



ARABIAN AEROSPACE

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

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Printed in the UAE by Emirates Printing Press.

The challenge is to protect our customers from threats

Our industry has again been shaken by tragedy. In May we had the terrible news of the EgyptAir flight that crashed into the Mediterranean with the loss of all lives.

While we still await the preliminary report from the accident investigators, we do know that there was a fire onboard but we still do not know whether this was an

act of terrorism or a catastrophic incident in the aircraft systems and it would be wrong to speculate.

However, it is right that we offer our condolences to our friends at Egypt Air and of course to the families and friends of the passengers and crew who lost loved ones.

For them the agony of the disaster was made worse by a failure to know exactly where the aircraft went down meaning delays in closure as rescuers and then recovery teams could not find a trace of the aircraft – and this in a busy stretch of water.

More than two years after the disappearance of MH370 somewhere in the southern Indian Ocean, we showed that we were no further in our ability to live track our aircraft. This issue must be raised in the industry's priority list. The technology exists and there should be no excuses for further delay.



While there were no definite answers about the cause of MS804, there were no doubts about June's tragic massacre at Istanbul Ataturk Airport where 41 people died and more than 230 killed by supposed Daesh sympathiser gunmen who killed indiscriminately.

Once again we have to examine the way we protect our customers against threats. But if

our industry is to operate with the freedom it needs, then this will become increasingly difficult to achieve. Events like the Airport Show in Dubai looked at this in some detail as we report in this issue.

Again our condolences go to those in Turkey affected by these killings. In this issue we look in detail at the Turkish aviation and defence industry. In October the Istanbul Airshow takes place. Every conceivable step is being made to ensure the show is a success. Istanbul remains one of the great world cities and the industry has huge growth potential. As an industry we should not be beaten by terrorists and I for one hope that we come together to support this show and demonstrate that our industry is secure and confident of a solid future.

Alan Peaford
Editor-in-chief

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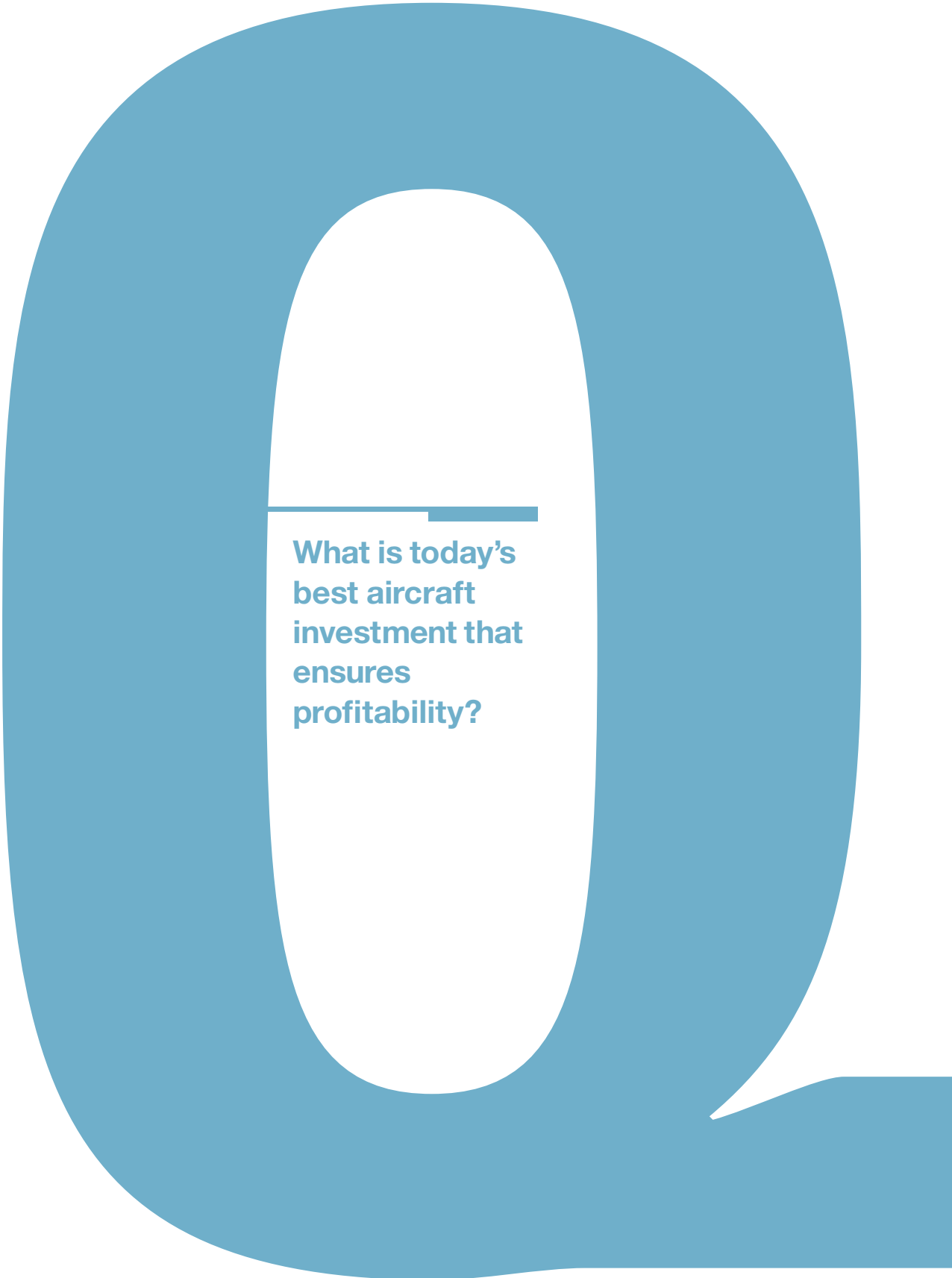
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**What is today's
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profitability?**

A low-angle, close-up photograph of the nose of a white Airbus widebody aircraft against a clear blue sky. The aircraft's cockpit windows and the 'AIRBUS' logo are visible on the fuselage. The image is framed by a blue trapezoidal shape that tapers towards the top.

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The 2016 Moroccan show reflected region's woes but the show must go on.



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Giant touches down at Abu Dhabi

The world's largest cargo aircraft, the Antonov AN225, paid a visit to Abu Dhabi International Airport. Arriving from Kiev with 160 tonnes of cargo, the plane was unloaded and returned to Ukraine later that evening.

Mubadala sells SR Technics control

Abu Dhabi aerospace investment company Mubadala has sold its majority shareholding in MRO company SR Technics to China's HNA Group. HNA will take an 80% stake in the Swiss-based company through its HNA Aviation division. Mubadala retains the 20% balance.

Airbus CN235 set for Turkish support

Airbus Defence and Space has authorised the Turkish Air Force's 2nd Air Supply and Maintenance Centre (2nd ASMC) in Kayseri as a regional support and maintenance centre for Airbus CN235 aircraft following a detailed certification process conducted over the last year.

Emirates' ten-year Unison support

Emirates has signed a ten-year After Market Services Agreement with Unison Industries in support of the largest GE90 and GP7200 engine fleets in the world.

The agreement extends through 2025 and covers external Unison new parts and component repairs for GE Aviation and Engine Alliance engine families in the Emirates fleet.

Jazeera terminal go ahead

The Kuwait government has given Jazeera Airways the go-ahead to build a \$46 million dedicated terminal at Kuwait International Airport.

The low cost carrier confirmed it had been allocated the land at the airport, and said the development would take 15 months to complete. The project forms part of the carrier's long term expansion plan including an internet check-in facility, in-flight WiFi internet, a business class lounge, and the launch of long haul flights.

Flydubai switch

Flydubai will complete its move from Dubai International to Dubai World Central by the end of next year, the CEO of Dubai Airports, Paul Griffiths, has disclosed.

Algerie converted to Boeing freighters

Air Algerie has signed a commitment with Boeing for two 737-800BCFs. The freighter conversion programme transforms passenger aircraft into freighters, extending the economic life of the airplane.

Boeing launched the 737-800BCF programme in February.

TOPS move for Qatar Airways

Qatar Airways has completed and implemented a new fleet management system called total operations systems (TOPS), which allows the airline to optimise the scheduling of aircraft and better manage flights, ultimately driving a more efficient and effective airline for its passengers.

Qatar Airways Group chief executive, Akbar Al Baker, said: "We elected to develop the technology internally, taking advantage of our world-class IT team. TOPS has undergone a number of iterations and, today, is second to none in its ability

to serve the needs of our flight dispatchers, operations control staff and others."

Dead Sea live debate

Jordan will host the 6th annual Arab Aviation Summit December 5-6 under the theme 'Linking Cultures, Driving Economies.'

The Summit, at a Dead Sea resort, will focus on the trends, insights and opportunities driving the continuous development of the Arab world's avia-tourism industry.

Key Summit findings and outcomes are compiled into a white paper report which is later presented to regulators and decision-makers from both public and private sectors.

DACC drafting heli-taxi masterplan

Dubai Aviation City Corporation (DACC) is drafting a masterplan for a proposed heli-taxi platform to be centred at the Dubai South aerotropolis, which includes Al Maktoum International Airport.

Khalifa Al Zaffin,

DACC's executive chairman, said the plan would be ready by the end of the year.

"It will address the transit and tourism needs of passengers using Al Maktoum International and service the whole of the UAE from Dubai South," he explained.

Rolls-Royce and Mubadala step up

Rolls-Royce and Mubadala have announced further details of a new approved maintenance centre (AMC) in Abu Dhabi and confirmed plans for a manufacturing facility that will produce aero engine components.

Esterline up front for RJAF PC-21s

Esterline CMC Electronics has been awarded a contract by Pilatus for the Royal Jordanian Air Force. The contract is for cockpit avionics for eight PC-21 turboprop trainer aircraft, where Esterline CMC will supply cockpit displays, dual Flight Management Systems (FMS), GPS Global Positioning System (GPS) Landing System Sensors and the Head-Up Display (HUD) sub-system.

Drones close Dubai airport

Dubai International Airport (DXB) was closed to aircraft from 11.39am to 12.45pm on June 11 - due to unauthorised drone activity," according to Dubai Airports.

DXB is one of four drone no-fly zones set up by the UAE's General Civil Aviation Authority (GCAA) after a drone incursion incident last year resulted in a 55-minute shutdown. Dubai's other drone no-fly zones are Al Maktoum airport, Al Minhad air base and the Palm Jumeirah.

Oman sets up aviation holding Co.

Oman's minister of transport and communications, Dr Ahmed Al Futaisi, said the government is in the process of setting up a holding company whose assets will include Oman Air, the Oman Airports Management Company, and the soon-to-be-established Oman Air Navigation Services Company.

