first time on the

smaller Anka on December 27, 2018.

A Turkish Aerospace source added: "Initially, we want to reach 40 hours flying duration with an electro optical/infrared (EO/IR) turret, then fly 12 hours with a maximum 750kg payload."

There are six hardpoints on the massive wings to accommodate a diverse range of weapons.

A sonobuoy pod was also seen fitted under the wing to optimise maritime surveillance operations.

Weapons integration is expected to cover between 50 and 60 test flights before live firings in the last quarter of this year. Turkish Aerospace intends to hand it over to the armed forces to evaluate inside the first six months of 2020.

Turkish Aerospace and the Pakistan Army Aviation (PAA) are still optimistic that the US



Civilian possibilities: The T625 Gökbey is the first platform Turkish Aerospace could sell into the civilian market as well as the military. As a result, it views the Middle East as a region where the helicopter could do well.



Versatile: The Anka S has a SATCOM inside the nose with a range of 1,000km. This version is used by the navy in the maritime patrol role, although the work has been contracted to Turkish Aerospace. The Land Forces use it as an attack platform.

Government will authorise the export of the Honeywell/Rolls-Royce LHTEC 800 engine. The powerplant is part of the \$1.5 billion deal for 30 T129s ATAKs ordered by the PAA, announced on May 24, 2018.

The T129 is powered by two LHTEC T800-4As, but an export licence is required and the deteriorating relationship between the US and Turkey, as well as Pakistan, could sink the deal.

Another option could be TEI's TS1400 turboshaft engine, which was powered for the first time in early January. However, it is still in the project phase and will not be ready for production until next year at the earliest.

A PAA delegation visited IDEF19 to view the technologies used on the attack and reconnaissance helicopter. They looked at the avionics system of the helicopter, as well as a demonstration of the ATAK's

Avci (Hunter) helmet-mounted display slewing the 30mm machine gun.

Meanwhile, 44 T129s have been delivered so far – 40 of 59 on order to the Turkish Land Forces and four of 21 ordered by the Gendarmerie. This includes five of the phase 2 variant, according to a TAI source, that includes a Aselsan laser warning receiver, radar warning receiver, jammer and Aselsan 9681 radio.

Of all the projects currently being worked on, there is a certain amount of excitement that the new six ton T625 Gökbey (Sky Lord) twin-engine medium helicopter could break Turkish Aerospace into the civilian market.

The first prototype is expected to fly in June, according to Turkish Aerospace officials.

While a first T625 did fly on September 6 last year, this was essentially an 'iron bird' – a ground-

test vehicle that was modified with new avionics and engine. Its flight marked the fifth anniversary of the contract being signed to develop the aircraft.

Civilian certification will start in the summer and should be completed in 2021, when serial production is expected to begin.

Although the civilian prototype will use the LHTEC 800 powerplant, the military ones will be powered by the newly designed TEI TS1400.

Turkish Aerospace has already started work on a version to replace the military's ageing UH-1H Hueys, AB212ASWs, and Sikorsky S-70B Seahawks. A company official said it could be flying by the end of the year. The same source added: "There will be two military prototypes, one in an attack configuration and another in a search-and-rescue (SAR) role fitted with a hoist."

"We see a requirement right across Turkey's military for up to 500 T625s."

The army is looking for up to 160 Gökbeys to fulfil the attack, SAR and utility (with 16 seats) roles, while the air force, Jandarma and Gendarmerie will have their own requirements.

Signed agreement

At IDEF 2017, Turkish Aerospace signed an agreement with the SSB to launch the armed Hurkus C.

The prototype, a converted civilian Hurkus, was seen parked in the outside display area armed with a Laser-UMTAS long-range anti-tank missile first fired in April 2017.

Four Togan 81mm mortar bombs, which Tubitak-SAGE has been developing for almost two-and-a-half years, were also mounted on the aircraft.

The first successful air drop tests were performed in February, using a locally built multi-carriage rack. Drop tests will continue to validate the proximity, point detonation and timing fuse.

The more familiar Cirit 2.75 laser-guided missile has also been integrated and, according to Turkish Aerospace, so has the Teber 81 and Teber 82.

The Turkish Land Forces are considering the Hurkus C for combat air patrols – fast response teams equipped with an Aselsan CATS EO/IR turret underneath. The development aircraft has flown 470 hours to date during its flight and evaluation programme.

The Turkish Land Forces have a requirement for 18, with a contract expected to be signed with SSB 'within the next two months'.

While IDEF 2019 was hailed as an international event, and to its credit hosted more than 1,000 companies, most of the focus was on the big four mentioned earlier. As such, it provided an insight into the huge strides Turkey's aerospace industry is taking in the government's indigenous revolution. One wonders how the F-35 decision, and the possibility of further US export controls, may make it have to work even harder, particularly on the engine front, which remains Turkey's Achilles heel. ■

TAI unveils heavy attack helicopter

The TAI T129 ATAK – a derivative of the AgustaWestland AW129 Mangusta – is currently being produced under licence from Leonardo Helicopters and is already in full frontline service with the Turkish Army and the Gendarmerie General Command.

Now the armed forces are looking to acquire a larger, heavier, new generation attack helicopter.

A mock-up of this heavy class attack helicopter, which may have been provisionally designated as the T130 ATAK 2, was displayed at the International Defence Industry Fair (IDEF) in late April 2019, and subsequently at the Paris Air Show in June.

Turkey is pursuing an aggressive timescale, hoping to roll out a prototype of the new helicopter in 2023 or 2024, to fly it in 2026, and bring the type into service in 2031.

The proposed ATAK-2 is a 10t, twin-engined multi-role attack helicopter, armed with a 30mm cannon and 16 Roketsan radar-guided anti-tank guided missiles. It will be equipped with millimetre-wave radar (MMW), similar to the Apache's Longbow system, and directional infrared counter measures (DIRCM), putting it in broadly the same category as the Boeing AH-64E Apache Guardian.

The new helicopter will use broadly the same configuration as the T129 and Apache, with a wheeled taildragger undercarriage, tandem cockpits, and a conventional rotor layout.

The ATAK-2 is optimised for missions in harsh environmental conditions, and will be equipped with modern avionics systems and state-of-the-art target tracking and imaging, navigation, communications and electronic warfare systems, while offering high performance, increased payload capacity and low maintenance cost.

The modular avionics package will include a four-axis autopilot and helmet-mounted displays for the crew.

The existence of the heavy class attack helicopter programme was first revealed in November 2018 when the Turkish Undersecretariat for Defense Industries (SSB) unveiled details of the new helicopter programme on social media. A development contract was signed by the SSB and Turkish Aerospace Industries (TAI) on February 22 2019.

A few days earlier, Ismail Demir, chairman of the SSB, told a Turkish TV channel that talks with Italy were under

The Turkish Armed Forces are looking to acquire a larger, heavier, new-generation attack helicopter to augment and eventually replace the T129.

Jon Lake reports.

First look: This early impression of the ATAK 2 shows a triple-barrelled 20mm machine gun under the nose. The ATAK 2 is now envisaged as having a single-barrelled 30mm cannon.



way discussing cooperation on the design of the ATAK 2, but TAI general manager, Temel Kotil, contradicted this, saying that the helicopter would be “100% local and national, because it will be designed from scratch”.

The ATAK 2 is intended to reduce Turkey's dependence on the import of major items of defence equipment, and to stimulate local industry. The project is also intended to win valuable export orders.

It has been reported that the ATAK 2 will incorporate particular sub-systems from the T625 Gökbey utility helicopter project, including the transmission, five-bladed main rotor and landing gear, but will also incorporate unspecified technology from the T129 ATAK, as well as leveraging technological know-how and operational experience from the T129.

Two engine options

The ATAK 2 will be offered with two engine options – the indigenous 2,000hp turboshaft engine developed by TUSAS Engine Industries for the T625, or the General Electric T700-TE1-701D engine, which is being licence produced (with 61% local content) for the T70 Turkish utility helicopter programme.

These should give the aircraft a maximum speed of 172 knots, a service ceiling of 20,000 feet and a 6,000ft hover out of ground effect (HOGE) ceiling.

Other indigenous equipment used in the ATAK 2 includes the MilDaR fire control radar, which is small, lightweight and which also has relatively low power consumption. The radar uses a conventional mechanically driven antenna that rotates to provide 360° coverage, rather than fixed conformal active electronically scanned array (AESA) radar arrays.

The aircraft will also use Aselsan's third-generation common aperture targeting system (CATS) electro-optical (EO) reconnaissance, surveillance, and targeting system, which is also planned for use on the T129B2 aircraft.

The aircraft can carry an external payload of up to 1,200kg (2,646lb), with three weapons stations on each wing capable of mounting guided and unguided 2.75-inch rockets, anti-tank guided missiles and air-to-air missiles. The helicopter will also be armed with a nose-mounted 30mm cannon.

TAI T70 PROGRAMME ON TARGET FOR 2021

The Turkish Aerospace (previously TAI) T70 programme is on track to achieve Turkish military certification by February 2020, leading to initial deliveries from around March 2021, writes Jon Lake.

The T70 is a locally assembled Sikorsky S-70i International Black Hawk derivative, developed as part of the Turkish utility helicopter programme (TUHP) following the type's selection in 2011, when it fought off competition from the AgustaWestland AW149.

TAI signed a contract with Sikorsky in 2014, under which the Turkish prime will be responsible for the manufacturing and final assembly of the T70 at its Ankara facility, together with testing and integrated logistic support for airframe structures and the composite rotor blades. Alp Aviation is responsible for the production and assembly of landing gear, gearbox and dynamic components.

Turkish Engine Industries (TEI) will build GE Aviation T700 engines under licence from General Electric, while Aselsan will develop and integrate the new avionics suite, the so-called integrated modular avionics system (IMAS) that the company is co-developing with Sikorsky Aircraft.

In February 2017, Sikorsky transferred a Polish-built S-70i Helicopter to Aselsan to serve as an engineering testbed for the new avionics suite, and as



New users: TAI T70s will be supplied to six Turkish Government operators. Their insignia (and that of the SSB) adorn the door of this S-70i.

the de facto prototype for the TUHP. Three more prototypes were delivered to Turkish Aerospace by Sikorsky to support the certification effort. Sikorsky delivered the first five kits for assembly by TAI in 2018.

TAI will manufacture 109 T70 helicopters under the \$3.5 billion programme, with production eventually ramping up to around 24 per year for six government departments.

Turkish industry will build an additional 109 aircraft over the 30-year life of the programme, which Sikorsky will sell on the export market.

Sikorsky president, Dan Schultz, called the

programme "the largest international industrialisation project in our 93-year history".

The T-70 will be delivered in two configurations – the first examples will be in a more basic configuration for the General Directorate of Forestry. The second common baseline configuration will be used for the aircraft delivered to the Turkish Air Force, Turkish Land Forces, special forces, General Command of Gendarmerie, and Turkish National Police.

The TUHP programme has not yet been affected by deteriorating Turkish-US relations. ■

UNDER THE PATRONAGE OF HIS MAJESTY KING HAMAD BIN ISA AL KHALIFA, KING OF THE KINGDOM OF BAHRAIN

BIDEC
Bahrain International Defence Exhibition & Conference

WINNER
BEST TRADE SHOW OVER 10,000SQM IN THE MIDDLE EAST
MESE 2018 AWARDS

BAHRAIN'S PREMIER INTERNATIONAL TRI-SERVICE DEFENCE SHOW

28 - 30 October 2019
Bahrain International Exhibition & Convention Centre

www.bahraindefence.com /visitbidec @visitbidec @visitbidec2019

Officially Supported by: Bahrain Defence Force, Royal Bahrain Air Force, Royal Guard, Royal Bahrain Naval Force, National Guard, Ministry of Foreign Affairs, Ministry of Information Affairs

Knowledge Partner: CERASAT

Platinum Sponsor: BELL

Gold Sponsor: LOCKHEED MARTIN

Silver Sponsor: MILKOR

Media Partner: ARABIAN AEROSPACE

In Conjunction with: MEMTEC (Middle East Military Technology Conference)

Organised by: MEMTEC, CLARION EVENTS

Leading Arab air forces have been among the vanguard of air arms that have enthusiastically embraced active electronically scanned array (AESA or E-scan) radar technology for their next generation of fighters.

Jon Lake takes a detailed look at the technology.

AESA DOES IT ...OR DOES IT?

The jury is probably still out on the total benefits of AESA radar over the more traditional mechanically scanned (M-scan) radars.

Some believe that AESA radar is the single most important innovation in new-generation fighter aircraft. Most aircrew view it as being a 'must have', and are fulsome in their praise for the new technology, and persuasive and articulate in outlining its benefits.

However, others do not share their enthusiasm.

As far back as 2012, a US Navy Super Hornet pilot from VFA-81 told me that, for some missions, he would prefer to take an aircraft with the M-Scan AN/APG-73 radar than one fitted with the AESA AN/APG-79 – his unit then having a mix of aircraft fitted with the two radar types.

More recently, in November 2018, an experienced Luftwaffe Typhoon pilot told me that he hadn't found himself "in one situation where I wanted or needed E-scan".

Excellent performance

He highlighted the excellent performance and capability of the M-scan radar on the Eurofighter and stressed that he would rather have the EuroFirst passive infrared airborne track equipment infrared search-and-track (PIRATE IRST), which was absent on German Eurofighters, than a new radar.

He would also rather augment the existing radar with a Litening laser designator pod (LDP) to give a passive long-range visual identification capability.

Contrast that with some UK Royal Air Force pilots with experience of operating over Syria viewing M-scan radar as being on the verge of complete obsolescence, since mechanically scanned radars exhibit an inherently greater vulnerability to jamming and suffer from an inability to fully exploit the performance and capabilities of new weapons, including the Meteor BVRAAM.

Whatever the arguments, there's no doubt that the Middle East has embraced AESA technology.



The antenna of the Super Hornet's AN/APG-79 is tilted upwards to reduce frontal radar cross-section.

The UAE Air Force's Block 60 Lockheed Martin F-16E/F Desert Falcons had a Northrop Grumman AN/APG-80 AESA radar when they were delivered from 2005, making it one of the first air arms to operate AESA-equipped fighters.

Saudi Arabia's new F-15SAs and upgraded F-15SRs are equipped with Raytheon's APG-63 (V)3 AESA radar, as are the F-15QAs ordered by Qatar.

The Rafales supplied to Egypt and now being delivered to Qatar, are also AESA equipped, using the Thales RBE2-AA, an AESA derivative of the original passively scanned RBE2.

Kuwait's newly ordered Super Hornets and Bahrain's F-16V Fighting Falcons will be equipped with E-scan radar in the form of the Raytheon AN/APG-79 and Northrop Grumman AN/APG-83 scalable agile beam radar (SABR), respectively.

Also, Kuwait, Qatar and probably Saudi Arabia, are set to receive Eurofighter Typhoons equipped with the next-generation Leonardo Captor-E AESA radar, which has a mechanical re-positioner to give improved angular coverage and performance.

The Eurofighter Typhoon's M-scan Captor-C

radar was originally engineered with a lightweight antenna, big, powerful motors and robust gimbals, which allow it to be repositioned very rapidly and with great precision. It could intersperse the search pattern with 'loopbacks' to hit high-priority targets, rather than being stuck in a constant raster scan pattern like many conventional mechanically scanned radars.

Most advanced

Some have claimed that the Captor-C is the world's most advanced and most capable M-scan radar, and that, as such, it may offer some advantages over some older and smaller E-scan radars.

When Typhoon was being conceived, Euroradar believed that AESA was not really ready but that commercial RF technology would make it a less costly and more efficient upgrade option, or as a new radar for late production aircraft. Conventional M-scan fighter aircraft use a moving antenna, which is repositioned mechanically in order to 'steer' the radar beam. This requires complex and powerful mechanisms to move the antenna quickly and precisely, sometimes under high g-force.

The slim nose of the Rafale limits the size, and thus the power and range, of the RBE2-AA radar. Qatar's new Rafales (inset), like those delivered to Egypt, are fitted with the RBE2-AA AESA radar.



Traditional M-scan radars produce a single radar beam and usually operate on fixed frequencies – often with relatively limited frequency agility. There is no ability to simultaneously operate in both air-to-air and air-to-ground modes.

AESA radars also use a single transmitter/receiver, making them potentially vulnerable to unreliability – with a number of ‘single-points-of-failure’.

The first in-service fighter to use an electronically scanned array was the Russian Mikoyan MiG-31 ‘Foxhound’, but its Zaslon radar used a passive electronically scanned array (PESA), also known as passive phased array.

This still had a single transmitter but it was connected to a fixed antenna with multiple antenna elements or transmit/receive modules (TRMs). These allowed the radar beam to be steered electronically by ‘phase shifting’, using timing differences between the signals from each element to form and steer the radar beam without needing to physically move the antenna array.

A PESA radar was able to scan a volume of space much quicker than a traditional mechanically scanned radar, and was able to

generate several beams, allowing a degree of simultaneous multi-tasking.

A number of PESA fighter radars were produced, including the N035 Irbis for the Sukhoi Su-35BM, the NIIP N011M Bars for the Su-30MKI and the Thales RBE2 for the Dassault Rafale.

Impressive ability

The RBE2, in particular, demonstrated an impressive ability to operate in air-to-air and air-to-ground modes simultaneously, and was able to dispense with the heavy and complex hydraulic drives required by mechanically scanned radars, with consequent serviceability and reliability advantages.

But PESA radars came with considerable disadvantages, too. They had modest range capability and, with a transmitter that represented a potential single point of failure, many applications were also heavy and prone to cooling problems. PESA radars are today most often viewed as representing a technological dead end.

The first fighter radar to use AESA technology was the Mitsubishi J/APG-1, fitted to the

indigenous F-2 tactical fighter, which entered operational service in 2000, five years before the F-22 and F-16E/F.

Early AESA arrays tended to be heavier than equivalent mechanically scanned planar arrays and their drive systems required more cooling and electrical power. However, the lack of moving parts significantly improved reliability, and reduced costs of ownership, while performance and operational advantages were compelling.