Jet Aviation cleared for A320 support

Jet Aviation Dubai has been approved by the UAE General Civil Aviation Authority (GCAA) to support Airbus A320 series aircraft. The company already holds Federal Aviation Authority (FAA)



Qatar Apaches finally get go ahead

Qatar has signed a contract with Boeing for the purchase of 24 AH-64E Apache helicopters.

This is the conclusion of the agreement reported two years ago when the US Defense Security Cooperation Agency notified Congress that authorisation should be given

for the \$667 million contract. In addition to the Apaches, Qatar will also receive a Longbow radar crew trainer with ground support equipment and Thales radio equipment. Deliveries will begin in 2019, and the contract will complete in May 2020.

approval and is currently working to secure European Aviation Safety Agency (EASA) approval.

This GCAA approval authorizes Jet Aviation Dubai to support all Airbus A320 series aircraft registered in the UAE with line and base maintenance.

ATM exchange is for real

A real time flight data exchange has been successfully implemented between the UAE's General Civil Aviation Authority

(GCAA) and Eurocontrol. Real time updates of departure times and other trajectory information is now being exchanged between the operational systems of Eurocontrol network manager and the UAE main air traffic control centre on the major traffic flows between Europe and the UAE.

Aerovista leases B737-500

Air Libya has taken delivery of a leased Boeing 737-500 from Aerovista. The aircraft

is equipped with a 108 economy-class seat and eight business-class seat configuration.

The B737-500 will be used on services in the North African region from Ben Ghazi.

Pegasus expands ground operations

Pegasus Airlines has expanded its ground operations at Istanbul's Sabiha Gokcen Airport to now include ramp and aircraft parking services.

"As part of the project, we have created 1,000 new jobs," said CEO Mehmet T Nane.

"With the addition of our new personnel, Pegasus now has 5,378 employees at the end of the first quarter of 2016. We have selected the newest and most advanced technological equipment to run our ground service operations meticulously and have invested 20 million Euros in doing so."

Etihad and Avianca Brasil in codeshare

Etihad Airways and Avianca Brasil announced a codeshare partnership in June.

"Avianca is an important strategic partner for Etihad Airways in South America. In addition to the codeshare agreement recently signed with Avianca Colombia, we are further strengthening our presence in Brazil by offering our guests more convenience and connections with a single combined ticket," said Martin Drew, senior vice president - Americas at Etihad Airways.

Flynas leasing Turkish A320s

Flynas has wet-leased a pair of A320-200s from Turkey's Freebird Airlines.

TC-FHB and TC-FHC were delivered to Jeddah late last month and have joined the rest of the Flynas' fleet of 26 A320-200s.

Gulf Air reduces losses

Gulf Air has reduced its losses by 88% since beginning its restructuring strategy in 2013.

The carrier has focused on improving performance and operational results, and has achieved an on time performance of 89%, extended its network to 44 destinations and strategised its fleet capability to cater to its growth.

Iraq Caravan target

The Iraq Air Force has been in talks with American firms Flight Safety International and Orbital ATK to ensure that the Iraqi squadron utilising the military version of the Cessna Caravan can become self sufficient in its maintenance and operation of the aircraft.

DANS and EAU sign up for the future



Dubai Civil Aviation Authority, Dubai Air Navigation Services (DANS) and Emirates Aviation University (EAU) have signed a memorandum of understanding (MOU) to begin a long-term strategic partnership to design training and develop human resources.

They will also provide full-fledged technical academic programmes and internships for students and professionals in the aviation sector to give them a competitive edge in the job market.

The MOUs were signed by H.E. Mohammed Ahli, the director general of Dubai Civil Aviation Authority and the CEO of DANS, and Dr Ahmed Al Ali, the vice chancellor of EAU.



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Vertis Aviation partners with EAS

Vertis Aviation is adding a second Gulfstream G550 to its portfolio.

The aircraft, a 2006-built G550, which can seat up to 13 passengers, is operated by Executive Air Services (EAS), a Miami-based aircraft management, sales and charter company with 24 years experience.

The new trans-Atlantic partnership will see Vertis Aviation supporting EAS international growth as the team focuses on developing charter business on behalf of the American operator in Europe, the Middle East and Asia.

Flydubai partners with Booking.com

Flydubai is partnering with Booking.com adding a wide range of hotels and other accommodation options to its website – Flydubai.com.

Hotels.flydubai.com is powered by Booking.com and is designed to help passengers find the perfect stay to suit their preference and budget from more than 954,000 accommodation

VIP package from Lufthansa Technik and DC Aviation



DC Aviation's Michael Kuhn and LHT's senior vice president Walter Heerdt shake on the deal.

Lufthansa Technik has joined with DC Aviation Group to offer their respective VIP customers a package of services at Al Maktoum International Airport (Dubai World Central Airport).

An experienced, highly qualified team of engineers and mechanics will ensure cost efficiency and quality that are "made in Germany". Just like Lufthansa Technik, DC Aviation Group is headquartered in Germany, in this case in Stuttgart.

The contract services will be provided in the hangars and VIP facilities of DC Aviation Al-Futtaim a joint venture of DC Aviation and the Al-Futtaim Group. They will consist of regular checks as well as maintenance services, including unplanned repairs for example in the case of an AOG (Aircraft on Ground).

The portfolio also features services for aircraft cabins, including small modifications. Moreover, plans call for a mobile aircraft and cabin service to serve the region.

The offer is rounded off by extensive FBO services for ground operations at the airport, such as fueling, catering for passengers and pilots, and transport services. A luxuriously equipped terminal with 1,300 square metres of space is available for this purpose.

Around-the-clock facilities for entry procedures and customs clearance will ensure seamless support. A hangar extending over 5,700 square metres of floor space will accommodate business jets up to the size of an Airbus A320 or Boeing 737.

options worldwide. Passengers are able to browse other guests' reviews and book flexibly with a range of payment options.

Exam centre for Istanbul

CAA International (CAAi) is set to open a new European Aviation Safety Agency (EASA) part-66 aircraft maintenance licence

(AML) electronic examination centre in Istanbul, Turkey on behalf of the UK Civil Aviation Authority (UK CAA).

The first exams will be undertaken on September 22 this year at the British Side Language School, in Besiktas, Istanbul.

The exams will be delivered under the oversight of the UK CAA and will be administered locally by the British Council in Istanbul.

Jetex licenced for five Morocco FBOs

Jetex will launch new fixed-base operator (FBO) facilities in Casablanca Mohammed V, Marrakech Menara, Rabat-Salé, Agadir-Al Massira and Dakhla airports following its award of a licence by the Moroccan National Airports Authority (ONDA).

"By partnering with Jetex, ONDA marks a new strategic step in the development of business aviation activity across Morocco's airports," said ONDA CEO, Zouhair Mohammed El Aoufir.

"These five new FBO installations will undeniably bring a significant improvement in hosting and handling passengers across business aviation."

200B or not to be

Iran Air has retired its last remaining B747-200B from active commercial service.

Originally delivered to Lufthansa in 1982 the B747-200 conducted its last commercial flight on Saturday, May 8.

With no more cycles left

on its airframe, and the potential for new Airbus aircraft due in the coming months, Iran Air has opted to retire the aircraft instead.

The Iranian carrier continues to operate one B747-200 and one B747SP on commercial flights.

Saudia is no paper plane

Saudi Arabian Airlines (Saudia) has received authorisation for paperless flight deck operations.

The airline has integrated the installed version of Jeppesen FliteDeck Pro as its electronic flight bag (EFB) solution and uses a portable iPad-based EFB as a backup with its Boeing 787 aircraft.

Turkish trainers get Sim first

Alsim has announced the sale of an ALX simulator to ER-AH, flight training school in Istanbul, Turkey.

The school purchased the light turboprop variant, the first of its kind worldwide, the school said.



JSSI signs up Turkish operator

Jet Support Services (JSSI) has announced that Turkish operator, Genel Havacilik, enrolled its Bell 407 Helicopter on to the JSSI premium engine programme. The programme for the Rolls-Royce 250-C47B engines is a comprehensive hourly cost maintenance agreement, covering

scheduled and unscheduled events, as well as life-limited components.

Bell 407 operators also have the option of enrolling in the JSSI unscheduled engine programme that provides 100% coverage for unscheduled maintenance.

IATA calls on states to release funds

IATA has called on two Arab League governments specifically to respect international agreements obliging them to ensure airlines are able to repatriate their revenues.

The two are Sudan and Egypt. IATA also named Nigeria, Angola and Venezuela as being among the worst offenders.

“Air connectivity is vital to all economies. The airline industry is a competitive business operating on thin margins. So the efficient repatriation of revenues is critical for airlines to be able to play their role as a catalyst for economic activity. It is not reasonable to expect airlines to invest and operate in nations where they cannot efficiently collect payment for their services,” said Tony Tyler, IATA’s outgoing Director General and CEO.

Nanosatellite completes testing

The Mohammed bin Rashid Space Centre (MBRSC) and the American University of Sharjah (AUS) have announced the completion of the communication nanosatellite, Nayif-1.

The satellite has passed all tests and is ready to be launched aboard SpaceX’s Falcon 9 rocket.

It was developed by Emirati students from AUS, under the supervision of engineers and specialists from MBRSC.

Gama zeroes in on light aircraft

Gama Aviation has introduced a new ‘category zero’ handling rate for its fixed-base operation (FBO) at Sharjah International Airport, which is designed to encourage light aircraft users to use the airport.



Egyptair black box recordings indicate possible fire prior to crash

Egyptian accident investigators have confirmed that the word “fire” has been clearly identified in data from the cockpit voice recorder recovered from the wreckage of EgyptAir flight 804 that crashed into the Mediterranean Sea in May.

Investigators had earlier said that the other “black box” retrieved from the site had confirmed smoke alarms had sounded onboard and there are signs of soot on parts of the wreckage which had indicated a fire.

“The committee had started listening to the cockpit voice recordings before the occurrence of the accident; where the existence of ‘fire’ was mentioned,” the committee said in a statement.

“Still it is too early to determine the reason or the place where that fire started,” it said.

The data recorder points to smoke signals indicating fires in the lavatory and avionics section of the plane, according to the committee.

Egyptian investigators have confirmed the aircraft made a 90-degree left turn followed by a 360-degree turn to the right before hitting the sea.

The Airbus A320 was carrying 40 Egyptians from Paris to Cairo. There were 15 French, two Iraqis, two Canadians and one passenger each from Algeria, Belgium, Britain, Chad, Portugal, Saudi Arabia and Sudan.

The latest committee statement also said the search for the remains of passengers has ended.

The investigation continues.

Gama Aviation Middle East MD, Martin Ringrose, said: “The introduction of our category zero class of aircraft ensures that smaller aircraft types have an appropriate charging mechanism, and we hope this move will enable a greater number of clients to take advantage of our services and use us as a gateway to Dubai, Sharjah and the Northern Emirates.”

Oman partners with PDO for training

Oman Air and Petroleum Development Oman (PDO) have joined forces to provide career development training for 500 of the airline’s Omani staff.

Around 120 recruits

were selected to receive intensive training for four different ramp services positions within Oman Air.

A second group of 100 customer services agents will also receive training.

A320 family can now get GX

Inmarsat’s advanced Global Xpress (GX) Aviation in-flight connectivity service has received EASA certification for the A320 aircraft family. Inmarsat’s partner Lufthansa Technik obtained the STC after its design team developed an installation process that includes required electrical modifications inside and outside the aircraft fuselage, which

can be completed within only four days or during regular maintenance schedules.

Qatar Airways increases IAG stake

Qatar Airways has increased its shareholding in International Airlines Group (IAG) from just under 12% to 15.01%.

Qatar Airways Group chief executive, Akbar Al Baker said: “We have been very happy with our investment in IAG from a financial, commercial and strategic perspective. We have decided to further deepen our relationship with IAG and the increased stake recognises the strengthening commercial ties between us.”

Military rotorcraft deal for CAE

CAE has been awarded a contract to provide the UAE Joint Aviation Command (JAC) with a suite of helicopter simulators and training devices for the NorthStar Aviation 407 Multi-Role Helicopter (407MRH) as well as the Sikorsky UH-60M Armed Black Hawk (ABH).

EgyptAir raising standards

EgyptAir has worked in cooperation with the International Civil Aviation Organization (ICAO), to introduce the TrainAir Plus programme, which aims to raise levels of safety and efficiency of organisations working in the air transport industry. A recent course was attended by a number of instructors in various fields including pilot training, engineering, cabin crew, quality, human resources and professional skills.

CAE brings G650 simulation to region

The Emirates-CAE Flight Training Centre in Dubai will be targeting operators of the Gulfstream G650 across the region and beyond.

The Dubai-based training programme for the Gulfstream G650 will utilise the latest innovative training tools, including CAE Simfinity XR Series ground school training solutions featuring classroom software, distance learning and a tablet application for course materials and pre-study tools.

Abha gateway boost

Saudi Arabia’s General Authority for Civil Aviation (GACA) has announced the city of Abha will become the kingdom’s southern gateway hub with local budget carrier Flynas its designated carrier.

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RJ at the heart of Revolt celebrations

Royal Jordanian staff and aircraft were at the heart of the centennial celebrations of the Great Arab Revolt in Jordan.

An RJ 787 Dreamliner – emblazoned with the Great Arab Revolt centennial logo on the bottom of the fuselage – performed in a flying display alongside the country's aerobatic Falcon display team.

The air show overhead King Hussein Park included two tours over Amman, where people from all over the kingdom came to attend the party.

A large number of the airline's employees – in uniform – took part in the parade, preceded by a float featuring an RJ aircraft.

Iran Air plans \$25 billion deal

In June, Boeing and Iran Air reached agreement on a \$25 billion deal, as Boeing plans to sell the carrier 100 737 and 777 aircraft.

The deal is a large step in relations between the United States and Iran after sanctions on Tehran were lifted last year and, if approved, it will be the largest deal between the two countries since the 1979 revolution.

"Boeing will continue to follow the lead of the US Government with regards to working with Iran's airlines, and any and all contracts with Iran's airlines will be contingent upon US Government approval," the carrier said in a statement.

Air Arabia sees new Horizon

Air Arabia is to introduce SITA's next-generation passenger management system to extract even greater efficiency across its operations. Horizon Weight & Balance will increase fuel savings for the airline by providing full load planning capabilities, including a graphical user interface framework, for all the functionalities required to load and dispatch an aircraft. This includes all

legally required documentation for both airlines and ground handlers.

Bahrain Airport to use SITA kiosks

SITA will install and manage six new AirportConnect S4 kiosks at Bahrain International Airport this year, with four to be introduced in the economy check-in area and two in first and business class check-in.

Mohamed Yousif Al Binfalah, chief executive officer of Bahrain Airport Company (BAC) said: "This project is the first step

towards the company's vision of implementing the International Air Transport Association (IATA) fast travel initiative, which will significantly enhance the passenger experience at Bahrain International Airport."

Falcon grows helitour business

Falcon Aviation Services, which operates sightseeing helicopter tours from its certified helipad at Dubai's flagship Atlantis The Palm resort, says uptake for the service rose 20% last year. Falcon, which operates the service in partnership with

Alpha Tours using a seven seater, EC130 helicopter, said it's also aiming for a 20% rise in bookings this year.

Business begins at Al Maktoum

Air Charter Service arranged the inaugural private jet flight from Dubai Al Maktoum's new VVIP terminal on an Embraer Legacy. The terminal is the world's first 7-star airport facility and this flight marked the beginning of operations at the private aviation-dedicated terminal.

Falcon 8X receives EASA certification

The Falcon 8X received certification from the European Aviation Safety Agency (EASA) in June.

The certification had been anticipated, and certification from the Federal Aviation Administration (FAA) is due to be issued shortly.

First deliveries of the aircraft are due at the beginning of the fourth quarter of this year, as announced when the aircraft was launched in May 2014.

Emirates completes aircraft makeovers

The Emirates Aircraft Appearance Centre completely stripped and repainted 33 aircraft last year – 13% of the carrier's fleet.

During the year, Emirates gave a fresh coat of paint to three Airbus A380s and 22 Boeing 777s, in addition to eight aircraft that were retired as a part of the airline's strategy to operate a young, modern, and efficient aircraft fleet.

Space summit date

The dates for the Global Space Congress in Abu Dhabi have been changed. The Congress will now run between 31 January - 1 February 2017.

R-R steps up Abu Dhabi services



Eric Schulz (left) Rolls-Royce, president – civil aerospace, and Homaid Al Shimmari, Mubadala, chief executive officer, aerospace & engineering services.

Rolls-Royce and Mubadala confirmed plans for a manufacturing facility that will produce aero engine components and announced further details of a new approved maintenance centre (AMC) in Abu Dhabi.

Mubadala will create a purpose-built and wholly-owned facility that will carry out work on the Trent XWB, the aero engine, that powers the Airbus A350 XWB. The Middle East region is forecast to have one of the world's largest concentrations of Trent XWB engines with more than 20 per cent of the 1,600 sold to date due to be operated by airlines in the region, including the 62 A350s to be operated by Abu Dhabi-based Etihad Airways.

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THE COMPETITION

EGYPT'S NESMA SET TO ENTER THE FRAY

Much has been written over the past three years about the planned liberalisation of Saudi Arabia's domestic airline market. The Arabian Peninsula's largest nation has long been dominated by flag-carrier Saudia, which boasts around 90% of internal passengers, with the remainder choosing to travel with hybrid carrier Flynas.

New contenders Al Maha Airways and SaudiGulf Airlines plan to enter the market as soon as they can obtain their air operator's certificate (AOC) from the Saudi regulatory authorities. That process has taken longer than anyone could reasonably have foreseen, but the documents will be handed over at some point, allowing Qatari-backed Al Maha and home-grown contender SaudiGulf to begin operations.

The Saudi market, then, is about to become extremely competitive. Not, perhaps, the best circumstances for a small airline to also throw its hat into the ring. But that is precisely what Nesma Airlines plans to do.

Egyptian carrier Nesma has been flying since 2010, initially as a charter operator bringing European holidaymakers to Red Sea resorts such as Sharm El Sheikh. However, by the end of 2011 it had begun scheduled flights between Egypt and Saudi Arabia and it is in the latter nation that its CEO and partner, Ashraf Lamoum, believes it can find a profitable future.

This move towards scheduled services accelerated in late 2015, after the destruction of a Russian Metrojet Airbus A321 shortly after take-off from Sharm El Sheikh by what the Russian authorities believe was an improvised explosive device (the Egyptian investigating authorities have not confirmed this).

Charter flights from Europe swiftly dried up after several nations advised their nationals to stay away from Egypt.

"It's not a matter of us stopping charter flights,

Another airline is planning to enter the increasingly crowded Saudi Arabian market, with an operating philosophy it hopes will create a successful niche.

Alan Dron reports.

but there's no demand," said Lamoum. "Therefore, we're concentrating on scheduled operations. If the demand returns, we're ready to restart our charter operations."

The airline's HQ and main operating base remains in Cairo and the Egyptian authorities issue its AOC. However, by the time this issue of *Arabian Aerospace* appears, Nesma Airlines KSA should have received an AOC from Saudi Arabia's General Authority of Civil Aviation.

"When we have our Saudi AOC, we will be allowed to operate domestic flights there, in addition to international flights originating from Saudi Arabia," said Lamoum.

But why get involved in a market where major carriers will soon be pumping in vast marketing budgets in an attempt to persuade travellers to fly with them? What chance does a small airline have of competing?

"We have a vision that the Saudi market is still under-served," said Lamoum. "We highly respect the competition but Saudi Arabia as a

country is expanding into new cities and new airports. There are a lot of huge infrastructure projects and there is a huge development strategy requiring transportation.

"There are 22 airports in Saudi Arabia, most of them under-served. We believe we can get a good market share."

Nesma has, hitherto, operated a small fleet of Airbus A320s; three are on strength, with an A319 having recently joined the fleet. However, for its Saudi operations, Nesma plans to introduce a second type, the ATR 72-600 turboprop. Two were acquired in April from lessor Dubai Aerospace Enterprise and, at the time of writing, negotiations were continuing with lessors for a further four of the Franco-Italian aircraft.

Traditionally, turboprops have not been popular in the Gulf, where passengers prefer jets. However, Lamoum said that Nesma was approaching the market with a new operating philosophy.

He intends to create hubs at smaller Saudi regional locations, feeding passengers into larger airports. Currently, the airline's Saudi route map has only Jeddah as a major destination, but features eight regional airports – Abha, Al Jawf, Gassim, Gizan, Hail, Tabuk, Taif and Yanbu – and Lamoum plans to increase this number. It will employ a full-service approach, rather than a low-cost one.

For Saudi travellers, the next couple of years offer a plethora of choices.



HOTS UP IN SAUDI

September 1 has been set as the date for Dammam-based SaudiGulf Airlines to launch commercial services.