Most AESA radars use a fixed antenna, consisting of a matrix of multiple solid state TRMs, each of which effectively functions as an individual antenna capable of generating and radiating its own independent signal, producing pulses on different frequencies and producing multiple beams simultaneously.

These modules operate at relatively low power, obviating the need for a large high-voltage power supply.

Because each module operates independently, the failure of a single TRM will not have a significant effect on overall system performance, and even the failure of a number of modules will not

Continued
on Page 62

CONTINUED FROM PAGE 61

prevent the radar from operating, but will rather result in a 'graceful degradation' of performance.

The AESA radar antenna array can be divided into sub-arrays that are capable of adaptive beamforming, including the generation of multiple independent beams. These beams may be interleaved, allowing the radar to support multiple simultaneous radar modes, including real beam mapping, synthetic aperture radar (SAR) mapping, sea surface search, ground moving target indication and tracking and air-to-air search-and-track.

These multiple modes can be operated near-simultaneously, providing a significant improvement in combat capability compared to legacy M-scan radars. This means that in a two-seat combat aircraft like the Boeing F/A-18F Super Hornet, the pilot in the front cockpit could be undertaking an air-to-air task, while the weapons systems officer in the aft cockpit is prosecuting an air-to-ground attack, with the radar supporting both.

An AESA radar will typically make a raster-type scan but using a thin pencil beam – giving a narrower and more elongated main lobe than a typical mechanically scanned radar. Because it can scan at a very high rate it can produce more power in this more 'dense' lobe, and with reduced latency.

Latency is further reduced because a track can be updated without having to wait for the next 'sweep' of the antenna. Instead, an AESA radar can prioritise and scan around the first detection or 'hit' and build track information. It also gives a higher quality track at range due to the shape of the beam, providing an accurate enough picture to support a wingman's weapons via data link.

Alternatively, one beam may be 'frozen', or can be kept pointing at a target continuously rather

than returning to that target with each raster scan, while other beams scan elsewhere.

Keeping the beam still during acquisition improves resolution and allows multiple targets to be tracked continuously, or for spatially separated targets to be tracked without any degradation in performance.

With an AESA radar using multiple beams, there is no need to rely on a single beam following a set raster scan pattern, or even to use that single beam to interrupt its scan to conduct a 'high-density update' on a contact.

An AESA radar will typically change its frequency with every pulse, generally using a random sequence, making it harder to jam. The simultaneous use of multiple frequencies makes life harder for radar warning receivers and electronic surveillance (ES) systems.

Spread signal emissions

AESA radars can also spread their signal emissions across a wider range of frequencies, which makes them more difficult to detect over background noise. The fact that an AESA does not have a fixed pulse repetition frequency makes it a low-probability of intercept (LPI) radar – 'stealthier' than conventional fighter radars.

An AESA radar can also use adaptive power management, using no more transmitting power than is needed to obtain the required information for each individual target – resulting in a further reduced probability of the radar's signals being intercepted by hostile forces.

AESA antennas can also be used to create high-bandwidth data links between aircraft and other equipped systems, and advanced AESA radars offer a useful electronic attack capability.

Many current AESA radars are lighter than early models, and are better able to work with existing aircraft power and cooling. Some now represent something close to a plug-and-play upgrade option.

However, most do require some increase in cooling and electrical power generation capacity, and often some strengthening of the forward fuselage.

The latest AESA radars represent something of a hybrid – adding a mechanical repositioner to a conventional E-scan array. This increases the radar's angle of regard from about +/- 60° on each side of the centreline to greater than 90°. This allows a fighter to turn away or 'crank' harder after launching a beyond-visual-range (BVR) missile, making it less vulnerable to a return missile shot, while still providing mid-course updates for the missile fired.

Leonardo's ES-05 Raven radar for the Saab JAS39E/F, and the same company's Captor-E for the Eurofighter Typhoon, are both equipped with a repositioner.

China is also understood to be working on an AESA radar using a similar repositioner.

Russia lags behind the west in AESA technology, but is developing E-scan radars for the new Sukhoi Su-57, and for the MiG-35.

Future AESA radars may incorporate additional conformal arrays to increase angular coverage, such antennas having been considered for the Su-57 and for the Rafale, among other types.

Leonardo has shown the way forward with its Osprey surveillance radar, which uses up to four fixed conformal arrays to provide up to 360° azimuth coverage for a range of rotary- and fixed-wing platforms. ■

SAAB EYES UP UAE DELIVERY WITHIN MONTHS

Saab chief executive, Hakan Buskhe, has announced that the UAE is on track to receive its first GlobalEye swing-role surveillance system (SRSS) aircraft in April 2020, writes Jon Lake.

The GlobalEye is a multi-sensor airborne early warning and multirole surveillance aircraft based on the airframe of the Bombardier Global 6000 business jet.

It has an S-band Saab Erieye ER active electronically scanned array (AESA) radar mounted in a 'ski-box' fairing above the fuselage.

It also has an under-nose FLIR Systems Star Safire 380HD electro-optical sensor turret and a belly-mounted Leonardo Seaspray 7500E surface surveillance radar.

The UAE originally placed an order for two ex-Swedish Air Force Saab 340-based airborne early warning (AEW) aircraft, carrying the legacy Erieye system, in November 2009. These provided an interim surveillance capability while it conducted longer-term assessments on the Boeing 737 AEW&C, the Grumman E-2D and the Saab 2000-based Erieye.

The UAE finally ordered the Erieye system in November 2015, opting for the new, extended-range Erieye ER version of the radar, becoming the launch customer for the GlobalEye, which mounted the new



Rapid progress: Saab's GlobalEye programme is heading towards customer deliveries from April 2020. This photo of the second aircraft making its maiden flight clearly shows the aircraft's various sensors and aerodynamic changes compared to a standard Global 6000.

radar on a Bombardier Global 6000 airframe.

The UAE initially placed a \$1.27billion launch order for two aircraft at the Dubai Air Show in November 2015, ordering a third aircraft (for \$238 million) during the IDEX show in February 2017.

The three airframes were converted from 'green' Global 6000 airframes at Saab's Linköping plant, with the modification including major structural, aerodynamic and wiring changes, all of which necessitated a major flight-test campaign.

The first GlobalEye was rolled out in February 2018, and made its maiden flight, post-modification, on March 14. After a brief series of test flights from

Linköping, the aircraft was deployed to Granada in Andalusia to take advantage of southern Spain's excellent weather.

The second GlobalEye made its maiden flight on January 3 this year. Fitted with mission equipment, this aircraft remained in Sweden for trials.

The third aircraft is still undergoing modification and is expected to fly in late 2019.

The lead ground station element for the GlobalEye has already been delivered to the UAE, while the flight-testing required for the grant of a supplemental type certificate from Sweden's military airworthiness authority will soon be completed. ■

Algeria and Egypt have ordered the Sukhoi Su-35S multi-role fighter (known to NATO by the reporting name 'Flanker-E'), risking incurring the wrath of the USA. Jon Lake reports.



Will Egypt and Algeria's Su-35s anger Trump?

In September 2018, the Trump administration imposed sanctions on China following its purchase of the Su-35SK under the terms of the Countering America's Adversaries Through Sanctions Act (CAATSA).

This Act is intended to counter Russian influence in Europe and Eurasia, and to punish Russia for its involvement in the wars in Ukraine and Syria and for its alleged interference in the 2016 US election, by restricting its ability to export weapons.

The US subsequently threatened to apply similar sanctions if Indonesia goes ahead with its own Su-35 purchase.

Augment its fleet

Algeria first requested an evaluation of the Sukhoi Su-35 in May 2016, hoping to acquire more than 10 aircraft to augment its fleet of 58 older generation two-seat Su-30MKAs. In August 2018, Russian state media reported that the Algerian Air Force had placed an order for 18 Su-35SK fourth-generation fighters.

Egypt's \$2 billion order for 20 Su-35SKs (or for "more than two dozen" aircraft according to the *Kommersant* newspaper) was also enacted in late 2018, but it was not formally announced until March 18 2019. Deliveries are expected to start in 2020-2021.

Egypt is a long-standing customer for Russian combat aircraft, though it has also procured fighters from the US and France, diversifying its sources of supply.

Following the 2013 military coup, which saw Abdel Fattah el-Sisi emerging as Egypt's new leader, the country began placing large contracts with Russian arms manufacturers. The first covered the supply of S-300VM4 'Antei 2500' and Buk-M2E surface-to-air missiles, delivered in 2015-2017 at a reported cost of \$3.5 billion.

Egypt subsequently ordered 46 MiG-29M/M2 fighters for \$2 billion and 46 Kamov Ka-52 'Nile Crocodile' helicopters for more than \$1 billion.

Since then, Egypt has ordered 32 ship-borne Ka-52K Katran helicopters for its navy. Some of this equipment may be funded by Saudi Arabia and/or other wealthy GCC states.

The Su-35S is an advanced derivative of the original Su-27 Flanker, a heavy, twin-engined interceptor and air superiority fighter, which was equivalent to the US Boeing F-15A-D Eagle in concept. Like the F-15, the Su-27 spawned a two-seat multi-role strike fighter variant (the Su-30M), and other versions.

An upgraded 'Flanker' air superiority fighter was first developed at the end of the Cold War. About 15 Su-27M prototypes were built, and the prototype flew in 1989.

Formidable capability

The canard-equipped, tall-finned Su-27M was subsequently redesignated as the Su-35, but today's Su-35S (originally known as the Su-27M2 or Su-27BM) is a very different aircraft, aerodynamically and structurally closer to the original Su-27, but with a modern glass cockpit and new sensors and systems. It has a formidable multi-role and air-to-ground capability.

The new Su-35S began development in 2003 and the first prototype flew in 2007. The type entered production in 2009.

The Su-35S is equipped with an N-035 Irbis-E passive electronically scanned array (PESA) radar, with OLS-35 infrared search-and-track (IRST) targeting system, and an L175M Khibiny electronic countermeasures system.

The Su-35S is powered by thrust vectoring engines and has 12 to 14 weapons hardpoints, allowing it to carry up to 17,000lb of air-to-ground munitions, or large numbers of the latest Russian air-to-air missiles.

The Russian MoD ordered 98 Su-35S aircraft, and the type entered service in 2014. Since then, the type has flown combat missions in Syria, targeting both the Islamic State and anti-government groups.

China was the first export customer, signing up for 24 Su-35SKs at a total cost of, \$2.5 billion. The first four aircraft were delivered in 2016, with 10 more following in 2017, and the remainder being delivered by April 2018.

In February 2018, Russia and Indonesia agreed a \$1.14 billion deal for 11 aircraft with the first delivery due in October 2018.

The Algerian and Egyptian deals promise to allow full capacity output to be maintained at the Komsomolsk-on-Amur Aircraft Production Organisation (KnAAPO), the largest aircraft-manufacturing plant in the Russian far east, for several years to come.

They will also represent, arguably, the most advanced fighters in service with an African air force, though some would accord this distinction to Egypt's Dassault Rafales, or perhaps to South Africa's Saab Gripen. ■

Dust devils: Oman's NHI NH90 transport helicopters take part in exercise Inferno Creek.



A towering Inferno for Omani NH90s

The Royal Air Force of Oman (RAFO) deployed a number of its NHI NH90 transport helicopters to take part in exercise Inferno Creek at Rabkoot, near the major RAFO airbase of Thumrait.

Inferno Creek is an annual three-week bilateral joint chiefs of staff/theatre security cooperation (JCS/TSC) partner nation event involving elements of the United States Army central command (USARCENT) and the Royal Omani Army.

This regionally aligned exercise is designed to strengthen defence relationships and to improve and enhance relations between the armies, building stronger bilateral ties.

It also represents an opportunity for both militaries to gain a shared understanding of each other's tactics, techniques and procedures, building partner nation capacity and tactical proficiency, while developing and improving interoperability.

US force elements were drawn from Task Force

Spartan, a multi-component organisation that supports operations in the US central command area of responsibility, currently including the 198th Armoured Regiment and the 155th Armoured Brigade Combat Team from the Mississippi National Guard.

Royal Army of Oman troops were supported by the RAFO, including the NH90 helicopters of No14 Squadron, which are normally based at RAFO Musannah.



The Sultanate of Oman issued an order for 20 NH90 tactical transport helicopters (TTHs) in July 2004 to replace ageing Agusta/Bell 205As and Agusta/Bell 212s for tactical transport and search-and-rescue operations. Deliveries began on June 23 2010.

The aircraft equipped No14 Squadron at Muscat/Seeb before the unit moved to RAFO Musannah by 2016.

The type also equips No17 Squadron at RAFO Salalah, while No14 Squadron maintains a detachment at Khasab, in Oman's Musandam exclaves – the country's northern tip – guarding the Straits of Hormuz, surrounded by UAE territory.

RAFO NH90s are equipped with more powerful engines to cope with the hot and high conditions encountered in the Middle East.

Elsewhere in the region, the Egyptian Navy entered negotiations for the purchase of five NH90 NFH helicopters in July 2015. These are intended to serve on board a newly acquired FREMM-class frigate and four Gowind corvettes.

Qatar signed for 28 NH90 Helicopters on March 14 2018, consisting of 16 NH90 TTHs and 12 NH90s NFHs, with options for six more of each variant.

Saudi Arabia agreed to purchase 64 NH90s in July 2006, but subsequently purchased 150 Mil Mi-35 and Mi-17 helicopters instead.



Improvements: Morocco's existing F-16Cs and F-16Ds are to be upgraded to F-16V standards.

MOROCCAN VIPERS GET

The US Department of State has approved a possible \$4.8 billion sale to Morocco of 25 Block 72 F-16C/D (F-16V) aircraft, together with upgrades to the kingdom's existing fleet of 15 Block 52 F-16s and eight Block 52 F-16Ds to bring them to virtually the same standard.

Post upgrade they will be designated as F 16V Block 52+ aircraft.

The Block 52 and 72 designations reflect the type of engine fitted.

Since the introduction of the alternative fighter engine project, F-16s powered by the 29,100lb Pratt & Whitney F100-PW-229 engine have a block designation ending in '2', while aircraft powered by the rival 29,500lb General Electric F110-GE-100 use block designations ending in '0'.

The Block 70/72 F-16V is the newest F-16 configuration to date, with a structural life that is claimed to be 50% greater than that of previous F-16 variants, according to Lockheed Martin.

The F-16 Viper variant includes a Northrop Grumman AN/APG-83 active electronically scanned

One possibility: The Embraer A-29 would give the Tunisian Air Force a tailor-made counter-insurgency aircraft.



BOOST FOR TUNISIAN LIGHT ATTACK FORCE?

There have been reports that the USA may offer light attack aircraft to Tunisia, perhaps in return for a permanent basing agreement.

The Tunisian Air Force presently relies on about 15 elderly Northrop F-5E/F Tiger IIs and 10 Aermacchi MB326s – the latter representing the survivors of 12 two-seat MB326Bs and MB326LTs – and seven dedicated single-seat MB326KT ground-attack aircraft.

These are augmented by nine Aero L-59T armed trainers.

None of these aircraft are well-suited to the asymmetric counter-insurgency operations currently being undertaken against Al Qaeda, Ansar al-Sharia and other radical groups.

The US has helped Tunisia to recapitalise its support helicopter force in recent years, and is supplying 18 Bell OH-58D Scout helicopters and 12 Sikorsky UH-60M Black Hawk transport helicopters.

Tunisia is likely to be offered a light attack aircraft – probably the Sierra Nevada/Embraer A-29 Super Tucano, or possibly Textron's AT-6 Wolverine, depending on the results of the US Air Force's ongoing light attack aircraft competition.

Such an acquisition will form part of a much wider growth in security cooperation between Tunisia and the US, which has already seen the supply of large

quantities of equipment, including rifles, body armour, and night-vision goggles, radios and devices to counter improvised explosives, helicopters and fast patrol boats.

The value of US military equipment delivered to Tunisia increased 10-fold between 2012 and 2017.



The Tunisian Government is sensitive about the presence of US forces in its territory, fearing that publicising this could provoke greater extremist violence. However, it is known that the US deployed MQ-1 Predator unmanned air vehicles (UAVs) to Tunisia in June 2016, and the type has been seen operating from the Sidi Ahmed Air Force Base in Bizerte, the Tunisian Air Force's main air base.

The Predator was replaced by the MQ-9 Reaper in March 2018, when the older UAV was retired by active-duty US Air Force and Air National Guard units, though contractors flying the older MQ-1 in the Middle East continued operating the type until December 2018.

The UAVs have been used to track and strike terrorists and insurgents infiltrating across Tunisia's borders with Libya and Egypt, supporting joint operations by Tunisian and US special forces.



Sought-after: Customers for the F-16V include Bahrain, Greece, Slovakia and Taiwan.

GREEN LIGHT FROM US

array (AESA) radar, also known as the scalable agile beam radar (SABR).

The aircraft also features new and improved cockpit displays, a new Raytheon modular mission computer, a MIDS-JTRS Link 16 datalink, an enhanced AN/ALQ-211/213 electronic warfare system, an LN260 embedded global navigation system, and an automatic ground-collision avoidance system.

The new aircraft will be supplied with six DB-110 advanced reconnaissance systems, 26 AN/AAQ-33 sniper pods, and 40 joint helmet-mounted cueing systems (JHMCS II). Weapons supplied will include 30 M61A1 20mm Vulcan cannons, 40 AIM-120C-7 advanced medium-range air-to-air missiles, 50 GBU-49 bombs and 60 GBU-39/B small-diameter bombs.

The package will include four spare Pratt & Whitney F100-229 engines and one spare APG-83 AESA radar.

Other customers for the F-16V include Bahrain (16 plus upgrades), Greece (85 upgrades), Slovakia (14) and Taiwan (66 plus up to 144 upgrades).

AW149 order gives Egypt programme a lift

Egypt's order for 20 Leonardo (AgustaWestland) AW149 helicopters, with options for 10 more, represented a crucial moment for what has been a struggling programme.

There had been just six orders from Thailand before the Egyptian Navy went for the type in April 2019.