On June 22, the airline cleared the final regulatory hurdle required before services can start when Saudi Arabia's transport minister, Sulaiman Bin Abdulla Al Hamdan, who is also chairman of the country's aviation regulator, the General Authority for Civil Aviation (GACA), handed over an air operator's certificate (AOC) to SaudiGulf's chairman, Tariq bin Abdulhadi Al Qahtani.

The period until September 1 will be taken up by SaudiGulf finishing the necessary number of test flight hours and other GACA requirements.

SaudiGulf is one of two new carriers that have been preparing to launch services in Saudi Arabia under the country's stated intention to liberalise its domestic aviation scene. At the moment, this is dominated by flag-carrier Saudia, which holds some 90% of the market, with Flynas making up the remainder.

SaudiGulf believes that the growth of the nation's existing carriers has not kept pace with demand in the international and domestic Saudi Arabian air traffic market and that domestic destinations are underserved.

A longstanding problem for companies trying to make a profit in the domestic Saudi market has been the existence of government-imposed fare caps. However, these are gradually being loosened: airlines are now allowed to raise their ticket prices within 10 days of a flight's departure or when load factors for a forthcoming flight rise above the 70-80% mark.

Gaining an AOC has been a lengthy process, with both SaudiGulf and the second planned new market entrant, Qatar Airways offshoot Al Maha Airways, having applied for the necessary approvals more than 18 months ago.

The June 10 GACA statement announcing

LAUNCH DATE BOOKED FOR SAUDIGULF

It has been a long road, but SaudiGulf Airlines is finally about to take to the air, increasing competition in the kingdom's domestic air marketplace. Alan Dron reports.

SaudiGulf's service entry made no mention of progress with Al Maha's application.

SaudiGulf will initially use four Airbus A320neos for its services, which will connect Dammam to Jeddah and Riyadh with up to four flights daily. In October, the airline plans to start flying on the heavily-used trunk route between Riyadh and Jeddah up to seven times daily. Its first international destination, Dubai, is due to follow by the end of the year.

The airline intends to gradually expand its radius of operations, from the Gulf to Middle East services, then to European destinations said Shehab Saeed, director marketing, product & loyalty.

Long-haul services in conjunction with a partner airline have been mooted, but this remains an aspiration for the future.

SaudiGulf aims to win customers from Saudia by a combination of upmarket facilities on board the new aircraft and high levels of service, said Saeed.

The A320s will have a two-class configuration, with business class having a 45-inch seat pitch and economy, 31 inches.

On-board facilities will include leather seating, Wi-Fi connectivity, espresso and cappuccino machines and a state-of-the-art in-flight entertainment system featuring Arabic and Hollywood films.

On the ground, it will offer an airport concierge service, chauffeur service and a mobile app for smartphones allowing online reservations.

The A320s will be followed by the first of 16 Bombardier CS300s, with six of the Canadian aircraft being added to the inventory from the second quarter of 2017 and a further six in 2018. SaudiGulf says that it will have a 26-strong fleet "within the next three years". That figure indicates that SaudiGulf will be firming at least some of its 10 options for the CS300.

When ordered at the 2014 Bahrain Air Show, Bombardier said that SaudiGulf had ordered 'every extra in the book' when outfitting its aircraft.

This upmarket approach contrasts with the current trend in the region towards low-cost carriers (LCCs); Saudia earlier this year announced plans to launch its own low-cost brand, Flyadeal, in mid-2017. It is thought that the new LCC will operate A320neos ordered at last year's Paris Air Show, as well as high-density Airbus A330-300 Regionals, for which Saudia is the launch customer.



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MORE TO BELIEVE IN

Meridiana still makes use of elderly McDonnell Douglas MD-82s.



Sardinia airline comes with a catch

Qatar Airways is seeking to link up with a struggling Italian carrier that has lost money for the past eight years. Alan Dron looks at the reasons why.

Eyebrows were raised last February when Qatar Airways signed a memorandum of understanding (MoU) with Meridiana of Italy to take up to 49% of the Italian carrier's shares.

That offer was firmed up as the Farnborough Airshow was winding down in mid-July when the Gulf carrier announced a 'contribution and shareholders agreement' with Meridiana's parent company, Alisarda, with final closure scheduled for early October. (Certain, unspecified, conditions have still to be met by the Italian company.)

At first sight, Meridiana, a scheduled carrier with a network of services in Italy and Europe, is not an obviously attractive partner.

The Gulf carrier's CEO, Akbar Al Baker, has repeatedly said over the years that he has no wish to become involved with any airline that would require a lot of money or management time to turn around. And Meridiana would.

Based on the island of Sardinia (see box), it has not been profitable since 2008.

It is virtually unknown outside Italy and is under siege by competitors – notably low-cost carriers – that have gradually nibbled away at its niche areas of operation, such as services to and from Sardinia.

It has other problems: Due to the peculiarities of Italy's labour laws, Meridiana has been grossly over-staffed. One such law allowed cabin crew that had worked for the airline on a part-time basis – Meridiana's business is heavily seasonal due to the busy summer holiday period – to insist legally on becoming permanent staff members. Its

workforce in February was 1600; Qatar Airways insisted that it trimmed that figure before it would firm up its MoU.

In addition, mergers with long-haul charter operators Eurofly and Air Italy in 2010 and 2011 respectively have left it with a heterogeneous fleet of around 20 aircraft, including elderly McDonnell Douglas MD-82s, various

marks of Boeing 737 and Boeing 767-300ERs. This mixed fleet gives it a high cost base.

Renewing that fleet would be one area in which a deal with Qatar Airways could help: Asked by journalists at the IATA annual meeting in Dublin in June about progress with the Meridiana deal, Al Baker replied: "You don't expect me to be a substantial shareholder and to fly with 35-year-old MD80s.

"Qatar Airways' oldest aircraft is 10 years old. Several Airbus A330s and Airbus A320s can be transferred to Meridiana as Qatar gets more aircraft."

Al Baker added that he wanted to grow Meridiana as an independent airline, which would retain its brand. He noted that Qatar Airways operates almost 70 weekly frequencies from Doha to Italy; a link-up with Meridiana offers the opportunity to feed passengers into its domestic and international network.

European destinations

Qatar Airways apparently sees Meridiana as a means of gaining more access to the significant Italian market, and to European destinations beyond. It seemingly believes that Meridiana can help funnel passengers into its own network, much as Alitalia does with Etihad.

Following February's initial agreement, negotiations between Meridiana and its unions over redundancies dragged on through the spring. In late June, the unions' continued refusal to accept the necessary job losses led to Qatar Airways walking away from the deal. It was cajoled back by Italy's transport minister Graziano Delrio, who had been active in the negotiations.

A few days later, the unions agreed to 396 redundancies (325 of them cabin crew); 250 other staff had already taken voluntary severance.

Apparently that was sufficient for Qatar to sign the agreement in mid-July. By the time this appears, Meridiana may be taking the first steps to a profitable future.

DECADES OF HISTORY

Sardinia-based Meridiana was set up in 1963 by the Aga Khan, leader of the world's Ismailia Moslem community, as a means of encouraging tourism to the Mediterranean island. In those days it was a relatively poor, undeveloped region of Italy.

Initially known as Alisarda, it changed name to Meridiana in 1991 and gradually became a significant player in Italy. It specialises in flights between Italian mainland airports and the islands of Sardinia and Sicily and to holiday destinations in the Mediterranean and further afield. It carries around 3 million passengers annually.

While everyone expected that the lifting of nuclear sanctions against Iran would unleash a flurry of deal-making, the scale of the ambitions laid out by flag-carrier Iran Air in January took many observers by surprise.

Within a fortnight of the implementation of the joint comprehensive plan of action (JCPOA) – an international agreement that lifts sweeping embargoes against the country – Transport Minister Abbas Akhoundi had announced a heads-of-agreement between Iran Air and Airbus for 118 aircraft. A parallel deal with ATR covered up to 40 turboprops for the flag-carrier.

In June, yet another memorandum to buy 80 aircraft from Boeing brought Iran Air's provisional order book to a jaw-dropping 238 planes – nearly 10 times the number it deploys today.

Chairman and chief executive, Farhad Parvaresh, is keen to put the spending spree in context, noting that the entire country has been blocked from purchasing aircraft for several decades. He estimates that Iran needs to acquire 350-400 aircraft in the coming years – at least half of them replacement units for its ageing fleet – and says Iran Air is “thinking long-term” about market share. The headline figures for its orders also include non-firm options.

Bold new path

Even so, with officials talking up Tehran's prospects as an intercontinental mega-hub, the government is plotting a bold new path for the flag-carrier. Repatriating traffic from Dubai, Abu Dhabi and Doha has suddenly become a strategic necessity.

“Just imagine how many passengers we can have on direct flights if we take this opportunity,” Parvaresh said during an interview at the International Air Transport Association (IATA) annual meeting.

“I came to Tehran with one of these regional airlines three weeks ago. The pilot said to the passengers, ‘Ladies and gentlemen, we have to wait for 30 minutes because we have 38 passengers on another flight from Los Angeles who want to take this flight to Tehran’ ... I thought to myself, ‘Just that one aircraft has 38 passengers going to Tehran!’ There are many daily flights by these airlines to Tehran. They're taking passengers who can't be carried by Iranian airlines.

“We can have a big share of this market if we have the right equipment. I'm sure that people would rather take a direct flight to Tehran.”

Having transported fewer than four million passengers last year – compared with 52 million at Emirates – Iran Air has a long way to go before it approaches the scale of the Gulf super-connectors. But a roadmap is slowly taking shape, with management first “stretching” frequencies to existing points, then resurrecting services lost during sanctions, and finally moving into new markets.

The initial focus will be on Europe. Iran Air currently serves 14 destinations on the continent, versus five in the Middle East and five in Asia.

Iran Air chairman Farhad Parvaresh sheds light on the flag-carrier's historic agreements with Airbus and Boeing. **Martin Rivers reports.**

SPREE SPIRIT

Lifting frequencies to the all-important hubs of London, Frankfurt and Paris is an urgent priority.

“British Airways is planning to come to Tehran with six flights per week. We are flying just three or four times to London,” Parvaresh noted, referring to the UK flag-carrier's upcoming winter schedule. “We have the right to fly daily to London in the bilateral agreement – why not take advantage of this?”

Re-launching routes that were forced to close under the weight of sanctions will be the next step. The past five years have seen Iran Air suspend flights to Seoul, Tokyo, Bangkok, Geneva and Copenhagen. “We had to stop because we didn't have the right type of equipment,” Parvaresh said of the Asian pull-out, which has left the flag-carrier with just two points in the Far East: Beijing and Kuala Lumpur.