Better known as the basis for the civil AW189 until now, the AW149 was designed as a medium-lift multirole military helicopter and was a larger, more powerful military derivative of the AW139.

The AW149 was unveiled at the 2006 Farnborough Air Show and featured a larger fuselage and more powerful 2,000shp General Electric CT7-2E1 turboshaft engines, together with a stronger landing gear.

It is fitted with a single-pilot night vision goggles-compatible low-workload 'glass cockpit' and its advanced open-architecture mission system allows the easy integration of customer-specific avionics and mission/weapon systems, including a comprehensive integrated defensive aids suite (DAS).



Versatile: The aircraft can be used for combat search-and-rescue or medevac duties.

The cabin accommodates up to 19 troops or 16 fully equipped troops in the transport role, while for special forces operations the aircraft can be fitted with a fast insertion system for up to two troops per side, with a back-to-back seat layout, combined with a 7.62mm or 12.7mm machine gun firing capability from the forward cabin windows.

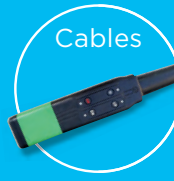
External armament options include 12.7mm and 20mm gun pods, 2.75in rocket launchers, and anti-tank guided missile launchers.

The aircraft can carry bulky cargo in its large, unobstructed, flat-floored cabin, or underslung loads of up to 2,800kg.

For combat search-and-rescue missions, the aircraft can carry two gunners at the front windows with four additional seats, and a large unobstructed operation area in the cabin.

For the medevac role, it can be fitted with a three-stretcher medical module kit, and up to six stretchers can be carried, with the option of fitting four NATO stretcher kits with litters installed transversely.

The first prototype made its first flight on November 13 2009. The derived TUHP149 was submitted as a candidate for the \$4 billion, 109-aircraft Turkish utility helicopter programme for the Turkish Armed Forces, but lost out to the Sikorsky S-70i Black Hawk in April 2011. Thailand finally became the first export customer in 2016, ordering five AW149s for the Royal Thai Army, and one for the Royal Thai Police.



ZERO EMISSIONS AND REDUCED NOISE

The ITW GSE 7400 eGPU offers flexibility, zero emissions, silent operation and reliable power. It simply changes how airports think about ground power.

itwgse.com/7400



It's all about connections

Dubai's Airport Show has become the world's biggest airport industry event.

Alan Peaford was at this year's mega affair.

The art of co-locating events in sectors that are closely aligned has become an art form for event organisers – and it is a strategy that has paid dividends for the Airport Show.

The event, with its associated conferences and workshops, has simply grown and grown.

Now claiming top spot on the global airport event scene, there are plans to make it even greater when it returns to Dubai in May next year.

New conferences on ground handling, ground services equipment and air cargo have been added to the calendar, taking into account the sweeping changes in these vital sectors of the aviation industry, especially in the Middle East.

Daniyal Qureshi, group exhibition director, Reed Exhibitions Middle East, said: "The overwhelming support and success this year shows that the global aviation industry continues to be vibrant, with immense growth prospects for the region. This success has prompted us to increase the exhibition space next year by 15% and launch a dedicated air cargo platform to gather more industry stakeholders under one roof."

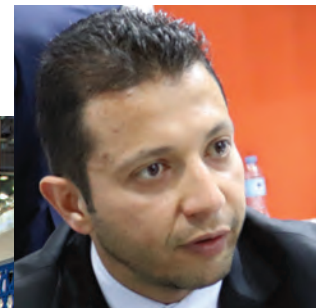
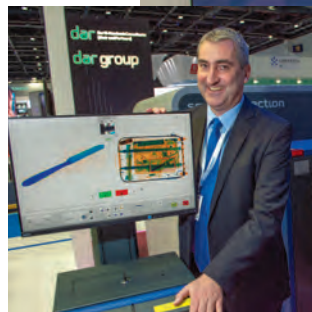
"This year's co-located events, like the Women in Aviation (WIA) general assembly and the Centre for Asia Pacific Aviation (CAPA) Middle East Africa aviation summit, attracted wider participation from officials, experts and representatives from global aviation companies. The conferences were major crowd-pullers with participants actively debating the issues under the spotlight."

This year's co-located events discussed the benefits that disruptive technologies like artificial intelligence (AI), blockchain, the internet of things (IoT) and augmented reality are providing to the airport industry. They also looked at the challenges of the exponential increase in air traffic around the world, especially in the Middle East.

Some 375 exhibitors from 60 countries showcased new technologies and innovative products to a record 7,500 participants and visitors.

Sheikh Ahmed bin Saeed Al Maktoum, president of Dubai Civil Aviation Authority, chairman of Dubai Airports and chairman and chief executive of Emirates Airline Group, officially opened the show.

COMING TOGETHER FOR A MEGA SHOW OF STRENGTH



algorithm could 'learn'. Collins Aerospace showcased its ARINC SelfPass biometric solutions. Rakan Khaled, director of

global business, avionics, said the biometric solutions provide individual and mutual benefits to airlines, airports and passengers.

"Using biometrics and touchpoints through the airport creates a seamless, stress-free and even safer experience for travellers from check-in to destination," he said.

Data was also being recognised at a key driver at airports.

Dubai-based DTP, which provides a comprehensive portfolio of products and services to optimise planning and operations in the aviation industry for clients such as Dubai Airports and Abu Dhabi Airports, signed a deal at the show to partner with data and analytics specialist Cirium

Abdul Razzak Mikati, DTP's managing director, said: "By solving operational challenges with advanced analytics by Cirium, we are confident we can address the automation and recovery needs of our customers by combining modern technology with smart data."

The company manages the impact of disruption with intelligent data and analytics solutions to keep the industry in motion. Last year, nearly 18% of flights in the UAE alone were disrupted, resulting in delays for more than nine million passenger journeys.

Combining modern technology with smart data: Kevin O'Toole, Cirium VP strategy and DTP managing director, Abdul Razzak Mikati.

Inset left: Smiths Detection's Hans Joachim Schöpe shows how a knife can be highlighted by the iCMORE scanner.

Inset right: Rakan Khaled: Biometrics will make life easier for passengers.

He highlighted the importance of the aviation industry's role in boosting gross domestic product (GDP) and appreciated the impressive growth achieved by the industry.

He said: "Airports are growing in size and prominence as cities compete to be preferred hubs for the tech-savvy travellers. The air transport sector is now worth a \$2.7 trillion in global economic activity, carrying more than four billion passengers and 62 million tonnes of freight each year."

Security in both the cargo and the passenger activities at airports were covered across the show.

Smiths Detection announced weapon



Paris Air Show – the world’s largest global aerospace event – brought aviation and defence leaders from around the world to Le Bourget Airport in the northern suburbs of the French capital. Alan Peaford reports on the highs and lows. Pictures by Billypix.

SUBDUED SHOW WELCOMES FOCUS ON THE ENVIRONMENT

The shadow of the tragedy of the Boeing 737 Max was certainly felt across the Le Bourget exhibition site as the Paris show got under way.

Boeing were certainly at a lower key than at previous shows, but took the opportunity to demonstrate contrition and humility at their various outings.

Boeing’s senior vice president of sales and marketing, Ihssane Mounir, made clear his feelings as he summarised the company’s business at the event. “We came into Paris saying, from the very beginning, that this will not be a typical show for us. It’s been a very difficult time for all of us at Boeing.

“We’ve been devastated by the two accidents and the loss of life. Our teams have been reflecting on all of this daily since it happened and, to come to this show and receive such a strong expression of support from our customers and many industry partners has been very, very touching. It’s been very humbling; we’re all humbled by it.”

Fewer order celebrations

It was widely expected that there would be fewer order celebrations and, indeed, lower levels of business from the ‘big two’ airframers – Airbus and Boeing – led to a quieter event for those who judge a show by its commercial aircraft order commitments. Yet it remained a busy show with a number of important announcements and commitments about key issues, including sustainability, training and digitalisation.

This year’s Paris show – the 53rd event – was the biggest ever in its 110-year history. The number of exhibitors smashed the 2,450 mark. “We sold out within weeks of opening the booking in October 2018,” said air show chairman, Patrick Daher.

Daher said the show was an ideal opportunity to promote new technologies and initiatives that will continue to limit aviation’s impact on the environment.



The static park and areas like the innovation hall, called Paris Lab, featured electric and hybrid-electric aircraft designs and systems, composite structures, and sustainable fuels.

“We are getting a bashing from the public and it is important to show that we are not a dirty, polluting industry, but one that is working hard to build products that significantly limit our impact on the Earth’s resources,” Daher said.

The first all-electric aircraft, the Alice, from Eviation, had a full-size prototype on display in the static park and was drawing interest throughout the week. Its

Top: All-electric: Eviation’s Alice makes her show debut.

Above: The big reveal – France’s President Emmanuel Macron leads VIP guests at the unveiling of the new European fighter.

presence was capped with a “double-digit purchase order” from Cape Air.

Space was also high on the agenda as part of the commemoration of the 50th anniversary of the Apollo lunar landings, with astronauts giving talks about the value of space and supporting plans for the return to the Moon.

The defence industry is also looking at new horizons. French president, Emmanuel Macron, joined defence ministers from Germany, France and Spain to unveil Europe’s future air combat system, which will be built by Dassault and Airbus. Turkey also



Patrick Daher: the show chairman was delighted with the focus on disruptors.

revealed its fifth-generation fighter TF-X.

Embraer was pushing hard with its competitor to the venerable C-130. The KC-390 is much more than a tanker and demonstrated its capabilities as a transporter, a medevac/flying field hospital, surveillance and search-and-rescue aircraft. "It can fulfil a lot of missions with very proven solutions," said Jackson Schneider, CEO of Embraer's defence business.

Lower maintenance costs

"We have Collins avionics, we have the engines of the IAE, which is already flying more than 1,000 engines around the world, bringing to the market lower maintenance costs in the category and very low production costs."

When it came to those actual airliner orders, even if numbers were lower, analysis from *FlightGlobal* showed 866 aircraft were ordered – including 200 737 Max aircraft from IAG, giving American manufacturer Boeing a real confidence boost.

Airbus was the busiest, launching its new longer-range model the A321XLR. It secured orders and commitments, including conversions, for more than 240 aircraft.

The former C-Series, now the Airbus

A220, was described by the manufacturer as having "unbeatable fuel efficiency and wide-body passenger comfort in a single-aisle aircraft". It said it expected the airliner to win the lion's share of the 100- to 150-seat aircraft market, which it forecasts will need 7,000 aircraft over the next 20 years. It picked up 50 orders from lessor Air Lease Corporation.

ATR, which had been down in the doldrums in the early part of the year, closed in on the go-ahead to launch a short take-off and landing version of the ATR 42-600, thanks to initial commitments, while Embraer celebrated 35 orders from KLM Cityhopper for the Emb195-E2 models.

The Brazilian manufacturer (but now intertwined with Boeing) brought a new show livery to reflect its 'profit hunter' campaign. This time the aircraft featured the face of a lion.

Boeing said it was delighted with the show of confidence by IAG and said the company's goal was to get the Max back into service.

"Our teams are continuing to work very hard to safely return the Max to commercial service. We're providing additional information to address requests from the regulators and we're all working very hard," Mounir said. ■

MIDDLE EAST CARRIERS SNAP UP THE A321XLR



Middle East carriers were among the first to recognise the potential value of the long-range A321neo, officially designated the A321XLR, which was launched at the show and which will become available from 2023.

Saudia led the way with 15 firm orders for the new variant; its neighbour, FlyNAS, ordered 10; and Middle Eastern Airlines (MEA) swapped a previous order of four A321neos to the extra-range aircraft.

The newest member of the A320 family is seen by many to be biting into the area where Boeing's expected mid-market aircraft (MMA) would be. It will give Arab carriers significant extra range – up to as much as 4,700nm – and could link city pairings such as Sharjah to Bali.

The aircraft are likely to be used on extending routes to Africa and Asia. The twinjet will have a maximum take-off weight of 101t and a range of 4,700nm compared with the 4,000nm of the current 97t long-range A321LR variant.

Airbus said the longer-range aircraft will allow operators to open new India-Europe or China-Australia routes and claimed it would offer 30% lower fuel-burn per seat than "previous-generation aircraft".

A321neos are powered by CFM International Leap-1A or Pratt & Whitney PW1100G engines.

For passengers, the A321XLR's new Airspace cabin will provide the additional space, while offering seats in all classes with the same high-comfort as on a long-haul wide-body, with the low costs of a single-aisle aircraft, according to Airbus.

BAHRAIN STEPS UP PLANS FOR AIRSHOW 2020



Done deal: Kamal bin Ahmed Mohammed and Gulf Air CEO, Kresimir Kucko, working together to promote the Bahrain Airshow.

Bahrain Minister of Transportation, Kamal bin Ahmed Mohammed, was in Paris to reinforce the Bahrain Government's commitment to the Bahrain Airshow, which will take place from November 18-20 next year.

He signed a deal with national carrier, Gulf Air, to be the host sponsor for the event.

He said that there will be major upgrades in the infrastructure at the Sahir Airbase, adding that most of the world's top 20 aerospace companies were already committed to the show, which draws large interest from neighbouring Saudi Arabia.

Mohammed urged smaller companies to take a look at the options. "This is a show where you will not be missed," he said, looking out of the window as the massive le Bourget display. "The intimacy of the Bahrain show is an advantage. You will be noticed," he said.



The wraps come off: The TF-X fighter model is unveiled.

TURKEY'S FIFTH-GENERATION FIGHTER

While there was much talk about the dispute between Turkey and the USA over the weaponry for the F-35, the spotlight suddenly changed towards a wrapped life-size model of an aircraft on the static park.

On day one of the show all was revealed as the wraps came off of the proposed Turkish fifth-generation fighter aircraft, dubbed the TF-X.

The aircraft is the result of a collaboration between Turkish Aerospace Industries (TAI) and BAE Systems. It was designed by TAI and is expected to roll-out in 2023, with a first flight two years later.

"This will be the best of the new fighter aircraft," TAI's chief executive, Professor Temel Kotil, said.



Dominant: The Kawasaki C2 on the static park in Paris.

HEAVIES WEIGH-IN ON THE STATIC

Tankers and transporters were dominating the static park, towering over smaller aircraft as they opened up to visiting military delegations. And there was plenty to see.

The Boeing KC-46A tanker made its air show debut with an aircraft from US Air Force's 931st Refueling Wing, based at McConnell AFB, in Kansas. The UAE and Qatar are among the targets for the much-delayed programme.

Delays in the 767-based KC-46A's development meant it missed out on several tanker competitions, with potential customers opting instead for the Airbus Defence & Space A330 multi-role tanker transport (MRTT). The UAE operates three MRTTs, but is also said to be potentially interested in the Boeing type.

Embraer's KC-390 gave impressive flying displays and looked good on the ground, too. CEO of Embraer Defence, Jackson Schneider, said the company has letters of intent for 38 KC-390s from six other potential customers. Schneider said that Embraer would consider opening final assembly facilities for the KC-390 in the Middle East should it make business sense.

Another debutant at the show was the Kawasaki C-2 strategic transport. Major General Masahito Goto said the C-2 has a capability to fly fast and far, allowing it to perform both tactical and strategic missions, including air drops of cargo and personnel, receiving fuel while airborne, low-level flight, and formation flight.

BOOM UPBEAT ON SUPERSONIC OVERTURE

Despite delays in the first flight of a demonstrator for the supersonic Boom Overture airliner, CEO and founder, Blake Scholl, bounced into Paris with upbeat messages about the programme.

The one-third size Overture demonstrator, XB-1, should be rolled out at the end of the year and fly in 2020.

Scholl remains confident that the supersonic passenger aircraft, being produced with launch customer Japan Airlines (JAL), is on track for a first flight by the mid-2020s.

"This is an ambitious project," he said. "In the early days it is easy to underestimate what is required. We've moved things to the right as we've discovered complexity and opportunities to increase the safety level... look for first passengers in the 2025 to 2027 timeframe. We want to have speed as soon as possible, but we don't want to skip steps along the way."

JAL has invested \$10 million in Boom and



'pre-ordered' up to 20 of the Mach 2.2-capable Overtures, which will have 55-75 business-class seats, with a crew of six, including two pilots.

Helicopter Emergency Medical Services (HEMS)

Abu Dhabi Aviation in partnership with National Ambulance have delivered World class aero medical clinical care to ADNOC Group. This is the first dedicated HEMS operation in the UAE with further expansion plans to cover the country. Transporting patients outside the scope of traditional land based ambulances with a high level of care from point of origin to definitive clinical care.



Oil Support

Seismic / Construction

Fire Fighting

Photography

Flight Charters

Aerial Application

Helicopter Medical Services (HEMS)

Search and Rescue (GHQ)

Training / Simulator Center

Maintenance, Repair, Overhaul (MRO)

How can we serve you?



Outstanding Performance

Since 1976

Phone: +971 2 5758000 Fax: +971 2 5757775 P.O.Box 2723, Abu Dhabi, UAE
adava@abudhabiaviation.com www.abudhabiaviation.com

Abu Dhabi AVIATION
طيران أبو ظبي



Al Baker's advice for troubled Boeing

Qatar Airways chief executive, Akbar Al Baker (above) can always be relied upon to provide some sound advice to original equipment manufacturers (OEMs) and he didn't hold back when he joined Boeing on the stage in Paris to commit to five more Boeing 777F freighters.

He urged the American manufacturer to develop a freighter version of its 777X. He said if Boeing was to develop the large freighter he would be happy to sign up as a launch customer.

□□□□□

"By 2025, our initial freighters will be getting to be about 10 years old, so we will need to replace them with more efficient freighters. We have confidence in Boeing to listen," he said.

Boeing senior vice-president of commercial sales and marketing, Ihsane Mounir, said the company was talking to 777F customers about the potential for the composite wing freighter, which would be fitted with new GE Aviation GE9X engines.

Al Baker also said Boeing will need to rename the 737 Max to raise brand reputation in the wake of the grounding that followed the two fatal accidents.

"The only thing that we have difficulty with will be how to convince people to get into a Max, because of the reputational damage," he said. "I think Boeing will have to come up with something to rename this aircraft."

Meanwhile, when IAG announced its Max orders at the show, it described the aircraft as the 737-8 and 737-10.



Paul Stein: "We will share information, technology and data to bring about change."

HOW TO CREATE A SUSTAINABLE FUTURE

The chief technology officers of Rolls-Royce, Airbus, Boeing, Dassault Aviation, GE Aviation, Safran and United Technologies took an unprecedented step at the show to meet to discuss the public and social pressure facing the aviation industry over sustainability and how to counter it.

Rolls-Royce CTO, Paul Stein, said: "Commercial aviation's role in connecting people across borders, facilitating mutual understanding, social and economic advances, and therefore making the world a safer place, has been underestimated

"Proponents of a reduction in travel to counter climate change are looking at a darker age," he added. "Flying is good – what we have got to do is manage the emissions."

The CTOs wanted more than talk – they agreed to now meet three times a year to co-ordinate strategies on how the aviation industry as a whole can reduce its environmental impact and achieve a commitment to a net reduction in carbon emissions from 2050.

"We will share information, technology and data to bring about change," he said.

MITSUBISHI ENTERS NEW SPACE WITH RENAMED JET

Japanese manufacturer, Mitsubishi, was being questioned about the likelihood of taking over the remainder of Bombardier's commercial aircraft business – indeed while the show was still being packed up, the two companies confirmed that the deal had been done.

According to the agreement, after the purchase is completed, Mitsubishi Heavy Industries (MHI) will "acquire the maintenance, support, refurbishment, marketing, and sales activities for the CRJ Series aircraft".

At the show, Mitsubishi announced a new member of the Space Jet family – the regional jet formerly the long-delayed MRJ90 had been



renamed Space Jet 90 (above) to give a new boost to the aircraft as it approaches certification.

Now it will be joined by the Space Jet 100, a 76-seat version that will meet the restrictive scope clauses in the US market.

SANAD GETS MRO OK FROM ROLLS

Abu Dhabi's Sanad Aerotech has been appointed by Rolls-Royce as an authorised maintenance centre (AMC), which could see the UAE provider trebling the number of Trent 700s it currently services annually.

Rolls-Royce chief customer officer for civil aerospace, Dominic Horwood, said: "As several Trent 700 engines reach the end of their first lifecycle, Sanad Aerotech will be a valuable addition to our network, ensuring aircraft availability and completing essential maintenance work for our customers in the Middle East region and beyond."



Putting pen to paper: (from left) Khalid Al Breiki; Tawazun CEO, Tareq Abdullaheem Al Hosani; Tawazun chief economic development officer, Matar Ali Al Romaithi; AAR regional SVP, Rahul Shah; and Nicholas Gross, AAR SVP, for government programmes.

TAWAZUN OPTS FOR AAR COMPONENT REPAIR

The UAE's Tawazun Economic Council, in conjunction with Abu Dhabi's Global Aerospace Logistics (GAL), used Paris to sign a new strategic partnership with AAR to provide component repair management and consulting services for UAE military fleets.

AAR will begin the two-year repair management contract, providing complete repair loop services and supply management for GAL clients in the UAE.

AAR support will include UH-60 Black Hawk, CH-47 Chinook, Twin Otter and C-208 Caravan platforms.

"We are embarking on the next phase in development and growth for GAL and endeavour to strengthen our industry relationships," said Khalid Al Breiki, GAL's chief executive.

"We are excited to leverage AAR's global supply chain and logistics support expertise, which will make us more agile as we scale our own capability. We see this as the beginning of a larger strategic partnership with AAR."

Following the success of the inaugural edition of the Bahrain International Defence Exhibition and Conference (BIDEC) in 2017, the show returns in October with organisers saying it will be “even bigger”. Marcelle Nethersole reports.

Bahrain is gearing up to host the second edition of BIDEC at the Bahrain International Exhibition & Convention Centre on October 28-30. The inaugural show, which took place in 2017, welcomed more than 9,000 visitors.

Held under the patronage of His Majesty King Hamad bin Isa Al Khalifa, the event offers an opportunity for exhibitors to showcase the latest technology, equipment and hardware across land, sea and air.

Organiser, Clarion Events, believes this year will be “bigger and better” and said it had received great support.

“BIDEC is fully supported by the Bahrain Defence Force (BDF) and has continued government support from all functions, including specially selected committees within the BDF, Naval Force, Air Force, Royal Guard, National Guard and other government divisions,” said Thomas Gaunt, managing director, MENA Clarion Events.

“Visitors can expect to see the latest equipment, technology and systems from more than 200 companies, as well as live demos and numerous networking opportunities. They will also have the opportunity to attend the Middle East Military Technology Conference (MEMTEC), which will run alongside the BIDEC exhibition.”

Off-site activities

Gaunt, added that BIDEC is not just an exhibition and conference but that visitors would also be able to visit the off-site activities, with regular shuttle buses leaving from the exhibition.

“Off-site activities include military vehicle demonstrations, indoor and outdoor shooting demonstrations, warship display, sniper and night shooting demonstrations, and parachute demonstrations,” he pointed out.

Of the 200 exhibiting companies expected, approximately 35% will be from the Middle East.

The show floor will feature eight country pavilions from France, Pakistan, Russia, Saudi Arabia, Turkey, the UAE, the UK and the USA.

Already 40 new exhibitors have confirmed for this year, including Dillon Aero, Unidef, Ohio Ordnance, Milkor, and Halo Maritime Defense Systems.

There will be a large presence of exhibitors who operate in the air sector,

BIDEC IS BACK, BIGGER AND BETTER



Military precision: Visitors should expect to see a high military presence, with many delegates confirmed from GCC and other Middle Eastern countries with close relationships with Bahrain.

with Bell Helicopter returning as platinum sponsor for the second edition.

Lockheed Martin has also confirmed its support, signing up as gold sponsor.

“The off-site demonstrations will also give visitors the chance to see the latest parachute systems in action too,” said Gaunt. “Visitors with the appropriate free-fall licence will be given the opportunity to trial these products.”

Visitors should expect to see a high military presence, with many delegates confirmed from GCC and other Middle Eastern countries with close relationships with Bahrain.

“In 2017, there were huge delegations that attended from the UAE and Saudi, two of Bahrain’s closest allies,” said Gaunt.

“This year, invitations have been sent to other major armed forces including the United States, United Kingdom, and France. In the previous edition, we welcomed 61 official delegations from 26 countries.”

For those attending MEMTEC, topics planned for discussion include issues on the current status and future of military

technology, cyber defence strategies, the impact of artificial intelligence on the functions of armed forces, the use of military technology to develop simulation models of war, the impact of military technology on regional conflicts, and the future of military industries in Middle East states.

The confirmed speakers will be announced closer to the event.

Bahrain is a small island country with just over 1.5 million people. So, what makes BIDEC an event worth travelling to?

“With more than 7,000 years of civilisation and a key strategic location in the Middle East, linking east with west, Bahrain has been a hub within the region for trade and travel for many years,” explained Gaunt.

“Bahrain has recently shown great support for international navies, as well as the Bahrain Defence Force currently supporting coalition forces overseas. The country has a strong history of education and training, working with international partners, which will only strengthen in years to come.”

On track: Abu Dhabi International Airport's proactive role in implementing baggage-tracking has led to a 33% reduction in mishandled bags for Etihad.

Analysis shows that tracking and technology are key to improved baggage delivery figures and greater customer satisfaction.

Jill Stockbridge finds out more.

A HEAVY CASE FOR TRACKING

In April, air transport IT specialist, SITA, released its 2019 baggage IT insights. The study revealed that the previously record drops in baggage mishandling globally have continued to plateau, staying steady at around 5.7 bags per thousand passengers over the past three years.

However, the report also showed that airlines and airports implementing tracking at check-in and loading on to the aircraft, were recording rates of improvement of up to 66%.

Over the past year, an increasing number of airlines and airports have started to introduce tracking at key points in the journey to improve baggage management and further reduce the chances of mishandling. SITA's research provides the first glimpse of the success of this tracking.

Implementation at loading

Peter Drummond, director of baggage at SITA, said: "We analysed about 10 million bag records. This revealed that bag-tracking implementation at loading is helping airlines to improve their rate by at least 38% – if they already had good processes in place. If they had not previously undertaken any tracking, their bag mishandling rate reduced by up to 66%.

"Eight out of 10 passengers check in luggage. In 2018, 4.36 billion travellers checked in more than 4.27 billion bags. More bags make things more challenging. Everyone across the industry needs to look beyond the process and technology improvements made in the past decade and adopt the latest technology, such as tracking, to make the next big cut in the rate of mishandled bags," he added.

The wider application of tracking systems at various points in the baggage journey follows the implementation of International Air Transport Association (IATA) Resolution 753, which



When data is shared with passengers, the satisfaction levels are higher.

PETER DRUMMOND

requires all bags to be tracked from start to finish. The resolution is intended to encourage airlines to reduce mishandling by implementing cross-industry tracking for every baggage journey. The resolution became effective in June 2018, with 90% of airlines expected to have implemented it by the end of 2019.

According to Resolution 753, airlines must track baggage at four key points in its journey: check-in, loading on to the aircraft, transfers and arrival.

IATA recognises that, although the resolution itself could seem simple, implementing baggage-tracking can be complex and may require changes in processes and/or infrastructure. This is why it feels it is important for airlines and key stakeholders to understand the Resolution 753 requirements, assess their current situation, identify gaps and define the best strategy to maximise the benefits it could bring.

Journey stages

Drummond said: "Loading is one of the easiest journey stages for an airline to implement tracking and is key to delivering the benefits of Resolution 753. Many airports provide common-use baggage reconciliation systems (BRS) and, where these are available, we would encourage airlines to use them. These baggage systems will strengthen airlines' processes and improve their ability to keep track of each item of luggage."

The SITA data analysis shows that, as well as plateauing in figures, the reasons for the mishandling remain largely unchanged from 2017. Delayed bags accounted for more than three-quarters of all mishandled bags in 2018.

The breakdown showed 77% of mishandled bags due to delay, 18% damaged or pilfered, with 5% lost or stolen.

The leading cause of delay in bags is



transferring luggage from one aircraft to another or one airline to another.

Drummond said: “The main culprit is transfer mishandling, which is where 46% of the problems lie. This is an area that airports and airlines can address with tracking. However, with transfers it is never possible to have zero – as it is a decision made with each flight.”

Mohammed Nasser Al Otaiba, general manager of operations, Abu Dhabi Airports, added: “Abu Dhabi Airport handles more transfer passenger than local passengers. Transfer times must be respected so everyone can do their jobs properly.”

In the remaining 54% of delayed bags, minor improvements were noted in loading/offloading errors and mishandling due to airport, customs, and weather and/or space-weight restrictions. However, there was a slight rise in mishandling as a result of ticketing errors, bag switches, security and other miscellaneous factors.

Drummond believes that tracking will enable improvements in other areas, such as pilfering. He said: “The tracking points in the journey allow you to see where the bag may be being pilfered. It can pin it down to a certain point, where the bag took longer to travel than it should have done. The teams can then ask why it stopped, what was happening to it, and then can check the CC TV.”

The report was launched at Abu Dhabi International Airport, the first time SITA has held the event at an airport, in recognition of its proactive role in implementing baggage-tracking, which has led to a 33% reduction in mishandled bags for Etihad.

Drummond said: “Abu Dhabi Airport invested heavily in baggage delivery in 2018. It provided a platform for all airlines to comply with resolution 753.”

Al Otaiba added: “The vision of the company is



Abu Dhabi International Airport has been the best in the region for two years running. The rate of mishandled bags in the airport was down to two per 1,000 passengers in the first quarter of 2019.

MOHAMMED NASSER AL OTAIBA

to be the leading airport group worldwide. We have grown since 2017/2018 and we have now a 95% delivery of bags. The future is coming with SITA, we are working with them to ensure we provide a seamless travel experience for customers.”

And customers are feeling the benefits, with those who received regular updates through improved technology reportedly more satisfied. Drummond explained: “When data is shared with passengers, the satisfaction levels are higher. The single greatest satisfaction improvement is in baggage collection, and that is only possible because of this technology. The top three demands for technology are all about baggage.”

Baggage carousel

One of the most stressful points in the passenger journey, especially those on transfer flights, is waiting at the baggage carousel. This has traditionally been rated as one of the lowest areas of satisfaction for travellers. However, those receiving real-time mobile updates on the position of their baggage were highly satisfied, with satisfaction levels second only to the check-in experience.

Around 26% of travellers received baggage collection notifications via their mobile devices in 2018. Their satisfaction level was 8.6% higher than those relying on screen or public announcements.

Drummond concluded: “Passengers want to know where their bag is at every step of the way and are reassured by the information.”

Al Otaiba added: “Abu Dhabi International Airport has been the best in the region for two years running. The rate of mishandled bags in the airport was down to two per 1,000 passengers in the first quarter of 2019. In 2018, it was 5.3 bags per 1,000 passengers. Both Abu Dhabi Airports and the Government of Abu Dhabi are very serious about this.”

DXB's run(a)way success

It's no small job resurfacing a runway that's 4.5km long. But that is exactly what happened at Dubai International Airport this spring.

Alan Dron
reports.

Dubai International Airport (DXB) has been one of the Middle East's success stories over the past 20 years, with steadily increasing numbers of airliners touching down on its two runways.

With the number of passengers now topping 80 million per year, that's a lot of landings – often with more than 200 tonnes of aircraft hitting the runway's surface scores of times a day. Eventually, even the best-made runway needs some TLC.

So, this spring saw runway 12R/30L – the southern of the airport's two landing strips – being taken out of commission for 45 days for a complete makeover. The northern runway underwent a similar procedure five years ago.

"It's more than just refurbishing the actual runway," explained Damian Ellacott, vice-president Airport Operations Control Centre at Dubai Airports, which operates both DXB and Al Maktoum International, otherwise known as Dubai World Central (DWC). "It included advance work several months before the main resurfacing got under way and works on the adjacent taxiway."

The quantities of material required for the job were vast. Around 60,000 tonnes of asphalt had to be replaced and some 8,000 cubic metres of concrete was poured. The project also involved the replacement of 800km of cabling, together with the renewal of associated infrastructure and structures.

45-day closure

The 45-day closure started at 3pm on April 16 and ended at 6pm on May 30. The project saw as many as 1,900 people working on a 24/7 basis.

The primary work involved scrubbing off the existing, worn runway surface before ensuring that its under-layers were prepared so the process of laying a new one could begin.

Selecting the right companies for the job was crucial: "The contractors and subcontractors were all experienced at these kind of operations; many were involved in the north runway a few years ago," said Ellacott.

Given the scale of the project and its implications for the continued smooth running of DXB during the refurbishment, planning began 12 months or more before the first construction crews moved in.

DXB normally handles around 1,100 movements a day. "Obviously, that was reduced somewhat," said Ellacott. Around 150 daily movements were switched to Dubai World Central.

"From an early stage it was essential that we identified a number of carriers who would be happy to move some or all of their capacity down to DWC."

Fortunately, several airlines fell into that category. Among them was one of DXB's largest users, low-cost carrier Flydubai, which moved a significant part of its operation. Transferring services was eased by the fact that "they were already routinely operating a few flights a day out of there, so they were familiar with it".

Transferred flights

Other carriers that transferred some or all of their flights to DWC for the duration came from the Gulf region (Gulf Air, Kuwait Airways and Flynas), eastern Europe (Aeroflot, Ural Airlines, Ukraine International and budget carrier Wizz Air), and the Indian sub-continent (low-cost carriers IndiGo and SpiceJet, together with Nepal Airlines).

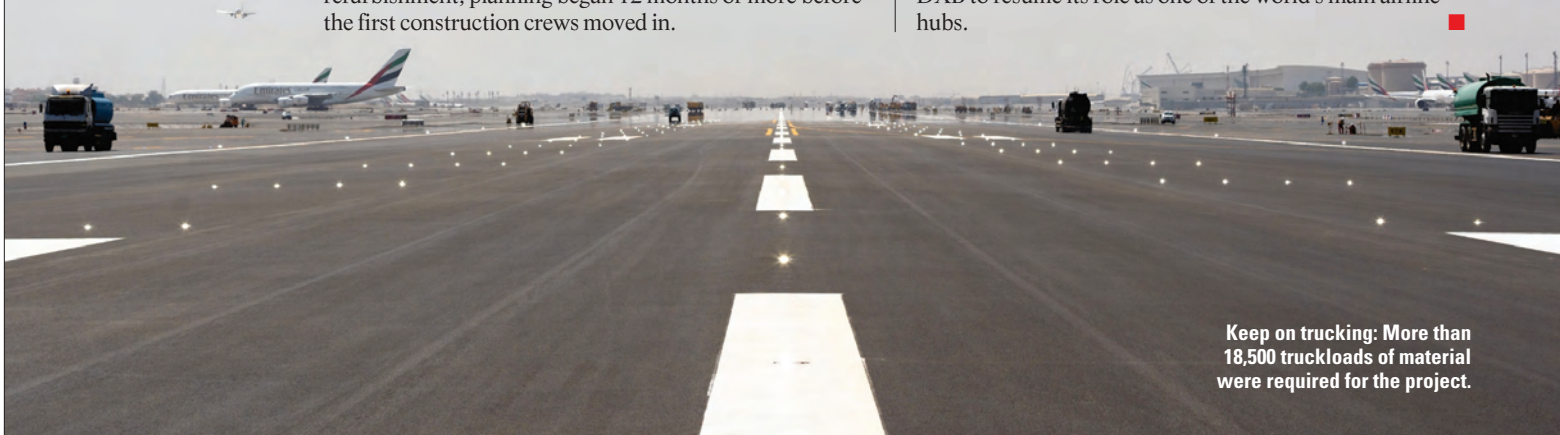
Of the airlines which switched their services to DWC, "the feedback we've had has been very positive", said Ellacott. "The facility down there is great, with capacity for 26 million passengers per year. One of the advantages down there is that the experience of passengers is very hassle-free; they can park easily – and for free.