Iran Air's historic route from Tehran to New York is another oft-cited casualty of the political climate. President Hassan Rouhani has repeatedly affirmed his desire to restore the US link, citing the needs of the two million ethnic Persians who live in America.

Route launch

Despite echoing those sentiments, however, Parvaresh downplayed expectations of an imminent route launch. “I don't think this will happen soon,” he said reluctantly. “We need time.”

As well as capturing point-to-point demand, officials want to take a slice of their Gulf neighbours' sixth-freedom traffic. Tehran's Imam Khomeini International Airport (IKA) – opened in 2004 but designed in the 1970s – was always conceived as a bridging point between east and west. The capital offers shorter flying times from Europe to southeast Asia, but its appeal as a transfer hub waned as Iran became side-lined by the international community.

That long-forgotten strategy is now back on the agenda, as evidenced by the inclusion of Airbus A380s and Boeing 747-8s in the post-JCPOA

deals. Those jumbo-sized models are typically only deployed by the very largest network carriers.

Parvaresh said the government was eager to lift capabilities as quickly as possible. Talks are under way with Aéroports de Paris about expanding IKA's annual capacity from 6.5 million to 15 million by 2018. “If that happens, we can use Tehran as a hub for passengers and cargo between Europe and the Far East,” he affirmed.

At the same time, however, officials are being pragmatic about the scale of the commitments tentatively given to Airbus and Boeing. Neither agreement has been set in stone.

“We don't have enough infrastructure for the A380s yet,” Parvaresh admitted, emphasising the need to modernise IKA's terminal buildings, jetways and transit facilities. Despite provisionally agreeing to take the first A380 in 2021, Iran Air will not make a final decision about the type until 2018. “We will let Airbus know later on when we are ready for that aircraft,” he said. “We have the possibility to change it to other [models].”

The Airbus deal also faces other, more fundamental hurdles.

Several financial institutions have had their fingers burned in the past when dealing with Iranian entities which they considered innocuous, but which the US Treasury judged to have illicit ties. Despite lifting nuclear sanctions against Iran, Washington still prohibits transactions with individuals and companies suspected of terrorist associations. The perceived threat of enforcement action – though misplaced for Iran Air specifically – has had a chilling effect on European banks.

Uncertainty about legal protections for repossessed aircraft, as well as the upcoming US presidential election, has further jangled nerves. Nonetheless, Parvaresh remains upbeat.

“I'm very optimistic and positive about the banking issues,” he said, pointing to expressions of interest from several European and Chinese financial institutions. “Of course, it's not easy –



“Just imagine how many passengers we can have on direct flights if we take this opportunity.”

FARHAD PARVARESH

“If the licence is granted for Airbus to deal with Iran Air, then everything related to this deal should be licenced as well,” Parvareh argued. “If every company which is dealing with us needs to go to OFAC again, that is nonsense. They will be very busy and it will be very complicated.”

All being well, Iran Air aims to receive five new Airbus jets this year, followed by about 14 per year until 2024. Its provisional agreement covers 45 A320-family aircraft, 45 A330s, 16 A350-1000s and 12 A380s.

In America, the historic memorandum with Boeing faces hurdles of a different nature. Lawmakers on both sides of the aisle have lobbied against the deal, accusing the manufacturer of endangering national security by – in the words of Republican congressman Peter Roskam – trying to “weaponise the Islamic Republic”.

Sanctions-relief

Boeing has reacted scathingly to the criticism, insisting that sanctions-relief under the JCPOA is actually helping to defuse a geopolitical crisis.

The US memorandum covers 46 737s, 30 777s and four 748-8s, with deliveries expected to run from 2017 to 2025.

Boeing has also agreed to facilitate the leasing of 29 737s, enabling Iran Air to begin re-fleeting as soon as possible. Efforts to find a bridging solution with Airbus “didn’t work out”, Parvareh said, though independent talks with lessors continue. He estimates that two to four used Airbus jets – mostly wide-bodies – could be leased this year.

With the European Union lifting most restrictions against Iran Air in June, the floodgates to a new era of growth have already opened. Time, effort and politics will determine its success.

still some people are hesitating – but Iran’s central bank and some banks from other countries are working on this issue.”

The flag-carrier is holding out for “one or two financiers” to fund the “whole [Airbus] package,” rather than signing deals for a handful of aircraft at a time. Operating leases are the only structures being considered.

Once funding is in place, the speed of

deliveries will depend on the willingness of the US Treasury – acting through the Office of Foreign Assets Control (OFAC) – to issue the relevant export licences. This could be another stumbling block, as it is unclear whether third-parties involved in the deals – engine manufacturers, insurers, spare-parts suppliers and so on – will need to secure their own independent authorisations.

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Commercial Aviation

*Nile Air chief executive Ahmed Aly talks to **Martin Rivers** about another year of impressive growth for the Egyptian carrier.*

Aly keeps Nile on its natural course...

Egypt's Nile Air is shrugging off difficulties in its home market and pressing on with a rapid expansion programme that has already seen its fleet triple in size over the past two years.

The privately-owned carrier has added five international destinations from its Cairo base so far in 2016: Istanbul Sabiha Gokcen in Turkey, Al Ain in the United Arab Emirates (UAE), Basra in Iraq, and Jizan and Abha in Saudi Arabia.

It has also entered the domestic Egyptian market by launching flights from Cairo to Hurghada and Sharm-el Sheikh, as well as connecting the latter resort with Riyadh and Tabuk in Saudi Arabia. Together with frequency hikes across the existing network, the airline's capacity is up by 72% over the past six months alone.

"Our plan is stable year-on-year growth," chief executive Ahmed Aly said.

"We see that the Egyptian market requires more capacity. We've seen significant demand growth in certain regions – the Middle East and Africa in particular – while the European market has remained fairly stable. It's not as strong as the Middle East region, but we are positive about seeing a pickup from 2017."

Nile Air's decision to launch services to Sharm el-Sheikh is particularly striking given the Red Sea resort's tainted reputation following the bombing of Metrojet Flight 9268 by Daesh last October.

The Russian charter flight was destroyed shortly after take-off from Sharm el-Sheikh in the worst aviation-related terror attack since 9/11, casting a cloud over Egyptian airport security and prompting an immediate exodus of European holidaymakers.

"The Red Sea resorts, irrespective of the soft demand of the last few months, are still strategically important markets," Aly stressed.

"Historically, the majority of tourism to Egypt has been to the Red Sea resorts – the likes of

Continued
on Page 28




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Sharm el-Sheikh, Hurghada, Dahab, Marsa Alam – and we certainly see that the demand is still there. The Egyptian market is a very resilient one. We believe that, once the restrictions from various European countries are removed, the rebound will be very strong and quick. And we expect that to happen by the end of this year.”

Russia closed all air corridors to Egypt in the aftermath of Flight 9268, but now says that measures taken by the security services may justify a resumption of flights this year. Germany lifted its own ban on Sharm el-Sheikh flights in May, albeit while retaining a host of related travel advisories. The UK still advises against “all but essential travel by air to or from Sharm el-Sheikh”.

While Egypt’s tourism sector is reeling from the European pull-out – nationwide visitor numbers fell by 51.7% year-on-year in May – Aly sees ample opportunities to develop new inbound markets for the Red Sea resorts.



Nile Air: reaching critical mass with A320s.

“The underlying foundations of these markets are strong,” he reiterated. “We’ll be looking at attracting the local [Egyptian] market, and international tourism from the Gulf ... and expatriates.”

Cairo provides a further bulwark against the tourism downturn, with overall seating capacity to and from Egypt’s capital remaining largely unchanged over the past 12 months. Its resilience is partly down to the high proportion of business travellers that pass through the airport, while traffic is also propped up by Visiting Friends and Relatives (VFR) and outbound religious travel.

“It’s about targeting the right segments – not being dependent on one particular traffic type or one particular destination,” Aly said.

“In Saudi Arabia, we’ve got the religious Hajj and Umrah traffic; we’ve got the VFR traffic, in terms of the large Egyptian community living

out there; we’ve got the strong inbound tourism from the Gulf region; we’ve got the corporate agreements with the oil companies and with universities in Saudi Arabia and Egypt; and we’ve also got the government traffic.”

The airline’s international network focuses heavily on Saudi Arabia, with 14 routes currently operated to ten points in the kingdom: Abha, Jeddah, Jizan, Al Jawf, Hofuf, Gassim, Riyadh, Tabuk, Ta’if and Yanbu. Outbound services depart from Cairo, Alexandria and Sharm el-Sheikh.

Although bilateral restrictions have clipped its wings at times – Riyadh is only connected with Sharm el-Sheikh, for example – Nile Air has proven adept at catalysing growth in secondary and tertiary markets.

Aly cited two examples: Gassim, about 400km north of Riyadh; and Yanbu, about 200km west of Medina. “We initially launched [these destinations] as three-per-week services. Today

they’re operated as triple daily,” he beamed.

“Yanbu and Gassim have actually become markets in their own rights. They’re not reliant on ... Riyadh or Medina. They are actually strong population and business centres in their own right.”

The remainder of Nile Air’s overseas network comprises Baghdad and Basra in Iraq; Al Ain in the UAE emirate of Abu Dhabi; Istanbul in Turkey; Port Sudan in Sudan; and Kuwait.

Some of the more niche services that lack direct competition have taken time to mature. Cairo-Port Sudan, launched in June 2015, is one route still in the development stage. Its load factors were initially disappointing, but have since crept above 70% thanks to a succession of interline agreements with European operators.

Another route launched last summer, Cairo-

Baghdad, has gone from strength to strength – in part due to a tightening of Turkish visa restrictions that is pushing Iraqi holidaymakers to Egypt. With inbound tourism now dominating the twice weekly connection, Nile Air has begun deploying its larger 204-seat Airbus A321 to the Iraqi capital.

That stretched unit is also being used for flights from Cairo to Jeddah, Kuwait and “anywhere we’ve got significant spill with the A320s”.

“Our A321 is configured with 25% more seats than our current A320s, with a cost that isn’t too significant an increase,” Aly noted. “It’s a great aircraft that gives us a competitive advantage on high-demand trunk routes.”

The airline’s fleet – currently five A320s and one A321 – should grow to ten aircraft over the next two years. Airbus is due to deliver a pair of ordered A321s in 2018, by which time Aly “conservatively” expects to have leased two additional A320-family units. A planned flotation in mid-2017 will help fund the expansion, with listings on both the Cairo and London markets being targeted.