"And the check-in walk is a short one through security. I think the carriers have found it a pleasant experience. The feedback we've had has been very positive."

One of the reasons for undertaking the refurbishment during Ramadan was because passenger volumes for the holy month are lower than normal. "It would have been more straightforward for carriers to manage their schedules – for example, by using larger aircraft to reduce frequencies, but carry the maximum number of passengers."

The project was timetabled to be completed shortly before the Eid-al-Fitr festivities began, when passenger traffic increases once more.

Both runways are now back in commission, allowing DXB to resume its role as one of the world's main airline hubs. ■



Keep on trucking: More than 18,500 truckloads of material were required for the project.

Sharjah International Airport (SIA) is taking a lead in the Middle East with steps to control air pollution on the ramp in a pilot study with 'green' mobile ground power units (GPUs). Chuck Grieve reports.

Game-changer: ITW GSE's e-GPU has been undergoing a three-month trial at Sharjah.



Sharjah ramps up emission control

The emissions from engines of all kinds operated at airports are harming the environment and affecting workers' health.

A 2012 study by Copenhagen Airport shows that air pollution on the ramp, on average, is double that of rush-hour traffic in the city centre.

Of the many sources of this pollution, the biggest are diesel-powered ground power units (GPUs), which emit nine times the harmful ultrafine particles found in the air on the busy street.

Airport operators recognise their responsibility to reduce the emissions under their control. Many, including SIA, are members of the airport carbon accreditation (ACA) programme, a carbon management certification standard.

Carbon neutrality

SIA has already achieved ACA level 3 (optimisation) and, in line with its commitment to carbon neutrality, it has conducted a three-month trial of an innovative 'green' mobile GPU from manufacturer ITW GSE that uses cutting-edge battery technology.

ITW GSE says it's a "game-changer" in the ongoing drive to lower the environmental impact of airports.

Ivana Meyer, head of airside operation for Sharjah Aviation Services, said the performance of ITW GSE's electric GPU (e-GPU) during the three-month trial was satisfactory. Users found it "easy to operate and environmentally friendly due to noticeably reduced noise and carbon pollution".

It has been developed by ITW GSE in collaboration with the Schiphol Group and Nissan. Launched in 2017, it combines ITW GSE engineering with Nissan battery

technology – it uses batteries supplied as standard on Nissan's LEAF electric car.

Described as a world-first, the e-GPU is already in operation at several airports including Schiphol, Eindhoven and Rotterdam The Hague in the Netherlands, and Brisbane in Australia. It is on trial at others including Zurich, Madrid and Barcelona. It's also being used by United Airlines in the USA.

David Feuga, ITW GSE's Middle East and Africa sales director, said the unit is configured with four batteries that produce power at 400Hz, the frequency used in most commercial aircraft, and 28VDC. It can operate up to 14 hours without charging, he added. "Realistically, the unit can accommodate six to 15 turnarounds, depending on the aircraft."

Airports recognise the drawbacks to using diesel-powered GPUs but, until now, have been restricted in choice for aircraft parked away from bays equipped with fixed electrical power sources. The new electrical mobile unit gives them the opportunity to reduce their carbon footprint and the health risks to employees.

Zero noise

ITW GSE says the key features of its 7400 e-GPU include zero noise, built-in redundancy against battery pack failure, a reduction in CO₂ by 90% and NO_x emissions by 95%. It also has the ability to be recharged from any 50/60Hz socket.

The Middle East is catching up with Europe and North America in tackling sources of pollution, Feuga said, noting that many airports in the MENA region are now putting in place sustainable, environmentally friendly programmes.

However, he added: "While diesel remains cheap, it will be difficult to convince people to invest in equipment that is more expensive."

National initiatives such as the UAE vision 2021, Abu Dhabi's economic vision 2030 and Dubai's clean energy strategy 2050 are expected to help change this mindset.

Feuga said airport authorities throughout the Gulf and Turkey are interested in the clean GPU technology. For many, it's "important to show the world that they're prepared to go green".

He said it is too early to forecast how many units ITW GSE could sell into the region, or the wider impact that the SIA trial will have. Dnata, which operates globally, could be watching closely.

While the initial cost may be greater, the operating costs of the e-GPU are lower because it needs no maintenance, unlike a diesel unit. The only moving parts are its four wheels.

In the US, where airlines typically own their own equipment, United Airlines has trumpeted its adoption of e-GPUs as part of its effort to reduce its carbon footprint. The marketing potential of going 'green' has not been lost on United – and ITW GSE isn't complaining about the exposure.

"Airlines and airports are investing a lot in ramp equipment," said Feuga. "New pushback tractors are electrical. The only system that runs the whole time an aircraft is on the apron is the GPU. Even the shortest turnaround can be 40 minutes. We think the e-GPU has huge potential."



Power-packed: The mobile GPU from manufacturer ITW GSE.

Sustainable alternative jet fuel is no longer an initiative, it's an essential. More than half the aircraft flying into this year's European Business Aviation Convention & Exhibition (EBACE) display were burning biofuel.

Dave Calderwood *was on one of them.*

HELLO GOOD BIO

The Embraer Phenom 300E accelerated quickly and lifted off barely halfway down Farnborough's runway, punching up through the clouds before being vectored around London's airspace by air traffic control.

Soon, though, we were clear and heading south-east across the English Channel, above France and bound for Geneva, Switzerland, for the annual EBACE show.

It was cloudy around Geneva too and, again, because of other traffic, we couldn't go straight into the approach procedure. The airport operates on a north-south axis between the Alps to the west and the city and lake to the east.

We knew this because we could follow every move on the Phenom's impressive Garmin G3000 multifunctional display, which was visible through the cockpit door. Red and yellow areas on the moving map warned of the high ground nearby but, again, soon we were cleared to join the approach.

What was clear, though, was that the jet's engines were not in the least bothered by having a tankful of sustainable alternative jet fuel (SAJF), and the fuel wasn't affecting how the two Embraer factory pilots were flying the aircraft.

David Coleal, president of Bombardier Business Aircraft and chair of the General Aviation Manufacturers' Association (GAMA) environment committee, had been dead right earlier in the day when he said: "The aircraft

doesn't know the difference between SAJF and Jet A1. SAJF is a drop-in fuel."

One of the two big themes at this year's EBACE was sustainability. Before the show opened, a coalition of business aircraft manufacturers, fuel companies and operators, came together at TAG Farnborough Airport in the UK to launch business aviation's participation in the EU sustainable energy week and promote the way forward for SAJF.

There's no doubt that business aviation is supportive of the SAJF initiative – and with good reason. The ambitious targets set out cannot be met without its use.

That's right. All the good work done by aircraft manufacturers to produce aircraft that burn less fuel with clever aerodynamics, winglets, lighter materials and more efficient engines, all the work to become carbon neutral by airports such as TAG Farnborough, and even advanced avionics and software, which facilitate efficient flight planning, are not enough on their own.

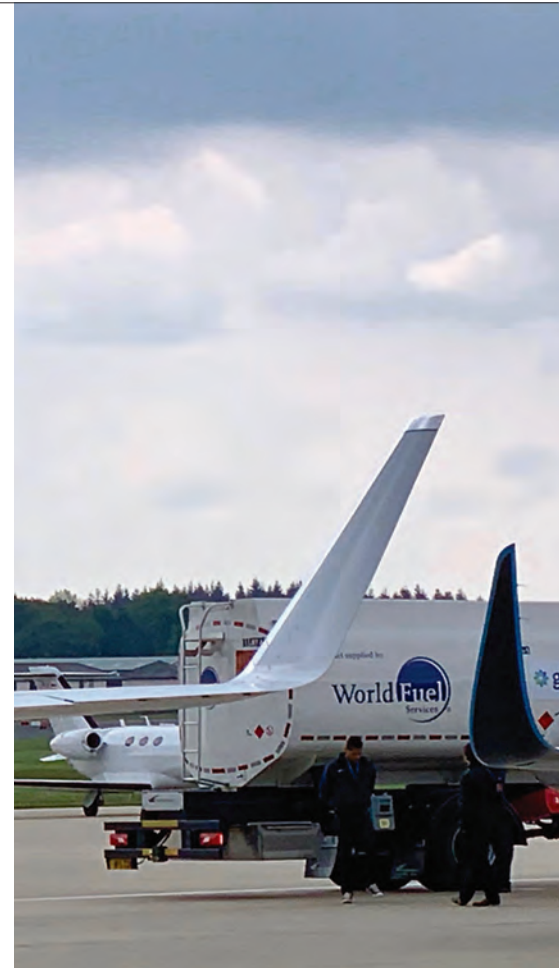
Kurt Edwards, director-general of the International Business Aviation Council (IBAC), made it clear that to meet the 2050 target to become carbon neutral is a big ask.

"New business aviation aircraft are making a big difference," he said. "They are, on average, 15% more fuel-efficient. Gulfstream's G500 and G600 are 20% more efficient than the aircraft they replace. The Global 7500 is 10% more efficient than smaller existing Globals.

WHAT IS SAJF?

Sustainable alternative jet fuel (SAJF) is a general term for non-petroleum based jet fuels, or blends. It's also referred to as biofuel or bio-kerosene, but it has to meet the technical and certification requirements approved by the aviation industry for use in turbine-powered aircraft engines. It can come from many sources whose chemical components can be converted to the pure hydrocarbons that make up jet fuel. Feedstocks can range from cooking oil, plant oils, solid waste (such as refuse), waste gases, sugars, and agricultural residues. The best known are crops that are purpose-grown to provide a convertible biomass.

It's this growing process that re-absorbs the carbon molecules produced when the jet fuel is burnt by a turbine engine, and creates the 'virtuous circle'. Crucially, whatever crops are grown must not impact on food production but may be part of a crop rotation cycle.



"But sustainable aviation fuel is a key factor in meeting the goals – it's probably going to make the biggest impact. Relative to fossil fuels, sustainably produced unconventional jet fuel results in a net reduction in CO2 emissions across its lifecycle.

"The industry has focused on fuels that produce more than 50% reductions but it's not uncommon to see approaches that deliver up to 80%. What's more, SAJF can be slightly more efficient than conventional Jet A due to a higher energy mass density."

After the presentations came a panel discussion chaired by Tim Obitts, chief operating officer of the National Air Transport Association (NATA), and featuring seven key players in the SAJF coalition.

Straight away the panel zeroed in on price, with Gulfstream scientist, Charles Etter, saying that with SAJF currently three times the price of Jet A1 in Europe and the US, it's better suited to business aviation than commercial air traffic, which is more price sensitive.

"SAJF can help support a company's own sustainability goals with carbon offsetting," he said. Etter was involved in an SAJF demo day at California's Van Nuys Airport in January. "Afterwards, we had the phones ringing off the hook with operators asking where they could get

Topping up: The Embraer Praetor 500 refuelling with SAJF at TAG Farnborough Airport before flying to EBACE.



THE COMMITMENT

The business aviation commitment on climate change is 10 years old this year and sets out the industry's plan for dealing with its carbon footprint. There are three key targets:

- A 2% improvement in fuel efficiency per year from 2010 until 2020;
- Carbon-neutral growth from 2020 onwards;
- A 50% reduction in carbon emissions by 2050, relative to 2005.

These targets will be met through four courses of action. They include more efficient operations; continuing infrastructure improvements; market-based measures, such as fiscal incentives and carbon offset schemes; and technology, including SAJF.

SAJF. There's a desire, need and willingness to use SAJF among corporate operators because of their environmental responsibilities."

Juergen Weise, chairman of EBAA and head of car manufacturer BMW's global corporate aviation operations, confirmed that demand is there even at that price difference.

Marcelo de Freitas, a development engineer at Embraer, who is deeply involved in Brazil's emerging biofuel market, pointed out that production of biofuels is a young industry, just 10 years old, and that they were still working on different ways to produce it.

For World Fuel Services director, Guy Sawyer, one important aspect was the blending process. Currently SAJF has around 17% biofuel blended with Jet A1, with blends of up to 30% projected. Jet A1 is still necessary because of certain aromatics present to help with seal swelling. "Blending takes time and the fuel has to be retested and this all takes time," said Sawyer.

Keith Sawyer (no relation), Avfuel's manager of alternative fuels, pointed out the 'virtuous circle' of SAJF whereby the CO2 produced is absorbed by the growing of raw materials.

"We're recycling carbon molecules through photosynthesis," confirmed Etter.

Brad Nolen, of Bombardier, fielded a question about electrification of aircraft, pointing out that it comes down to energy density. "One pound of Jet A1 produces 40 times more energy than one pound of lithium-ion battery," he said. Hybrid aircraft are more likely than all-electric aircraft.

The crunch for business aviation is availability, with operators using hundreds of small airports – a challenge to supply.

"But the real bottleneck is the pool of supply," said Tom Parsons of Air BP. "More sources are necessary."

However, even with the current supply issues, Parsons thinks that the SAJF market will double each year. ■

THE WARNING

While aviation recognises the absolute need for SAJF, a word of caution was sounded by Eamonn Brennan (right), director general of Eurocontrol, which manages air traffic over 41 states, mostly Europe but as far as Morocco, Turkey and Ukraine.



"The last five years have seen continuous growth in air traffic and the average is now 30,000 flights a day over Europe. That is near maximum capacity. Germany causes most of the air traffic delays, not helped by a shortage of staff. France also.

"So, this summer we are introducing routes to avoid the most congested areas."

Brennan showed examples of three such 'curved' routes, rather than straight lines to avoid the choke points, which will have an impact on the amount of fuel burnt.

Eurocontrol is already level-capping flights, such as telling an Airbus A320 that it is only cleared to 18,000ft, with an accompanying 20% drop in fuel efficiency.

He went on to point out that Eurocontrol is expecting demand to rise to 55,000 flights a day by 2030 over Europe.

Big ideas: Co-managing directors Jan Stoevesand (left) and Michael Britzke want to turn Aviation DataHub into the data platform for the entire aviation industry.

*Control of the ‘big data’ generated by modern airliners is increasingly a sensitive issue in the maintenance, repair and overhaul (MRO) industry. Is how the data is used ultimately more important than who owns it? **Chuck Grieve** investigates.*

Hub that can give MRO data extra bite

The new technology associated with ‘big data’ is changing the dynamics in the MRO industry, and many in the established MRO community are uneasy about what they see.

They fear being denied access to the terabytes of information that modern airliners relay to base, which could affect the way they maintain customer fleets.

A recent initiative called Aviation DataHub seeks to prevent that. It was launched in March by Lufthansa Technik (LHT) as an independent company to give data owners efficient control over the collection, compilation and processing of their data across all relevant dimensions of an airline’s business, including technical, ground and flight operations.

Share their data

“Airlines, in particular, will now be able to decide whether and with whom they want to share their data regarding the technical support of aircraft or the improvement of ground-handling and flight operations,” the company said.

Neutrality is key. The data hub “is open to anyone who wants to improve our industry – and that naturally includes our competitors”, said Dr Christian Langer, head of LHT digital fleet solutions.

Michael Britzke, co-managing director with Jan Stoevesand, said Aviation DataHub aims to become the data platform for the entire aviation industry. “Our mission is to leverage synergies in the digitalisation across the industry and ensure



“ People are not aware which data is important and which is not. ”

DR JOHANNES BUSSMANN

data protection and competition at the same time,” he said.

Stoevesand added: “It is our firm belief that all data that is owned by the operator should also remain under the control of the operator.” He was confident the interest shown in the concept before launch would translate into the active participation that will enable LHT to reduce its 100% stake in the new venture.

How quickly this happens is open to conjecture. Airlines appear to be more concerned with the traditional factors of cost, on-time performance, quality and consistency in their MRO outsourcing decisions than with access to data and data analytics, according to the 2019 Oliver Wyman MRO survey.

Data, its collection and use can be misunderstood. “People are not aware which data is important and which is not,” said Dr Johannes Bussmann, LHT chairman and chief executive. The problem is simply not making full use of the data that is available.

System suppliers have “invested billions” and need to review operational data from the current generation of aircraft and engines to guide the development of the next generation. “I think there could be a potential problem if everything ends up with the airframers,” he said.

Equally, airlines – especially smaller ones – could lose out on data-driven competitive advantages if decisions affecting their fleets’ technical reliability were being made by others.



Open and shut case?

With OEMs aggregating data on platforms and in common formats to enable better analytics, questions arise as to how open these platforms actually are?

“There’s a lot of tension over what the effect of some of these platforms will be,” said Mark Leach, partner in the international law firm Bird & Bird.

Speaking at the International Air Transport Association (IATA) Paperless Aircraft Operations and RFID Conference, Leach suggested smaller players, in particular, are bound to ask if some platforms are for the benefit of the industry as a whole or a bid to dominate the market.

Under English law, he said, data or information is not treated as a form of property that can be owned. Most operational data will not be sufficiently original to qualify for copyright protection or sufficiently sensitive, in itself, to qualify for legal protection as confidential information or a ‘trade secret’.

He said genuinely open data platforms would help allay some concerns of MROs. Safety is an obvious area where a strong case could be made for non-proprietary data-sharing platforms.

Some in the industry would like to see open standards and aggregation of data more generally. “In practical terms,” said Leach, “this would be difficult to achieve, particularly with commercial imperatives and the level of investment that has been made to date in existing platforms.

“While I can see that open platforms would, in many ways, be of greater benefit to the industry as a whole, I think a balance between open data and proprietary systems is where we will end up.”

What’s needed, he said, are benchmarks that cut across the industry. “At the end of the day, the target is to have aircraft as safe as possible. Everyone is working on this.

“I’m convinced that different engineers looking at the same problem from different perspectives helps advance safety and reliability. That’s why I think the focus should be on analysing the data in a smarter way, not who has access to it.

“Everybody has a role here. Airframers have a great deal of knowledge but we also know a lot about what happens during an aircraft’s operation, why it happens and so forth. Everyone should be involved in finding solutions to technical problems.”

Way forward

Dr Bussmann believes the way forward is with a neutral system that would allow operators to access and analyse aircraft data, and share it with their chosen MROs. “We decided to establish Aviation DataHub for processing any kind of flight, MRO and context data,” he said. “It is designed to avoid a data monopoly.”

Lufthansa Technik isn’t looking to make money out of it, he said. The objective is to store data securely in a structured way. “From there, an airline can decide who the data goes to for analysis. Then we work together on whatever problems come up.”

Wide participation by original

Continued
on Page 82

MAINTENANCE

CONTINUED FROM PAGE 81

equipment manufacturers (OEMs) is important, he said, adding that it makes no sense to replace one set of information silos with another. "It will be an open and global data hub in aviation and will fuel the digitalisation of our industry and related ones."

This should be welcome news to Ajay Agrawal, president of aftermarket services for Collins Aerospace, who sees the need for an "aftermarket digital ecosystem" where the right data is interpreted and used correctly. Writing in *MRO Network*, he suggests the aftermarket needs better coordination to help customers realise the value of their big data.

While Collins and others are working to leverage multiple digital products to get the full benefit of predictive maintenance, "closer collaboration between leading players in the industry is needed to accelerate progress and bring actionable solutions to the customer faster".

Among those leading players is Boeing, whose spokesman said: "Our industry has always shared information and collaborated on common issues, such as improving safety and environmental performance.

"We have found that deep knowledge of the entire ecosystem, including aircraft design and operations, is an essential requirement to extract

more meaningful results from raw data."

Boeing has AnalytX, which the Seattle manufacturer says is a collection of services and solutions designed to help customers improve their situational awareness, performance and processes. Options include 'DIY' data analysis, an analytics consultancy and software powered by analytics.

Ultimately, says Boeing, ownership of the data depends on the type of data, what systems generate it and the contractual relationship around it. At Boeing, many of these issues, such as sharing airline operational data, are handled by voluntary contractual agreements between parties.

Customers and suppliers

Under the long-established Boeing in-service data program, for example, customers and suppliers agree to share data to help improve Boeing aircraft and to allow airlines to benchmark their own operations to improve reliability. Boeing manages data access based on voluntary contractual agreements. Airlines can see operational data only from their own fleets, unless they agree to share data among themselves.

As to sharing data with a third party, such as

an MRO facility, that's up to an airline to decide. Boeing is not involved in that decision, and does not control access to that airline's fleet data in these instances.

AJW chief executive, Christopher Whiteside, says data analytics has an impact on his company's operation with improved decision-making throughout the supply chain. "We use the data to ensure we have the right part in the right place at the right time to maintain the highest standards of customer service," he said.

AJW gathers data across various commercial and business aircraft platforms and has access to a large number of data sets and data collection points from many vendors, including its own MRO facility, AJW Technique. The company also has access to historical data at a component and serial number level that helps analyse the past operational environment of an individual part or component.

The specific business need determines what data to use for individual business decisions. In some cases, pooled transactional data is most appropriate; in others, where, for example, customers operate in different environments, it is not. Customers also have varying approaches to maintenance. Where this is the case, the data applied needs to be specific to the relevant circumstances. ■

Wide open skies and a first-class welcome



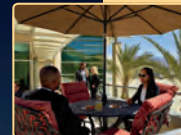
909.382.6068 • info@luxivairsbd.com • luxivairsbd.com • 295 N. Leland Norton Way • San Bernardino, CA 92408



Touch down at Luxivair SBD and delight in the unexpected.



This stunning and breathtaking FBO rivals anything in nearby Los Angeles or Palm Springs—and with far more competitive pricing.



- Onsite US Customs and Immigration
- Five-star amenities, services and concierge
- Exceptional business facilities and leisure areas
- Pilot lounge and snooze room
- MROs directly available

At Luxivair SBD, everything is designed for maximum convenience and minimum downtime.

Offering an unparalleled mix of elegance and efficiency, Luxivair SBD is Southern California's destination of choice.

LUXIVAIR
S B D

Southern California's Premier FBO



Appealing: Honeywell says 'experiential learning' appeals to millennials, improves skill retention and shortens training duration.

Virtual answer for MRO training

'Enhanced' reality has lived up to its advance billing as a disruptive technology to watch in maintenance, repair and overhaul (MRO). One area where it is starting to make an impact is training, as Chuck Grieve discovers.

Training in a highly regulated industry such as aerospace MRO has its challenges. Access to approved maintenance training courses is one. Another is their focus – specific training qualifies engineers to do specific jobs on specific aircraft.

Commentators suggest engineers typically take five-to-six years of classroom and on-the-job training to reach peak productivity. Some believe that could be trimmed by a year or two through greater use of virtual, augmented and mixed reality (VR/AR/MR).

With the global shortage of qualified maintenance personnel starting to bite, the industry is moving in that direction with solutions from a range of manufacturers, MROs and software developers.

Thanks to advances in devices such as Microsoft's HoloLens and the HTC Vive, and a rush to develop software that uses their capabilities, trainees are learning to deal with tasks from the routine to the dangerous, all in the safety of virtual environments. There's no risk of injury, and research indicates the enhanced learning experience leads to better retention of technical instruction.

Equally important to airframe and engine owners and operators, this approach removes the risk of damage to their assets. This was a consideration behind Rolls-Royce's new VR tool for refresher training on the Trent XWB, launched with Qatar Airways in April.

A similar rationale inspired Rapid Access, a

specialist in aerial work solutions, to work with developers to add aviation-specific modules to its industrial VR training platform. Company strategists reasoned that improving the training environment would minimise damage to airframes, potentially saving users tens of thousands of dollars.

"This is one of the things the industry was asked to try and develop," said Mike Palmer, regional quality, health, safety, environment (QHSE) manager at Rapid Access.

The apparatus provides immersive VR simulations for trainees to explore realistic jobsite environments and safely test the limits of equipment. The simulations become progressively more challenging; metrics provide feedback about the operator's performance, showing weakness and strengths.

"The technology is only about 12-14 months old and there are only about six or seven operational units in the world," said Palmer. "We have two of them here in the Middle East."

Aerospace newcomer, Spiral Technology, is focusing its efforts on MR and has developed prototypes for the HoloLens. The company demonstrated its Reactor MR software at MRO Middle East.

"MR intertwines the real and virtual worlds, making them responsive to each other in real time," said Spiral chief executive Konstantyn Shyshkin.

The technology builds on AR, where physical assets are overlaid

Continued
on Page 84

CONTINUED FROM PAGE 83

with a digital layer of information, by making the information change contextually as the task progresses. For example, in an MR environment, a virtual hammer (a hologram) resting on a real table will fall if the user pulls the table sharply.

Modern holographic glasses are much more than just portable screens, said Shyshkin. “They have the features of a sophisticated computer, including sensors and cameras, which help them sense their position in the space. There’s also WiFi to connect to your enterprise cloud, plus headphones and microphone to allow users to talk to the holograms – to ‘whisper to the shadows’.”

Spiral says its comprehensive training programmes can replace a significant amount of the external training used by MRO shops.

Speeds up training

Another company taking advantage of HoloLens capabilities is Honeywell. The company says its skills insight immersive competency (SIIC) solution speeds up training, while making it more effective because “more experiential learning” appeals to millennials.

SIIC aims to improve skills retention by 100% and reduce training time by 60% using MR. Trainees approach activities through virtual environments that are accessed through the cloud, offering a natural way to interact and communicate with peers or a trainer.

Dassault Aviation has used VR technology in its MRO training since 2017. Falcon immersive practical training (FIPT), a key component of the practical training syllabus, lets multiple trainees learn the same thing simultaneously.

A Dassault spokesman said it can be “a bit time-consuming” for trainees waiting in groups to take turns inside the mechanical bays and other tight spaces on the real aircraft. “With our immersive training tool, trainees simply put on their headsets and find themselves in the same



Insights: A spheric cabin view in LTT’s media concept suite gives insights into installation locations that cannot be demonstrated in normal practical training.

virtual spot, even in tight spaces, with a perfect view of what the instructor is doing,” he said.

FIPT lets them ‘virtually roam around’ inside the airframe and simulate inserting tools and turning wrenches in tight spaces.

Meanwhile, AFI KLM E&M has developed web-based virtual aircraft systems for Boeing 787 and 777 types that can reproduce the entire aircraft and its systems in a 3D setting. The MRO says this includes access to the aircraft, its cockpit, technical compartments and capabilities to open the engine and auxiliary power unit (APU).

The virtual aircraft reduces training time and minimises the need to have an actual aircraft available. It was designed to a high specification so engineers – along with flight deck and cabin crew – could all carry out the practical parts of their type rating courses in accordance with the requirements of airlines and MROs.

A “media mix” is how Lufthansa Technical Training (LTT) describes its media concept –

theoretical close-to-reality interactive training. It includes maintenance training devices and virtual aircraft, system schematics, spheric views, cockpit panel descriptions and a useful handbook of Airbus and Boeing abbreviations.

“The primary objective is to strengthen the competence and skills of our trainees already in the classroom by using as realistic as possible didactics,” said the company. The concept is being applied to more and more aircraft types.

With this approach, says LTT, the aircraft is “almost present” in the classroom, allowing trainees to practice dealing with failure indications in connection with the aircraft documentation.

While the system schematics module explains the relationships between different systems, the spheric views show the installed position of individual systems and components. This is especially useful, says LTT, for segments that are not visible or accessible during normal operation of the aircraft. ■

QATAR ENGINEERS LEAD THE WAY WITH ROLLS-ROYCE VR TOOL

Qatar Airways engineers are using a ground-breaking virtual reality (VR) tool from Rolls-Royce for refresher training on the Trent XWB engine after the Gulf carrier became the global launch partner for the tool in April.

The new tool is designed to deliver training in a virtual environment without the need for a physical engine to work on.

This is particularly valuable for Trent XWB operators, such as Qatar Airways, because the engine, the largest built by Rolls-Royce, must be separated before engineers can transport it for maintenance and repair.

The Qatari flag-carrier operates a fleet of 38 Trent XWB-powered Airbus A350s, with a further 38 on order.

Trainees don an HTC Vive headset that immerses them in the process, using sight, sound and touch to separate the two parts of the engine in a virtual setting, without the complexity and cost of a real engine.

Akbar Al Baker, Qatar Airways Group chief executive, said this innovation reinforces Qatar Airways’ reputation as an “airline of the future”. He



Ahead of the game: Qatar Airways engineers are the first to use a new Rolls-Royce VR tool for refresher training on the Trent XWB.

added: “By adopting the latest technology in our engineering department, we aim to ensure that passengers arrive at their destination smoothly and without disruption.”

Rolls-Royce’s Chris Cholerton, president, civil aerospace, said VR performs a similar role in engineer training to simulators in pilot training. Since the UK-based engine prime designs, tests and maintains engines “in the digital realm”, it makes sense to apply similar cutting-edge technology to training.

□ □ □ □ □

“Qatar Airways was the first airline to take delivery of the Trent XWB, and their forward-thinking vision across their business makes them the perfect launch partner for this technology,” he said.

In 2018, Qatar Airways was the launch customer for RampVR, pioneered by the International Air Transport Association (IATA), which it uses to train its ground operations staff. This award-winning system harnesses advanced VR technology to simulate airside conditions. ■

DOING AFTERMARKET RIGHT

MRO SERVICES COMPOSITES PARTS
SUPPLY INTEGRATED SOLUTIONS O
MANUFACTURING MOBILITY SYSTEMS
OEM SOLUTIONS AIRLIFT MRO SERV



SUPPLY CHAIN INNOVATOR AFTERMARKET EXPERT
GLOBAL EXPERTISE, EMERGING MARKET REACH
NIMBLE SOLUTIONS INTEGRATOR INDEPENDENT
TRUSTED PARTNER POWER OF FOCUS

Visit us at MRO Asia-Pacific September 25-26 booth #349

+1.630.227.2000 | aarcorp.com



With airlines growing around the world, pilots are in demand and the training industry is rapidly expanding to meet expectations.

Dave Calderwood reviews the Middle East's progress, including cockpit-ready first officers.

In September, OxfordSaudia, a new venture between the Saudi National Aviation Company (SNCA) and leading pilot training company, CAE, will start flight training with its first batch of 400 cadet pilots.

They will be flying brand new Diamond DA40 single-engine piston and DA42 twin-engine aircraft – the first of a total of 60 ordered – at an equally brand new facility at King Fahad International Airport, Dammam.

It's on a dedicated 40,000sqm site complete with hangar and flight operations offices.

At the time of writing, there were 500 students going through phase 1 training in the English language, maths and physics – the basics for any potential pilot.

Once that 500 have been whittled down to 400 and flight-training begins, they'll also be using Frasca level 6 flight-training devices (FTDs) leading on to CAE full-flight simulators (FFS) configured for an Airbus A320 type rating.

The SNCA-CAE school will be teaching the General Authority for Civil Aviation (GACA) syllabus leading to an air transport pilot licence (ATPL) with an Airbus A320 type rating and, most importantly, cockpit-ready first officers.

"We are attempting to meet the needs of the local carriers by offering them a captain qualified to fly their aircraft when completing the training with OxfordSaudia, thereby removing the risk to the airlines that the captain might not perform to standards in their training," explained Captain Larry Page, CEO of OxfordSaudia (the Oxford part is because of links with CAE's premier and long-standing training location at the UK's London Oxford Airport).

OxfordSaudia is a massive investment by SNCA, announced nearly two years ago at the 2017 Dubai Air Show. Under the terms of the agreement, CAE will provide the authorised training centre in Dammam, Saudi Arabia, the key elements for world-class cadet training, such as commercial pilot licence curriculum and courseware; the training of staff and instructors; and safety and quality control systems.

“ We are attempting to meet the needs of the local carriers by offering them a captain qualified to fly their aircraft when completing the training with OxfordSaudia. ”

CAPTAIN LARRY PAGE

"Developing the pilots of tomorrow is our priority and, as the leading worldwide training organisation, CAE is the best suitable partner to help us with the launch of this project," said Othman Al Moutairi, president & CEO, SNCA.

"This centre gives us the ability to supply locally trained pilots to our growing regional and global airlines, while also providing a highly skilled career opportunity for students."

Al Moutairi hit the nail on the head when he said "growing regional and global airlines". In June this year, Boeing released its latest *Pilot & Technician Outlook 2019-2038*, the industry's most respected forecast of personnel demand. It projects that 804,000 new civil aviation pilots, 769,000 new maintenance technicians and 914,000 new cabin crew will be needed to fly and maintain the world fleet over the next 20 years.

The forecast includes commercial aviation, business aviation and civil helicopter operators.

"The demand will stem from a mix of fleet growth, retirements, and attrition," said the forecast. "Meeting this strong demand will require a collective effort from across the global aviation industry. As several hundred thousand pilots and technicians reach retirement age over the next

Continued
on Page 88



CAPTAINS



Shining star: The Diamond DA42NG is one of a number of aircraft in the EAT fleet.

FANTASTIC

CONTINUED FROM PAGE 86

decade, educational outreach and career pathway programmes will be essential to inspiring and recruiting the next generation of personnel.”

The Middle East share of this booming demand is 68,000 new pilots. This is some way behind the Asia Pacific region with 266,000, North America 212,000, and Europe 148,000, but ahead of Latin America’s 54,000, Africa’s 29,000 and Russia/Central Asia’s 27,000.

But that’s not the full story. Many of the regions that were once termed ‘emerging markets’, such as Asia Pacific, are short of experienced captains to work alongside the newly minted and low-hour first officers. Airlines in these regions are filling the gaps by paying extraordinary salaries to tempt captains away from more established regions such as Europe and North America.

That, in turn, creates early promotion opportunities for bright and high-achieving first officers with a couple of years’ line flying under their belts. You can see why the flight-training industry refers to the process as a ‘pipeline’.

Many existing flight-training organisations are doing well in the current climate, even when there are fluctuations in the airlines’ fortunes.

Prime example

One prime example is Etihad Aviation Training (EAT), formerly known as Etihad Flight College. Originally set up to deliver pilots for Etihad Airways’ own fleet, the rebranded EAT has widened its intake and is exploiting its location as “the crossroads between Europe and the Indian sub-continent”.

To help build up its appeal, EAT is certified by the European Aviation Safety Agency (EASA) to operate as an approved training organisation (ATO) – the first in the UAE.

Mohammad Al Bulooki, chief operating officer, Etihad Aviation Group, said: “Etihad Aviation Training is an ambitious enterprise pursuing its mandate to provide outstanding training services to a global audience. The growth of the business will mirror the expansion of the global training market and the entire group is excited about the expanding portfolio of programmes and products.”

Etihad Aviation Training’s EASA ATO approval covers Airbus A320s, A330s and A340s. It wants to extend certification to include the Boeing fleet offering both ATPL and multi-pilot licence (MPL).

The MPL is airline-specific using the airline’s own standard operating procedures (SOPs) and is for ab initio pilot training.

Captain Paolo La Cava, director of EAT, said:



Top-notch: EAT’s facilities are impressive, with no fewer than 11 full flight simulator units, including three Airbus A320 devices, two Airbus A330/A340s, one Airbus A380, two Boeing 777s and three Boeing 787-9s.

“The organisation is always looking for ways to expand its operations and activities, and this new approval is the perfect platform for growth.

“EAT operates two facilities, one adjacent to Abu Dhabi International Airport, and a flight-training operation based in Al Ain. The Al Ain facility is our ab-initio school teaching cadets, while Abu Dhabi is a training academy primarily responsible for delivering advanced flight-training for airlines.

“We are fortunate to have our largest customer right on our doorstep,” continued La Cava. “However, to build our third-party customer portfolio, we have installed a commercial team capable of taking our ATO to the next level. The real challenge lies in the long-term retention of the third-party customers.”

One new customer, though, is close to home. For the first time, EAT is collaborating with a partner in Saudi Arabia. Sky Prime will dry and wet lease EAT’s FFS at Zayed Campus, Etihad’s training facility in Abu Dhabi. The training will be conducted by both Etihad and Sky Prime instructors.

La Cava said: “EAT is looking forward to welcoming Sky Prime instructors and pilots to conduct Airbus A320, A340 and Boeing 777 and 787 training at Zayed Campus. Last year was a strong year following EAT’s relaunch and we anticipate an even stronger 2019, with Sky Prime as our first Saudi Arabian partner.”