The smallest members of the A320 family – the A318 and A319 – are not considered suitable for Nile Air’s expanding operation. But still-smaller regional aircraft may have a role to play in its long-term future.

Critical mass

“As we reach critical mass on the A320s we could start to explore different options,” Aly affirmed. “There are unique opportunities with regional aircraft, be it jets or turboprops. If you look at Sudan, Saudi Arabia, Jordan, there are plenty of tertiary airports which may not sustain a larger-capacity aircraft, but could potentially work with a smaller capacity aircraft between 50-90 seats.

“However, we are wary of adding too much complexity from a financial, technical, operational perspective at this stage.”

Preferring, for now, to scale up the Airbus fleet, Nile Air is casting its gaze far and wide for mid-size route opportunities. Studies are under way for destinations in “Europe, North Africa, East Africa and the Middle East,” Aly affirmed.

While branching out to Europe would pose challenges in the current climate, Nile Air is determined to serve the mainland “in the foreseeable future”. This could include either primary markets like London and Paris or lesser-known cities that lack existing connections with Egypt.

“How fast we expand is very much dependent on changes in the market and market growth,” Aly said, acknowledging continued uncertainty in Egypt.

“We’re not an airline who’s going to put pre-determined figures to our expansion. But we’ve got a very clear strategic plan covering the next five to ten years; a very clear commercial focus on how we expand. And we’ll take it as comes.”

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A DIFFERENT SCALE ALTOGETHER.

Though its economy is tiny compared to the Gulf's developed city-states, Kish Island has bold plans to become a regional hub for tourism and business. Martin Rivers assesses the prospects for local operator Kish Air.

KISH'S MR NICHE GUY

Kish Island – pronounced 'quiche' – has been a focal point for Iranian aviation since the 1970s, when Mohammad Reza Pahlavi, the last Shah of Iran, transformed the desolate Gulf island into a luxury casino and vacation resort.

Its small airport was specifically designed to handle the supersonic Concorde, which whisked foreign dignitaries in from Paris under a wet-lease agreement with Iran Air.

Much like the flag-carrier's own order for Concorde, however, the debauchery came to an end with the 1979 Islamic Revolution that deposed the Shah and introduced more conservative values across the country. Kish now adheres to the same religious codes that govern the rest of Iran – alcohol is forbidden; hijabs are mandatory for females.

The island forged a new path in the 1980s by becoming one of Iran's free-trade zones. Governing body, the Kish Free Zone Organisation (KFZO), now woos overseas investors with the promise of visa-free travel, 15-year tax exemptions and no restrictions on foreign ownership.

Its overarching plan is to transform Kish into "the next Dubai" – an oasis for business and high-end tourism in the Persian Gulf.

Yet, sanctions have long scuppered that vision. Despite steady investment in shopping centres, luxury hotels and even a dolphinarium, Kish remains a predominantly domestic resort served only by Iranian and Iraqi airlines. Persians account for nearly 90% of the 1.5 million people who visit the island each year. Among foreigners, the largest contingent is migrant workers from the United Arab Emirates, who come solely to renew their visas.

According to Saeed Kalhori, deputy-managing director of KFZO-owned Kish Air, the lifting of nuclear-related sanctions gives the island the best opportunity yet to make good on its long-standing aspirations.

"I remember when Concorde was landing here. Kish is a free-zone area and from the very beginning it has been a focal point for the tourists," he said. "So we know it could be a very good transportation hub for cargo and for the passengers – and there is no need for a visa when coming here.



Anybody can come very easily. They are all welcome."

Kish Air operates a dual-hub strategy from both Kish International Airport and Tehran's Mehrabad International Airport. Its network primarily focuses on domestic links from the capital, but also includes scheduled and charter flights to Turkey, Iraq, Azerbaijan, Armenia, Oman and the UAE.

Geographical advantage

As well as tapping into Kish Island's potential as a tourism destination, Kalhori is mindful of the Gulf's geographical advantage for connecting traffic. "Iran is in the middle [of the world], so we have lots of capability to go to the north to Commonwealth of Independent States (CIS) countries; to the south to all the Arabic places; and also to Europe or Asia," he said, using language reminiscent of the sixth-freedom Gulf carriers.

"Iran is just in the middle. We have possibilities in all four directions."

Casting his eye over markets within narrow-body range, Kalhori named Vienna to the west, Delhi to the east, and Moscow to the north as the boundaries for route development. A mixture of both scheduled and charter flights will be pursued.

Kish Air's expansion programme formally kicked into gear in March – just weeks after the lifting of nuclear-related sanctions – when the airline wet-leased two Airbus A320s from Jordan Aviation.

The aircraft joined a pre-existing fleet of seven McDonnell Douglas MD-80s and three Fokker

100s. They will be followed or replaced later this summer by two A321s. With near-term plans for six to eight additional narrow-bodies, the fleet could number 20 by the end of the decade.

"We have lots of offers from different companies," Kalhori noted, voicing a preference for second-hand units during the initial growth phase. "For the price of one brand new aircraft, we can buy maybe three or four [older] aircraft."

Asked whether the deliveries could allow Kish Air to retire some of its pre-existing aircraft – the MDs and Fokkers are all between 21 and 29 years old – he said adding capacity was the main priority in the short-term. Keeping the vintage planes in service will also give his pilots and engineers breathing space while they re-train for the latest generation of aircraft.

"We have to give ourselves a little time to be settled down," he stressed. "It's better to do it step-by-step."

Interestingly, although Airbus has secured a head start in post-sanctions Iran, Kish Air does not rule out transitioning to a Boeing fleet when it eventually acquires new-build aircraft.

Kalhori held informal talks with the US manufacturer at last year's Dubai Airshow, and he considers either the 737-800 or 737-900 to be viable long-term replacements for the A321. "Whatever is available; we want to expand the airline as soon as possible, so who is coming first is the one who gets the door open," he said. "Airbus has been here in Iran for the last 35, 40 years.



“Iran is in the middle of the world, so we have lots of capability to go to the north to Commonwealth of Independent States (CIS) countries; to the south to all the Arabic places; and also to Europe or Asia...”

SAEED KALHORI

phase] we will go for wide-body, long-range aircraft. If we go with Airbus for the narrow-body aircraft, then certainly it will be Airbus family for the wide-body. And the same [principle applies] for Boeing.”

As recently as December, media reports suggested that Kish Air was preparing to place an order for 10-15 Tupolev Tu-204s. Russian-built aircraft were easier to source and maintain during sanctions, but a spate of high-profile accidents tainted their image and prompted Iran’s Civil Aviation Organisation to impose a blanket ban in 2011.

Despite previously operating Tu-154s, Kalhori was adamant that Kish Air would not be acquiring Tupolevs.

With so much optimism about Iran’s post-sanctions prospects, it is important not to forget the uphill struggle that awaits its long-handicapped airlines.

Heavy exposure

Kish Air’s heavy exposure to the island after which it takes its name is particularly sobering.

Though officials speak confidently about a doubling of visitor numbers within three years – 2.7 million passengers passed through the airport in 2015 – delivering that goal will be no mean feat. Even if the airport’s new terminal is completed on time, the ever-present threat of snap-back sanctions could deter some foreign businesses and hoteliers from setting up shop. Iran’s national ban on alcohol may also be a dampener for foreign tourists.

Nonetheless, President Hassan Rouhani’s visit to Kish in March, underscores how the government now sees the island as a test case for the country’s economic renewal and global reintegration.

With Ayatollah Khamenei, Iran’s supreme leader, voicing support for a “resistance economy” that empowers domestic industries, the stars seem perfectly aligned for a new era of growth in the Shah’s former playground. As a subsidiary of KFZO, Kish Air is in pole position to facilitate and benefit from the developmental renaissance.

Boeing is just starting to look [at Iranian deals], so they have to do a lot [to catch up].”

Should one of the manufacturers secure a direct purchase, the spoils may even include wide-body commitments. Kish Air expects to order long-haul aircraft in about three years, Kalhori confirmed, and a mixed fleet is not in the plan.

“One type of aircraft is to the benefit of the airline,” the deputy chief said, pointing to synergies for engineering, maintenance and training.

“By the end of the third year [of the initial growth



Meraj targets growth despite sanctions

Even with sanctions hanging over its head, Meraj Airlines is among the Iranian carriers plotting ambitious growth during the next five years.

Martin Rivers
reports.

The lifting of nuclear-related sanctions against Iran may be a watershed moment for the country's civil aviation sector, but not all domestic operators are seeing immediate benefits.

Meraj Airlines, along with Mahan Air and Caspian Airlines, continues to be shackled by terrorism-related sanctions – a handicap that stems from its alleged support for Iranian military activity in Syria.

The company was founded in 2010 and partly functions as a scheduled passenger airline, deploying three Airbus A320s and two A300-600s from Tehran, Mashhad and Kish.

But it also operates VIP flights on behalf of the Iranian Government with a mixed fleet of A320-family jets, A340s, Boeing 737-200s, 707-300s and Falcon 50s. It is this facilitating role for the government that has aroused the concern of the US Treasury, which accuses Meraj of ferrying “illicit cargo, including weapons” to the Syrian regime.

Resting on their laurels

While that designation stops the airline from dealing with western suppliers, management have no intention of resting on their laurels amid a wider opening up of the sector.

Iraj Ronaghi, commercial vice-president, said that Meraj is in the market for up to 21 aircraft over the next five years – evenly split between wide-bodies, A320s and regional aircraft – with a view to adding 1,000 seats per year.

The regional aircraft will be deployed at two new bases primarily catering for tourism traffic.

“We want to establish two new hubs in north-west and south-east Iran to specialise in 45-minute flights covering major cities and neighbouring countries,” Ronaghi said. The northern hub will offer connectivity with Turkey, the Caucasus and Iraq, while the southern hub will cater for markets in the United Arab Emirates, Oman and “some Persian Gulf islands”.

Meraj currently operates scheduled flights to about 10 domestic points plus four international cities: Istanbul in Turkey, Najaf in Iraq, Kuwait City, and Varna in Bulgaria (seasonal).

Growth of the long-haul fleet will also facilitate a push into Asia, including a long-awaited service to Kuala Lumpur in Malaysia.

Notwithstanding his ambitious plans, Ronaghi admitted that sanctions against the company are limiting its procurement options. French-Italian manufacturer ATR went out of its way to deny speculation about an order from Meraj in February, stressing its compliance with US laws and regulations.

“We have to do it like we did in the past,” the commercial chief shrugged, when asked how the airline can bypass obstacles to re-fleeting. Decades of sanctions have made Iranian carriers experts at procuring aircraft on the black market.

Domestic rivals

Although relying on brokers could place Meraj at a disadvantage to its domestic rivals, Ronaghi is not overly concerned about losing market share.

He stressed that national plans to acquire 500 aircraft represent a long-term vision that will take upwards of a decade to fulfil.

“I think [the target] is quite big. It depends on the size and the programme of introduction,” the commercial chief explained.

“How can a company which owns maybe 50 aircraft all of a sudden operate 500 aircraft? That's impossible. The best thing to do is to have a programme of replacement and gradually add to the fleet. And I'm sure our authorities will do that.”

Yet, even as he voiced doubts about the timeline for renewal, Ronaghi described 500 aircraft as “not a very high goal” for the national fleet.

He pointed to a raft of advantages that make Tehran more attractive than other hubs in the region, including its geographical location, temperate climate, highly skilled workforce and comparatively low labour costs.

“In other Persian Gulf countries, you can see that most of the pilots and engineers are expatriates, so they are receiving high salaries,” he noted. “Here we have locals, so there will be big savings.”

“When Iranian airlines were formed they were number one in the region. I'm sure that in a short period this will be restored.”



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Qeshm Air chief executive, Mahmoud Shekarabi, talks to Martin Rivers about his efforts to promote charter tourism to the Gulf island – until recently home to a UNESCO World Heritage Site.

ISLAND THAT WANTS TO BE MAINSTREAM

Qeshm Island, like its smaller but better-known neighbour Kish Island, doesn't feature in the travel bucket-lists of many international tourists.

Of the 397,000 people who flew to the island in the Strait of Hormuz last year, three quarters were Iranian nationals.

Qeshm's Dayrestan Airport ranks as only the 13th largest gateway in Iran by aircraft movements, despite being the main entry point for one of the country's much-touted free-trade zones. No foreign carriers fly there on a regular basis.

"Our customers are Iranian tourists mostly," confirmed Mahmoud Shekarabi, chief executive of Qeshm Air, the airline that provides two-thirds of seating capacity at the island. "Due to the sanctions, there were some problems for businessmen to fly here [in the past]."

"But I believe there's going to be changes. Before, there was tourism and just maybe some students. Now it's going to be businessmen, students, tourists, families."

Seasonal charter services

Qeshm Air currently operates to 19 domestic and 14 international destinations, including three points in Turkey and seasonal charter services to southern and eastern Europe. Its only long-haul destination is the Thai capital, Bangkok.

The airline has 15 operational aircraft: two Airbus A320s, three A300-600s, three BAe RJ100s, one RJ85 and four Fokker 100s. Another eight aircraft are held in storage, including four Fokker 50s that are in the process of being sold.

Only "two or three" of the carrier's active aircraft are based in Qeshm, with the majority put to work plying domestic routes elsewhere in the Islamic Republic.



Asked about opportunities for expansion following the lifting of Iran's nuclear-related sanctions, Shekarabi can hardly contain his excitement.

The chief executive has already pledged to add or expand flights from four domestic points – Isfahan, Gorgan, Tabriz and Kermanshah – as well as bringing Muscat, Oman into the network. The airline's regional Middle Eastern footprint currently only extends to Dubai in the United Arab Emirates and Baghdad and Najaf in Iraq.

But far more ambitious growth lies on the horizon, with management aiming to grow the fleet by more than 50% this year alone.

"We are trying to lease or lease-purchase at least three A320s rapidly, maybe within two or three months," Shekarabi said. "And then after that, by the beginning of May or June, we will go for long-range aircraft like the A330. By the end of the year we are trying to increase our fleet to 20 aircraft."

Second-hand narrow-bodies between six and eight years of age will be targeted, he added, with long-term leases running for about a

decade. The "next phase of the project" will then involve placing direct orders for new-build aircraft.

"We have to see what's going on in the market first, in order [that] we don't put a lot of liability on our company," Shekarabi said of the staggered renewal process.

The pace at which Qeshm Air receives the new Airbus will also determine how quickly its older types are phased out.

"We are trying to get rid of the Fokker 50s [right now] and then the RJs [will be next to go]," the chief executive confirmed. "The Fokker 50s are grounded in order that we may sell them. The RJs may be grounded, but it depends on what kind of aircraft we get after the lifting of sanctions."

If all goes according to plan, foreign charter traffic to Qeshm Island should be a key driver of the expansion programme.

Scheduled operations

Today, most of Qeshm Air's flights are operated on a scheduled basis from Tehran Mehrabad International Airport and Tehran Imam Khomeini International Airport. Iran's capital city accounts for seven times as many seats as Qeshm Island when looking at the airline's existing scheduled operations.

"Only 20-25% of our flights are charter," Shekarabi said, referring to the group bookings favoured by many holidaymakers.

"I am sure this percentage will rise. We don't operate as a tour company – we are a pure airline business – but we will offer [our aircraft] as charter."

In April, the Qeshm Free Trade Zone Organisation (QFTZO) hosted a consortium



“We may aim for business class.”
MAHMOUD SHEKARABI

representing five countries – Russia, France, China, Italy and Germany – that is working to raise the island’s overseas profile. The authorities hope to entice 100,000 foreign visitors a year by promoting its eco-tourism attractions, including its world-class caves, mangrove forests and reef formations.

Restoring UNESCO World Heritage status for the Qeshm Island Global Geopark – a 30,000-hectare site comprising many of the island’s most impressive sights – is one priority. The park was removed from the UN list in 2013 due to alleged mismanagement by the authorities.

Qeshm Air, meanwhile, plans to diversify operations by increasing charter flights for pilgrims in the northern city of Mashhad.

But it is Qeshm Island itself that remains the focal point of Shekarabi’s efforts, with optimism also growing about its corporate prospects after Russia’s Tempbank pledged to open a branch on the island.

Whether tourists or business travellers ultimately drive the growth, Qeshm Air is re-positioning its on-board product to cater for higher-yielding clientele. Retrofitting its Airbuses with premium cabins – absent on all

but one of the existing units, an A300 – will be the first step.

“Most of our aircraft are all-economy, so we may now go for business class,” Shekarabi said, confirming that upgrades are being sought for both A320s plus the two A300s that lack premium seats.

Two-class cabins will also be a staple feature of the airline’s upcoming deliveries.

Asked how Qeshm Air plans to finance its expansion, the airline boss sounded an upbeat note about the willingness of foreign banks to lend assistance – despite uncertainty about Iran’s legal landscape; lingering financial restrictions; and even the risk of snap-back sanctions.

Financial deals

“Nobody around the world buys aircraft with cash. We are the same. So we are looking for the financing [deals],” he said. “We have some financiers internally [in Iran], but we prefer to get it from the outside.”

Initial overtures to foreign banks have already prompted “enthusiastic” responses, he added, while declining to name the institutions or countries involved.

Last year, Turkish media outlets reported that the National Iranian Oil Company, a state-owned body, had seized Qeshm Air from its former owner, Babak Zanjani, after he became embroiled in a corruption scandal. A five-star hotel on the island that was owned by Zanjani was also confiscated, and in March the billionaire was sentenced to death for embezzlement.

“Mr Zanjani was the first owner of the company, but he had some debts with the government, I believe, so they had to take [the airline] over as his debt,” Shekarabi said, without providing further details.

“We don’t have any business with him now. The company has been transferred [back] to the private sector. It is 100% private.”

Following a spate of disputes between Qeshm Air and the national government, and between the QFTZO and global environmental bodies, Shekarabi is working to put the island back on the map for entirely positive reasons.

If he succeeds, Qeshm could yet make an appearance in the travel bucket-lists of foreign tourists eager to discover Persia’s forgotten charms.



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WEST AFRICA EMERGING AS BUSINESS AVIATION MARKET



West Africa, particularly Nigeria, are emerging as business aviation growth markets as the region continues to develop industries based on its natural resources, according to the Middle East's only African-owned aviation company.

Promise Uzoamaka, Chairman of Sharjah-headquartered Amaka, which focuses on sales, acquisitions and business aviation consulting, says he envisions higher demand for private aviation from the region and that his company will soon expand into Africa.

Despite a widespread view in Africa that private jets are “symbols of excess”, Uzoamaka says their vital business role on the continent will spur demand.

“For instance, in the oil and gas industry, flying commercially to the production areas calls for three to four connections over multiple days and costs thousands of dollars,” he says. “For years, energy executives in Africa and the Middle East have saved time and money by sourcing private jets to reach remote areas. Private jets are a necessity in the oil and gas industry’s transportation,” he says.

Uzoamaka says business aviation has to stand ready to seize opportunities emerging through change in the African industry landscape. “At the moment aviation in Africa is going through a transition and development process. There are changes to regulations; airlines are forging relationships with international alliances. Low-cost airlines are testing the waters ... or the sky, to be more specific. I see a lot of potential that will require the business aviation sector to compete with the speed of economic development.”

“Embraer recently released its market outlook for Africa, which forecasts that the region will take delivery of 240 new jets in the 70 to 130-seat segment over the next 20 years. The 70 to 130-seat jet fleet in service is estimated to grow from the current 120 units to 260 by 2034. Africans are turning progressively to air travel. As in Asia, economic expansion, a growing urban middle class, continued market liberalization and regional integration will be the main drivers of air transport demand.”

Uzoamaka nevertheless admits Africa remains a challenging market for a plethora of reasons including lack of investment. “The infrastructure currently in place, in comparison with more established markets certainly requires more investment – to develop facilities such as MRO, training and education. We are also trying to familiarize ourselves with changes to regulations and this is slowing progress down a little at the moment.”

Though Uzoamaka is planning to physically move Amaka into the African market, he says the Nigerian aviation authorities need to act quickly to upgrade standards and boost confidence in the local industry. “The lack of health and safety standards and international aviation standards has led or contributed to avoidable tragedies and this has naturally diminished public confidence. Nigerian aviation authorities must first of all understand and accept the need for health and safety standards. High-quality standards benefit everyone and reduce risk to those providing the service and the users of the service. There is a need for education in this sector. Aircraft and aviation require high-quality standards. Training of personnel and the physically established MROs are imperative for this.”

“In the past there have been a lot of African airlines banned from entering airports outside Africa. I believe that this was due to poor standards and lack of long-term planning – for example, the wrong aircraft for the wrong routes, lack of maintenance and qualified

personnel and lack of essential follow-up that is obligatory in the aviation industry. Aviation demands high regulatory standards of operation and maintenance. I would advise that African airlines form alliances and endeavour to comply with official aviation authority standards.”