As part of the agreement, crew resource management (CRM) training, a tool for improving

air safety and a key element of the ATPL course, will also be conducted by EAT trainers for Sky Prime’s pilots and cabin crew. Sky Prime cabin crew will also receive recurrent training with EAT’s cabin safety trainers.

Captain Mamdooh Mokhtar, Sky Prime Aviation Services CEO, said: “In line with the Saudi 2030 vision, we are delighted Etihad Aviation Training are helping us fulfil our development strategy. To use their best-in-class training facilities and pilots to train our flying crew will enable us to gain the trust of our customers.”

EAT’s facilities are impressive, with no fewer than 11 FFS units, including three Airbus A320 devices, two Airbus A330/A340s, one Airbus A380, two Boeing 777s and three Boeing 787-9s.

Fixed-base device

The facility is expanding and will soon see the arrival of a brand new Airbus A350 FFS, as well as an Airbus A320 fixed-based device, both of which will be available in Abu Dhabi to third-party customers (who include L3 and Alpha Aviation).

Its fleet of aircraft is just as impressive and includes four Embraer Phenom 100E light jets, 10 Cessna 172SP Skyhawk, six Diamond DA42NG and two Extra 300 aerobatic aircraft for upset recovery training.

Etihad’s UAE rival airline, Emirates, also operates the Embraer Phenom 100 for flight-training at its new Emirates Flight Training Academy (EFTA) at Dubai South.

However, EFTA has upgraded to the very latest 100EV, which is equipped with a new Prodigy Touch flightdeck, based on Garmin’s G3000 avionics, and modified Pratt & Whitney Canada PW617F1-E engines, offering more speed with superior hot-and-high performance.

EFTA’s facilities at Dubai South, on a 164,000sqft corner of the aviation city at Al Maktoum International Airport, are stunning. EFTA is effectively a private airport with its own air traffic

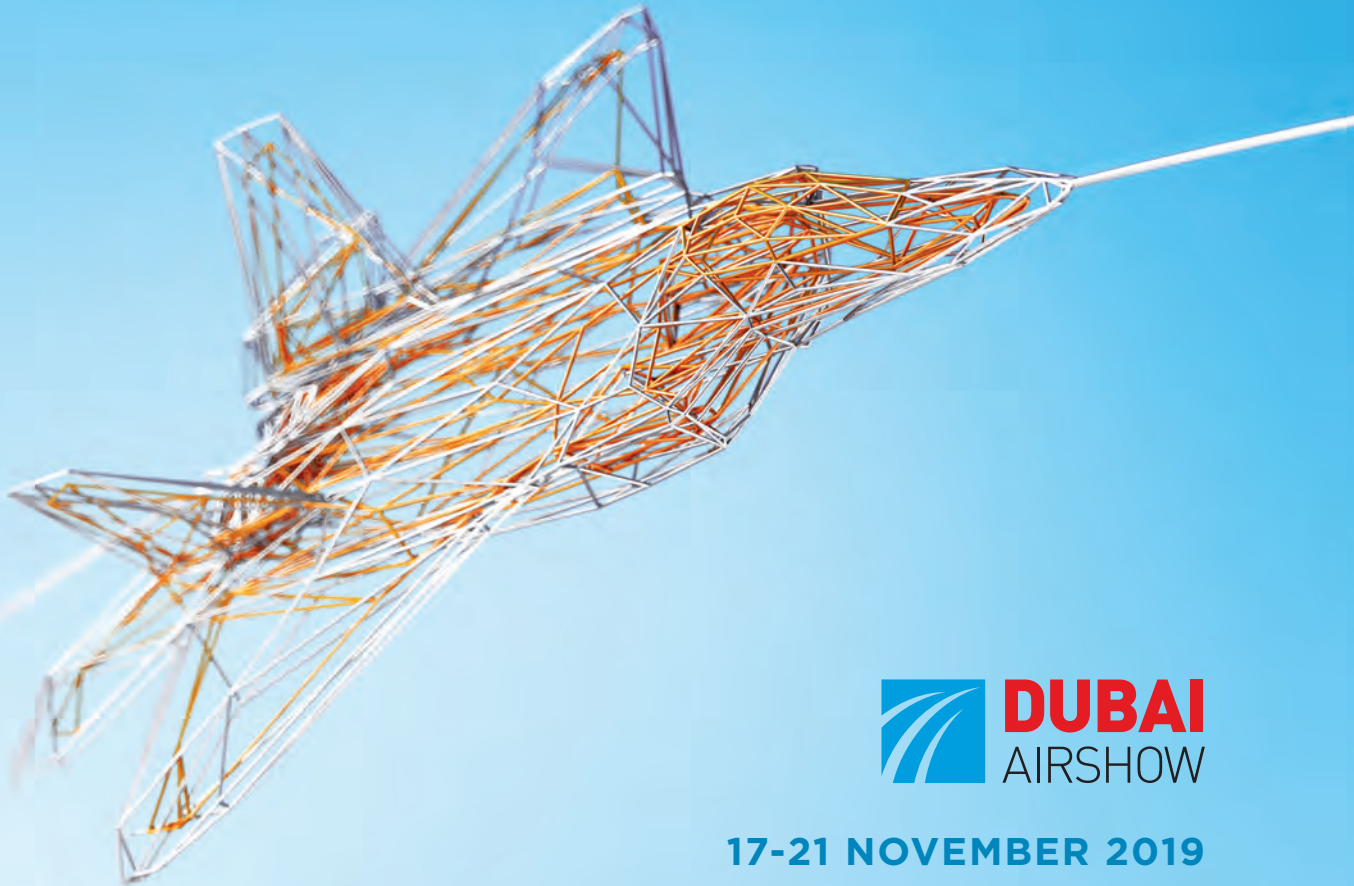
Continued on Page 90



CONNECTING

THE AEROSPACE

INDUSTRY



 **DUBAI**
AIRSHOW

17-21 NOVEMBER 2019
DWC, DUBAI AIRSHOW SITE

WWW.DUBAIAIRSHOW.AERO | [@DUBAIAIRSHOW](https://twitter.com/DUBAIAIRSHOW)

POINT CAMERA
TO REGISTER



CONTINUED FROM PAGE 88

control tower, fire service, hangar and apron for 30 aircraft, plus an 1,800 metre runway capable of handling hundreds of movements daily.

“What makes the academy truly unique is its innovative approach to training,” said Captain Abdulla Al Hammadi, vice-president of EFTA and a former Boeing 777 pilot for Emirates. Al Hammadi also worked on Emirates’ national cadet pilot programme, predecessor to EFTA.

“Cadets start training on the single-engine piston Cirrus SR22 G6 aircraft and then move directly to learning to fly the jet-powered Embraer Phenom 100EV, as against the conventional approach where cadets move from single-engine piston aircraft to twin-engine piston and then to jet aircraft. This eliminates an additional step, as well as allowing for more experience on jet aircraft,” said Al Hammadi.

“The Cirrus SR22 G6 is an ideal single-engine piston aircraft choice for ab initio pilot training. The aircraft incorporates a modern composite airframe, two large 12in flight displays, a flight management system with a keypad controller, and an integrated engine indication and crew-alerting system.

“Embraer’s Phenom 100 range of aircraft is also an obvious choice for airlines preparing cadets for multi-jet operations. The Phenom 100EV features state-of-the-art avionics and the industry’s first ever touchscreen glass flightdeck designed for light turbine aircraft, providing graphical flight planning training for cadets.

“The aircraft will allow cadets to benefit from airline-grade technology and performance during their training.

Effective and engaging techniques

“Inside the classrooms, cadets will be trained using the most modern, effective and engaging techniques and the latest technology. The curriculum at the academy is completely paperless and all cadets are issued with tablets, which they use for learning.

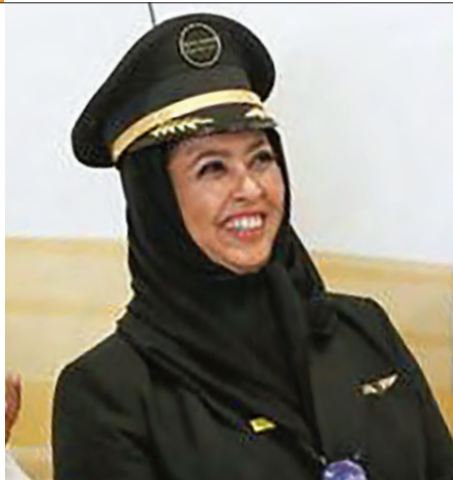
“We have partnered with Boeing, who have provided an integrated software system to manage cadet learning and training flight operations. Our curriculum is based on a competency-focused approach and will ensure that cadets complete at least 1,100 hours of ground school and 315 hours of flight school, exceeding all regulatory requirements.”

EFTA has also agreed a deal with TRU Simulation, a Textron company, for six flight simulation training devices (FSTDs) with mini-motion systems for the academy – the first of their kind in the aviation industry.

Three of the devices will be configured as Cirrus SR22 G6 FNPT2 and three as Embraer Phenom 100EV FTD Level II/MCC.

What’s interesting about all of these training courses is that they are open to both male and female cadet pilots. Partly this is due to the social and cultural revolution sweeping parts of the Middle East, but it’s also down to that boom in demand for pilots.

The numbers required cannot be achieved by taking the usual middle-class boys from wealthy families who can afford the high cost of training. Fully sponsored courses, paid for by airlines or



Inspirational: Yasmin Al Maimani became the first official Saudi female co-pilot.

national governments, are rare but, as Boeing notes in its *2019 Outlook*: “Airlines are also recognising the significant cost burden for students, and bond programmes have gained traction as another avenue for interested candidates.”

A bond programme is where the airline covers the cost of the training course, whether it’s ATPL or MPL, and may also pay a living allowance to the cadet pilot. Then, once qualified, the pilot pays it back over a number of years from their salary.

The upside is that a bond programme allows would-be pilots to apply from a wider mix of backgrounds, including women who may never had considered such a career in the past.

Even Saudi Arabia is now encouraging women to become pilots. In June this year, the Saudi aviation authority, GACA, celebrated the first official flight of a Saudi female co-pilot – Yasmin Al Maimani – who flew an ATR 72-600 for Nesma Airlines between King Khalid International Airport in Riyadh and Prince Naif International Airport in Qaseem, and between Hail International Airport and Prince Sultan bin Abdulaziz International Airport in Tabuk.

It wasn’t an easy career route for 29-year-old Al Maimani. Though her family supported her ambitions totally and she was able to start training in Jordan, she had to stop after the first stage, the PPL.

“Then I came back to Saudi, I had to stop my training,” she said. “A huge amount of money was going into it. When I was there, my dad used to come and stay and sometimes my mum. I was feeling like a burden to them. It was something like \$80,000 to \$90,000 going into my training.”

To continue, she took a job, first as a hotel reservation clerk, then working for the flight-training academy. The real break came with a US flying school in Florida, which agreed to train her. She gained a commercial pilot’s licence (CPL) and from there was among a batch of 11 young men and women who were accepted on to Nesma Airline’s four-stage future pilot programme.

The first stage was ground training at Prince Sultan Academy; the second phase was training

on a multi-engine aircraft and the third stage was ground training on an ATR 72-600 aircraft at Nesma Aviation Training Centre in Hail. The last and final training stage was on an ATR 72-600 simulator in the cities of Jakarta and Madrid.

Alpha Aviation Academy (AAA), which celebrated its 10th anniversary with a ceremony at its base in Sharjah, UAE in April, says diversity is a key focus. Its 330 graduates from 51 batches to date are from more than 67 different countries.

Of that, 20 female cadets are training with Alpha, with a further 28 having previously graduated. One of these is the inspiring Ghada Al-Rousi, now a first officer with Air Arabia and the first Emirati woman to hold an MPL licence.

AAA’s figures show a 14.5% ratio of females, which is far from equal but much better than the current worldwide total of just 3% qualified pilots.

In a move to encourage current professionals to undertake pilot training, AAA has recently extended the upper age limit on cadets training for the MPL licence from 33 to 35. Professionals who have gone on to train at AAA include former doctors and lawyers, a move which may also encourage female applications.

Ground-breaking year

Captain Nadhem Al-Hamad, general manager at AAA, said: “As the UAE celebrates a ground-breaking year of diversity and tolerance, and with industry demand for pilots growing, we say to the world, irrespective of gender, religion or nationality, anyone is welcome to study at AAA. Whether you are an international university graduate or an Emirati woman with a professional career, our door is open to you.”

Although space is not usually a limiting factor in the Middle East, some states do have limited facilities, so have successfully linked up with training organisations elsewhere.

Bahrain-based Gulf Aviation Academy (GAA) has teamed up with Airways Aviation for fair-weather training at Huesca, Spain, while Greece’s Egnatia Aviation Training Academy is also popular with many Middle East student pilots.

Egnatia has links with several ME airlines, including Qatar Airways, Emirates, Air Arabia, Kuwait Airways, Iraqi Airways and, most recently, Oman Air.

Egnatia Aviation also has an active partnership with Qatar Aeronautical College for the training of Qatar Airways pilots.

Of course, pilot training is not just about new airline pilots. CAE recently acquired Bombardier’s business aircraft training division and is rolling out what it calls a “digital transformation”.

CAE’s Dubai Al Garhoud facility is one of three centres to receive the company’s electronic training and checking authorisation (eTCA) application to better manage booking requests for training centres dedicated to business aviation.

“We are making the training process much easier, allowing pilots to go back to flying much faster,” said Nick Leontidis, CAE’s group president, civil aviation training solutions. ■

A panel with ideas: (from left) Haifa Hamedaldean; Lisa Lyons, VP trading Dubai Aerospace Enterprise; and Kerstin Ehmann, FO AW169 & Bell 412, Falcon Aviation Services.



The battle to beat subconscious bias

The sixth Women in Aviation General Assembly, which took place alongside the Airport Show in Dubai in May, was the biggest congress so far, including more than 750 attendees, 26 international speakers, 12 sponsor companies, and eight media partners.

Jill Stockbridge was there.

Mervat Sultan, co-founder and president of the Middle East chapter of Women in Aviation International, was delighted at the success of the event. She said: “We received great feedback from universities, companies, and attendees – all asking for more events on the same level.”

She continued: “Our mission, at Women in Aviation, is to be a premier gateway for women in the Middle East to achieve lucrative careers and educational opportunities in the aviation and aerospace industry. As such, an event like this is a great way to deliver our message.

“Moreover, we seek to challenge negative stereotypes that have been formed about women, and prove that, given the right environment and encouragement, women can reach epitomes of success in all fields, just as well as their male counterparts.

“This year, we are particularly keen to stress the need for successful women, who have made their mark in the aviation industry, to mentor and be a source of inspiration for others aspiring to be a part of the growing aviation sector.

“Equally, we plead with any man and woman who may be just finding their feet in the field, or even just considering joining it, to come forward and utilise the resources our platform provides.”

The opening keynote address was given by His Royal Highness Prince Fahd bin Mishaal Al-Saud, chairman of the GCC Aviation Authority, and vice chairman of the board of the Saudi Aviation Club.

He spoke of the outstanding female role models in aviation history internationally and, more specifically, in the region, citing modern Arab women who have blazed a trail, such as Latifah Al-Nayyah, the first Arab woman to get a flight licence in 1933, and UAE Air Force F16 pilot, Major Mariam Al Mansouri.

However, he felt that further potential lies in the wider aviation industry.

He said: “I believe that in the fields of development, research and innovation in the aviation

and aerospace sector, women will be creative, as they have been creative in the rest of aviation. We have many female role models, especially in our Arab world, who are a source of pride and have made



Mervat Sultan: “We seek to challenge negative stereotypes that have been formed about women.”

Continued
on Page 92

CONTINUED FROM PAGE 91

a clear addition to, and impression on, the development of the aviation industry.”

Prince Fahd acknowledged the International Civil Aviation Organization (ICAO) for its international and regional efforts to empower women through the adoption of a project entitled ‘the next generation of aviation professionals’. One of the project’s objectives is to increase the proportion of women employed in the technical fields of aviation to 50% by 2030.

He also pointed out regional developments. “At the International Air Congress held in Saudi Arabia last month, several recommendations were suggested to empower women and overcome difficulties in their participation in all fields related to the aviation industry,” he said.

Sponsor Bernie Dunn, president of Boeing Middle East, North Africa and Turkey, spoke of the inspiring success stories of the women present in overcoming challenges and the progress made in the field, but felt that it was still very slow. He said: “Despite data showing the benefits of greater diversity, we do not yet see the correction.”

He felt that subconscious bias, often formed in early childhood, is at the core of continued inequality. He said: “Subconscious bias remains the most difficult area to address. It is part of human nature and comes from a young age. Kids are born with a clean slate, but by the time they are six years old they have gender bias. We have to change that.”

In following the theme of mentoring and influence, the first panel discussed the role of social media in promoting the broader range of careers within aviation and redefining the image of women who work in those roles to break stereotypes.

Cecilia Bengtström, unit manager ATC, LfV Consulting, pointed out that LfV now has a range of women in senior positions, who are all high-profile, and how important this influence is. She said: “If you are a woman in a company and you don’t see women in senior positions, you don’t believe you can achieve those roles. If you see them, then there is much faster change within the organisation.”

Social media relevant

Captain Feras Malallah, a pilot with Kuwait Airways, felt that social media was particularly relevant in the region, as he explained: “We have a message to make people more aware of the aviation industry in the Arabic language. Social media is the most effect way to deliver that message.”

Later panels spoke of the support programmes run by major aviation players, such as Air BP, the International Air Transport Association (IATA) and Dubai Aerospace Enterprise (DAE), and the flexibility and environment required to encourage talented women to join and remain within aviation.

However, Haifa Hamedaldeen, transformation and project manager, Saudi Air Navigation Services, said: “Women in aviation is not going to happen by chance. It is important to have leadership support, but we also need to see the value in having women in the organisation – not just to fill a quota for Vision 2030, but the right people in the right jobs. Then it will trickle down and come through.”

In summing up, a number of the panellists returned to the importance of role models and mentors.

HE Captain Aisha Al Hamli, permanent representative of the UAE at ICAO and the first UAE female pilot, advised the young women in the audience to be strong. “This is a hard industry, but never give up. Build the connections that will help you reach your goals. My success came through perseverance, and because of the mentors I found – those who believed in me.”

Tina Ghataore, executive vice president-inflight connectivity solutions, Yahsat, said: “You need to network. It is most important. Look out for others who are on the path that you want to emulate and reach out to them.”

However, the final word goes to Engineer Hend Sameer Alawadhi, senior airworthiness inspector, Bahrain Civil Aviation Authority and one of the first aircraft engineers in Bahrain, who said: “If you cannot find a role model, you might be the role model.”

JORDAN'S FIRST FEMALE HELICOPTER PILOT TRAINS IN USA

The Hashemite Kingdom of Jordan's first female rotary-wing aviator, Cadet Aya Basheer Ibrahim Al Sourany, recently underwent UH-60 Black Hawk virtual flight training at the Fort Indiantown Gap (FTIG) National Guard Training Center, writes *Jon Lake*.

She is one of a large group of Royal Jordanian Air Force (RJAF) aviators who have conducted training on the UH-1 Huey and UH-60 Black Hawk over the past 25 years.

Numerous US and international students have been trained by the Pennsylvania National Guard at the FTIG and the Eastern Army National Guard Aviation Training Site, which includes Muir Army Airfield.

Cadet Al Sourany, who gained a bachelor's degree in computer systems engineering, enlisted in the RJAF and completed basic combat training in Jordan in October 2016. She subsequently completed the US Army initial entry rotary wing (IERW) course at Fort Rucker, Alabama, graduating in 2018 with military ratings on the OH-58 Kiowa and UH-60 Blackhawk.

□□□□□

The cadet is also a graduate of the RJAF advanced tactical training course, allowing her to fly Jordan's latest UH-60M Black Hawk variant.

These aircraft are now operated by the RJAF, having previously been considered to be Army assets. During 2018, the Special Operations Command (SOCOM) helicopters were transferred to the air force, forming a new quick-reaction force that was merged with the Prince Hashim Bin Abdullah II Royal Aviation Brigade.

The RJAF's No8 Squadron, part of the Prince Hashim Bin Abdullah II Royal Aviation Brigade at King Abdullah II Airbase, has taken delivery of 12 UH-60Ms, allowing the squadron to 'cascade' most of its surplus ex-US Army UH-60As to No14 Squadron.

Two ex-No8 Squadron UH-60As have been transferred to No7 Squadron at King Abdullah Airbase Amman/Marka for medevac duties, augmenting a pair of Super Pumas.

Eight ex-US Army UH-60Ls, previously used by No8 Squadron, have been put up for sale.

The Eastern AATS commander, Colonel Todd J Tuttle, met with the group of RJAF aviators, including Cadet Al Sourany, who was presented with a commander's coin in recognition of her accomplishments.



Excellent result: EAATS commander, Colonel Todd Tuttle, congratulates RJAF Cadet Aya Al Sourany on her performance in training.

Disparate DANS

With the world's busiest international airport and, potentially, the world's largest airport on your patch, plus possibly the world's first autonomous air taxis in a liberal drone-friendly city, the challenges are clear for air navigation.

Alan Peaford talks to Ibrahim Ahli, deputy CEO at Dubai Air Navigation Services (DANS).

When Ibrahim Ahli was a young boy in Dubai, he was fascinated by the airliners coming to the expanding airport in his home city. That led to him joining the Dubai Civil Aviation Authority as a cadet and training to become a controller.

Today, some 25 years after joining, Ahli is the deputy CEO of air navigation provider to the emirate, DANS – and the job is as exciting today as it was a quarter-of-a-century ago.

“We have to be better every day. So, we are building relations to improve our services, from safety, from efficiency from resilience, and all the other pillars that go with what we do,” Ahli said.

“In air traffic management we stand on three pillars:

- Equipment – we have the latest and we have the best;
- Planning – we have the contingencies in place for all procedures and we are developing new ways to improve the procedures and improve the airspace to cope with more travel;
- People – without people you can do nothing, so we work hard to make sure everyone is trained to face any scenario.”

Responsibility for approaches

DANS works closely with the UAE's federal regulator, the GCAA, and has responsibility for the approaches into Dubai's two international airports as well as tower operations. It also controls approaches to the northern emirates, including the rapidly expanding Sharjah Airport.

Developing technologies and methodologies have been vital for DANS to keep up with the growth at Dubai International.

“We have had to improve the capacity and have gone from 30 departures an hour to 40. We are also now touching the 40 arrivals every hour mark as well. I think it's like 25% growth in the traffic with the same airport and same runways,” Ahli said.

Of course, Dubai has a unique challenge in that more than half the world's fleet of the superjumbo A380s, and a huge number of Boeing 777s, are arriving or departing the airport every day. So, too, are smaller aircraft from around the region, raising the issue of wake vortex.

DANS has been working on vortex studies and developed models to enable separation – using two runways for arrivals and one for departure with mixed modality, which has increased the use.

Safety is at the heart of the DANS values. It has the world's largest tower simulator and staff are trained to face a huge range of incidents.

“We have more scenarios than before. And we have more mitigation for them if anything happened,” Ahli said. “We know so many things we didn't know because of the experience we have. We want the controllers in Dubai to be ready for all scenarios, then we are ready with a fast response time for any emergency. We also use the simulator with our partners or stakeholders at the airport, fire station, police, military, etc.”

DANS is also developing partnerships with

industry. Ahli used the Airport Show in Dubai to sign a memorandum of understanding (MoU) with technology giant, Honeywell, to explore the potential for the co-development of new technologies.

These will help increase efficiency, predictability, safety and environmental efficiency of airports and airside operations, Ahli said.

“Dubai being the global commercial and travel hub it has become is only going to expand further with Dubai Expo 2020 approaching us. Today, air traffic controllers manage a daily average of 1,500 movements in Dubai's airspace, and to enable and enhance seamless air traffic management operations further, we have to collaborate and work hand-in-hand with leading technology solution providers,” he said.

“Every day we have to be better. And, without innovation, there is no future. One person is weak, the group is stronger. So, what do we do? Well we are working with the highest technology in the world to help us for the extra miles we have to go in the future.”

With the potential for vertical take-off and landing (VTOL) air taxis' even as early as next year, and more unmanned systems in the Dubai skies, Ahli is unfazed by the challenge.

“I'm very confident because we have the best system. We have resilience if anything goes wrong. We have a plan for the contingency of whatever happens, and we have the best people. I'm very proud of the team we have. Working with our partners, we're always mitigating any risk you can imagine.”



Ibrahim Ahli: DANS is prepared for all eventualities.



Preparing for lift-off: Hazza Al Mansouri and Sultan Al Neyadi undergo simulation training in the Russian Soyuz spacecraft.

PICTURE: MOHAMMED BIN RASHID SPACE CENTRE.

UAE to launch first Emirati into space

The United Arab Emirates is firmly asserting itself as a major player in the global space industry with three major projects.

Steve Nichols reports.

Hazza Al Mansouri will become the first Emirati in space when he is launched on an eight-day mission to the International Space Station (ISS) on September 25.

Al Mansouri, 34, was selected as the prime astronaut and Sultan Al Neyadi as a back-up.

The pair, who were selected from thousands of applicants to become the UAE's first astronauts, are currently undergoing training at the Yuri Gagarin Cosmonaut Training Center in Star City, Russia, in preparation for the mission.

Salem Al Marri, head of the UAE astronaut programme, said: "Al Mansouri is undergoing his training with the prime team, while Al Neyadi is working with the back-up group."

Al Mansouri plans to present a tour of the ISS in Arabic and he will also study the effects of microgravity, including 15 experiments selected based on the Mohammed bin Rashid Space Centre (MBRSC) 'science in space' competition, which targets schools in the UAE.

Prior to applying for the programme, he was a pilot and flew the UAE Air Force's F-16 Block 60 aircraft.

"When I was told I was selected for the programme, it was difficult to express how proud and honoured I felt. I was euphoric," Al Mansouri said.

Developed by students

Meanwhile, the UAE's MeznSat is due for launch by the end of the year. The cubesat has been developed by students from the American University of Ras Al Khaimah (AURAK) and Khalifa University. It will operate using a short-wave infrared spectrometer to measure the presence and distribution of methane and carbon dioxide in the UAE's atmosphere.

A team of students will monitor, process, and analyse the data sent from the satellite at a ground station in Yahsat Labs in Khalifa University.

Abdulla Al Marar, head of space projects in the UAE Space Agency, said: "MeznSat will join the outstanding collection of satellites developed, owned and operated by

the UAE for a number of purposes, ranging from remote sensing and Earth observation to communications and navigation, collectively showcasing the UAE's position and leadership within the space industry."

Earlier this year, Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, announced the foundation of the Arab space coordination group during the Global Space Congress in Abu Dhabi.

In addition to the UAE, members of the new group include Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Saudi Arabia and Sudan.

Observation satellite

The group's first project will be the development of the UAE-funded spacecraft 813, an observation satellite that will monitor the Earth's environment and climate.

The multi-spectral satellite will monitor the Earth and measure the environmental and climatic elements, vegetation, soil types, minerals and water sources, as well as greenhouse gases, pollution and dust in the air in a number of Arab countries.

The satellite will be funded by the Emirates Space Agency and will be developed by Arab engineers at the National Center for Space Science and Technology at the University of the United Arab Emirates in Al Ain, the first space research centre in the Middle East.

The satellite will be built over the next three years by engineers from member countries at UAE University's National Space Science and Technology Center in Al Ain.

And, looking to the future, there is still the 'Hope' Mars probe launch to look forward to. The spacecraft is set to arrive at Mars in 2021 to coincide with the 50th anniversary of the founding of the UAE.

The rocket must blast off from Earth during a brief "launch window" in July 2020, when the Earth and Mars are aligned at their closest point. ■

Gulf Air appoints country manager

Bahrain-based Gulf Air has appointed Esam Abdulhameed Al Hammadi as a country manager for its Dubai station.

“This is a great challenge for me as I move from the hub of Gulf Air to one of its most successful and revenue-generating stations – Dubai. Although Bahrain and Dubai markets have similarities in terms of customer behaviour and travel patterns, I am sure there will be so much to learn,” said Al Hammadi.

“Gulf Air has been a big part of my life and I will continue to serve our airline from a different geographical location aiming to promote Bahrain and Gulf Air to a wider audience.”

Inspiring students at USW Dubai

The University of South Wales (USW) Dubai has appointed Dr Mark Pierotti as a visiting professor.

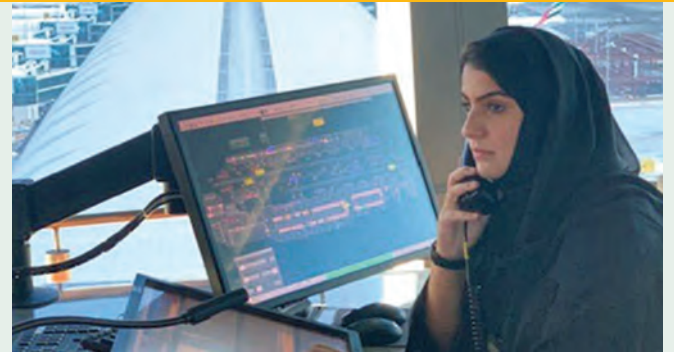
“Dr Pierotti’s successful career across airlines, aviation and engineering will be an invaluable asset to our students. He has more than 30 years of industry knowledge to impart to students who are keen to learn,” said Professor Julie Lydon, vice-chancellor, USW.

FIRST UAE FEMALE DUTY MANAGER

Dubai Air Navigation Services (Dans) has appointed its first female UAE national as duty manager in the emirate.

Marwa Al Matrooshi, who joined the organisation in 2004 as an air traffic control officer (ATCO), is responsible for managing the daily direction of ATC operations at Dubai International Airport (DXB).

As well as ensuring consistency in safety and service delivery, she will also be responsible for managing an entire watch, which comprises of five air traffic control officers working on different positions within operations in the tower.

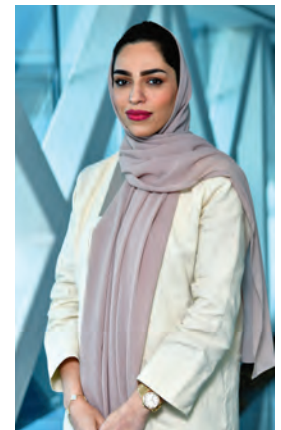


Hocquard steps up as CANSO top man

Simon Hocquard became director general of the Civil Air Navigation Services Organisation (CANSO) on June 19, succeeding Jeff Poole.

Hocquard, who previously served as CANSO deputy director general, said: “My relationship with the organisation goes back many years, both as a CANSO member when I worked at NATS, and latterly as deputy DG. My background as an air traffic controller, and in senior management positions dealing with strategic and aero political issues, gives me a comprehensive grasp of the current aviation environment.”

“With new technologies transforming ATM performance, new airspace users such as drones, and growing air traffic, the industry faces many challenges. I relish the opportunity to lead CANSO and help guide the ATM industry as it faces and successfully manages these changes.”



Emirates Group appoints Al Awadhi

The Emirates Group has appointed Hana Al Awadhi as vice president HR to oversee Dnata’s HR business partnership at Dnata airport operations in Dubai and across the world.

Al Awadhi started her career with Emirates in 2006 as a human resources specialist in the HR business support department. Since then, she has served in a number of operational roles including flight operations, Emirates engineering, service delivery, network control and Emirates security.

“I look forward to continue contributing to the success of the organisation through driving Dnata’s people strategy and creating a happy environment for colleagues,” said Al Awadhi.

NEW VP FOR SHELL AVIATION BUSINESS

Anna Mascolo has been appointed vice president of Shell’s aviation business, taking over from Anne Anderson, who is moving to a senior leadership role in Shell’s chemicals business.

Mascolo, who took over from Anderson on July 1, brings to the aviation business broad global experience from chemicals, fuels and gas products. Her career spans more than 20 years in customer-facing and supply roles.

Anderson said: “Shell Aviation is a thriving business in Shell’s portfolio, equipped with the right expertise and resources to offer a diverse suite of solutions for our customers. We have a new footprint through growth in new locations and new supply chains, and we are at the forefront of the industry response to climate change.”

“Through collaboration with external partners, we are providing truly add-value solutions, including our industry-first electric pump jet refuelling vehicles, Shell SkyPad – our digital refuelling data capture technology – and sustainable aviation fuel. The business is in an extremely strong position to help our customers’ businesses progress and succeed.”



all in a day

PEOPLE

Talel Kamel

Marcelle Nethersole *speaks to the Collins Aerospace VP customer and account management, Middle East and Africa.*

1

■ Collins Aerospace was announced last year after a merger between UTAS and Rockwell Collins. What have the effects of the merger shown?

Collins Aerospace, a unit of United Technologies Corporation, brought together the industry-leading capabilities of UTC Aerospace Systems and Rockwell Collins. We are building on the strengths of both organisations to offer a comprehensive portfolio, with expertise to solve customers' toughest challenges, and to meet the demands of a rapidly evolving global market.

We are about six months into the integration and our top priority remains to be number one with our customers. Customers want us to innovate and that's why we have the ambition at Collins Aerospace to redefine aerospace and, particularly, what is possible in the areas of intelligent aircraft, integrated and optimised aircraft products and services, and advanced defence systems.

Thanks to our talented base of employees in the region, we also want to make sure that our customers have the right support to be successful and, again, we are fully committed to be responsive and bring the best solutions to answer their needs.

2

■ What technologies and systems do you supply in the Middle East?

The Middle East is a key market for Collins Aerospace and we are well positioned to deliver the solutions that our civil and military customers need.

Our military solutions have been used by coalition forces in the region for years. And, on the commercial side, we were very successful in developing strong partnerships with airlines and operators.

Any challenges in the Middle East serve as opportunities. We will continue to partner with our customers to ensure that we are positioned for the demands of the future.

3

■ How much time do you spend on research and development in the region?

Innovation is at the core of what we do. Collins Aerospace invests \$2.5 billion every year in R&D, which demonstrates our commitment for innovation.

As the demands for an increasingly connected world grow, our team of engineers are focused on delivering disruptive innovations.

4

■ What is new for Collins Aerospace?

We are concentrating on our aftermarket solutions and also innovative products that highlight our vision for a more connected, more intelligent and more electric aerospace and defence industry.

5

■ What does a typical day hold for you?

In my role, I am privileged to work across all of our six strategic business units and aftermarket.

The team and I could go from having meetings with government officials to supporting a regional original equipment manufacturer (OEM) in building its light attack and trainer aircraft using our state-of-the-art avionics systems and more.

We also travel to meet our employees across the region; some of them are working side-by-side with our strategic customers. Getting to know about how they support our customers is enriching.

Last, but not least, interacting with academia is a part of the job that I personally enjoy, thanks to the enthusiasm and the innovation that the younger generations are bringing to our industry.

It is an exciting time to be at Collins Aerospace and I look forward to what the future has in store for us.





New World Class **MRO** & **FBO** Facility Al Maktoum International Airport

- Aircraft & Helicopter Charter
- Helicopter Filming
- Helipad Management
- Line & Base Maintenance
- 24/ 7 AOG
- Technical Training
- Aircraft Parking
- Ground Handling
- Aircraft Cleaning
- Aircraft Washing
- Interiors and Aircraft Detailing

*And Now **GACA** Repair Station Approval*

For enquiries, Please contact:

+971 2 444 0007 | sales@falconaviation.ae

www.falconaviation.ae





DELIVERING YOUR DREAMS

AMAC Aerospace is a world leader in Maintenance and Completion services for both narrow and wide-body VIP aircraft. Our bespoke handling of VIP maintenance projects is world-renowned and our 'Return to Service' are world class for completions.

AMAC's hangars are fully equipped with the latest technologically advanced equipment and manned by certified personnel. We offer a full spectrum of maintenance services and welcome the opportunity to serve you in any capacity.

www.amacaerospace.com