Swift and focused action on aviation standards in Africa will, according to the Amaka President, spur huge growth. “If there are effective and expedited decisions made on aviation standards, I believe the aviation industry will grow exponentially. African aviation in ten years’ time will develop a link with the new economies of Latin America and Asia. Cargo flights will increase to the landlocked countries. Increasing integration of the continent means that more people will be flying from one part of Africa to the other on business or leisure.”

And Uzoamaka is bullish about the Middle East’s business aviation sector despite “global economic hurdles, a sizeable grey market and lack of airspace” being “pressing concerns.” The sector, however, he says, needs to step up its human resource recruitment to cope with an anticipated upturn.

“Business aviation in Africa and Middle East is continuing its predicted trend and growing year on year, and the demand for new pilots may soon exceed supply, according to the International Air Transport Association over the next 10 years the aviation industry, both commercial and business, will need 17,000 new pilots per year worldwide.

“Currently global pilot training programs can train only about 15,000 per year, which would leave a shortfall of over 3,000 new pilots annually. I personally think that is a conservative estimate and the actual numbers of new pilots required could be significantly higher. As such, commercial operators are stepping up their recruitment efforts and so should the business aviation sector.”

Amaka has set up its own Foundation which Uzoamaka says will assist students who are pursuing careers in aviation as pilots, mechanics, and aviation administrators who are attending aviation programs worldwide.”

Within the Middle East, Uzoamaka has identified the GCC’s heli-travel sector as having huge potential “particularly for the region’s advancing tourism sector.”

“Though the region has a proliferation of helipads on major buildings, particularly in the five-star hotel and resort segment, helicopter travel is held back by a lack of dedicated infrastructure and operating systems. The sector in the region is still in its infancy yet the whole region needs it.

“The issue needs to be addressed by OEMs with infrastructure and regulatory operations required a combined approach by interior ministries, civil aviation regulators and operators, tourism regulators and planners and hotel owners and operators. For example, Saudi Arabia could particularly benefit from heliports to get people from major airports to other cities quickly and cost-effectively suggesting more infrastructure could be built into VVIP terminals.”

Mohammed Yassin, the chief executive of Daallo Airlines, talks to Martin Rivers about the bombing of Flight 159 in Mogadishu.

Daallo focuses on the lessons of terror attack

Somalia's Daallo Airlines is intensifying security checks and tempering expansion plans as it recovers from a high-profile attack by Al Shabaab, the Al Qaeda-linked terror group.

One of the airline's wet-leased Airbus A321s was struck by an on-board explosion 15 minutes into a flight from Mogadishu to Djibouti on February 2, blowing a hole in the fuselage and sending Abdullahi Borleh, the apparent suicide bomber, plummeting to his death. No-one else was killed.

Mohammed Yassin, the Dubai-based chief executive of Daallo, confirmed that new measures have been introduced to mitigate the risk of further security breaches.

"This has been a wake-up call for us," he said of the bombing, which appears to have involved a device embedded in a laptop. "Everything that we have previously taken for granted – not any more.

"We have to continuously improve the security situation and be proactive about it. We have to consider what could happen, where the threats may come from, how about bombing attempts using liquids, how about electronics? There are a lot of things now that everybody should look into."

Although Al Shabaab has claimed responsibility for the attack, Yassin pointed to "ambiguity" about the "interlinking" between the perpetrators and the wider terror organisation.

"Still there are some doubts," he said, when asked if it was possible that Syria-based Daesh – which has established a local affiliate in Somalia and is actively recruiting fighters from Al Shabaab's ranks – may have been involved.

Yassin reiterated his claim that Borleh was most likely trying to target Turkish Airlines, which cancelled its Mogadishu-Djibouti service on the day of the incident – purportedly due to high winds. Daallo stepped in at the last minute to carry the flag-carrier's stranded customers.

"If this passenger was on Turkish Airlines, he would have done the same [thing]," the airline boss said. "He had a Turkish Airlines boarding pass."

In the aftermath of the attack, Vlatko Vodopivec, the Serbian captain of the stricken A321, complained to the *Associated Press* that security at Mogadishu Airport was "zero".

Yassin rejected those remarks, stressing that "inside involvement" by at least one airport employee had allowed the bomber to bypass otherwise stringent security checks at the Somali gateway. "Somebody who was working at the airport was involved, and that's what made it possible," he insisted.

"Mogadishu Airport is a militarised airport, a highly



"We have to continuously improve the security situation and be proactive about it."

MOHAMMED YASSIN

fortified airport, so it's not easy for somebody from outside to do such an action."

In spite of their differing viewpoints, Yassin called Vodopivec a "hero" and said that Daallo "will try to keep him with us in the future".

"That captain and his crew did a fantastic job; he can be compared to the captain who landed the aircraft on the Hudson River," Yassin said, referring to Chesley Sullenberger, the US Airways pilot who saved 155 lives by crash-landing an A320 in the New York river in 2009.

Hermes Airlines, the Greek charter carrier that operated the bombed A321, has now suspended its wet-lease contract with Daallo.

In its place, another Greek wet-lease operator, Olympus Airways, is providing two AerCap-owned A321s – one to Daallo and one to its local equity partner, Jubba Airways.

The fleets of both Somali carriers are currently in flux, with Daallo temporarily wet-leasing an A320 from Aerovista, and Jubba in the process of withdrawing several Boeing 737 Classics.

Once the fleet changes have been finalised, Daallo will deploy one A321 and one BAe 146, while Jubba will deploy one A321, one A320 and one Fokker 50. The

latter unit will eventually be replaced by a pair of ATR 72-500s, though Yassin said efforts to acquire the turboprops have taken longer than expected.

New routes to Addis Ababa and Entebbe are also still being pursued, albeit with security concerns slowing down the approval process.

Separately, Daallo and Jubba remain committed to regional consolidation under the umbrella of the Africa Aero Alliance. The holding company, announced last year, is exploring partnership opportunities in Kenya, Rwanda, Uganda and Djibouti.

Before recruiting new members, though, Yassin wants to fully consummate the bipartite merger and "harmonise" the alliance's strategic vision.

"When you are fighting with someone for so long, your paradigm and mental set-up is that you like [it] that way, you like to fight," he admitted. "Telling the person that you have to disarm and we are friends, that takes time.

"I think by March next year the two companies will be fully merged and our vision of growing will start in a more speedy way."

TOTAL DOMINANCE



BENCHMARKING EXCELLENCE

- **Effective:** being the most powerful and reliable swing role fighter
- **Proven:** in global operations with highest operational statistics
- **Trusted:** to deliver performance, political and industrial partnership



Effective Proven Trusted



A Saudi Hawk trainer in action.



Triple boost to Saudi pilot supply chain

With deliveries of all three new trainer types ordered after a major revamp of its flying training system now under way, the Royal Saudi Air Force is entering a new era in which its student pilots will experience an advanced, all-digital cockpit environment before reaching the frontline.

Jon Lake reports.

Having ordered at least an initial batch of 72 Eurofighter Typhoons, as well as 84 Boeing F-15SA Advanced Eagles, and with plans to upgrade 70 more existing F-15S Eagles to the same standard, the Royal Saudi Air Force (RSAF) decided that it should also upgrade its pilot training fleet.

In May 2012, Saudi Arabia signed a £1.9bn (\$3bn) deal with BAE Systems covering the supply of primary/elementary, basic and advanced training aircraft and related support services and training devices under the Saudi British defence cooperation programme (SBDCP).

For BAE Systems, the most important element of the deal was a contract for 22 Hawk Mk 165 Advanced Jet Trainers, which were to be similar in configuration and equipment to the Hawk T.Mk 2s supplied to Britain's Royal Air Force. However, these would be equipped with a new data link, a different radio system and powered by an updated version of the Rolls-Royce Adour Mk.951 engine.

Like the RAF Hawks, the Saudi aircraft form an element within an overall training system, which includes synthetic training devices, various sensor and threat emulators and simulators, and other training equipment.

The new Saudi Hawks are also capable of

dropping practice bombs and firing rockets and a 30mm gun pod, unlike the RAF's new Hawks, which only simulate and emulate weapons dropping and strafe. This, of course, means that the Saudi aircraft could have a useful secondary front line close air support capability, if required.

The Saudi Hawk order was vital for BAE, since it allowed the company to re-start its Hawk production line and re-establish a supply chain that had disappeared following the completion of the RAF's 28 Hawk T.Mk 2s.

The first Hawk Mk 165 made its maiden flight on September 16 2015 in the hands of Andy Blythe. It was the first Hawk to be assembled in the UK since 2010, and was also the first to be produced in the newly reconstituted and relocated Hawk assembly line, which was moved from Brough in East Yorkshire to Warton Aerodrome in Lancashire.

With an active production line, BAE has resumed efforts to sell the Hawk, marketing the aircraft to Oman (which ordered eight Mk 166s) and also to Qatar, Kuwait, and the UAE. 1,020 Hawks have now been delivered, or are on order, and BAE Systems estimates that some 650 of these are operating on a daily basis, logging some 160,000 flying hours each year. This has given the company a large market for support solutions, and

Continued
on Page 40



Pilatus began delivery of the the first PC21 in June - more than 100 have now been built.

CONTINUED FROM PAGE 39

provides potential customers with the certainty of continuing support and an on-going development effort.

As well as marketing Hawks based on the T.Mk 2/Advanced Jet Trainer configuration, BAE Systems has studied a number of advanced Hawk configurations. For India, which has already ordered 123 Hawks, BAE Systems has proposed a midlife upgrade to India's existing Hawk Mk 132, under the tentative designation Mk 132 Plus.

Following the Hawk's demonstrated accuracy in weapons training, the Indian Air Force (IAF) has elected to use the Hawk as a combat aircraft in the close air support role, supporting the army. The IAF has, therefore, asked BAE Systems what extra capability could be added to the aircraft, within the constraints of using the existing Hawk airframe. India wants to incorporate a laser designator pod with laser-guided rockets and bombs, wingtip-mounted advanced short-range air-to-air (ASRAAM) missiles and defensive aids, including chaff and flare dispensers.

New-build variant

BAE Systems has also examined a new-build variant of the Hawk, which one programme insider referred to as the HAL chairman's 'Dream Hawk'.

This would incorporate a new, slatted wing, giving it much higher airframe performance, allowing it to land on shorter runways, and conferring a significant improvement in instantaneous turn rate and radius. The new version could have a longer, 10,000-hour service life, and could incorporate a number of features to bring down manufacturing costs.

The new variant would also feature a smart weapons package and a new cockpit with a single large area display replacing the current three multi-function displays, transforming the man-machine interface.

Following the signature of a memorandum of understanding (MoU) on May 15, a demonstrator programme is going ahead, with a company Hawk (ZJ951, the Hawk new demonstrator aircraft) assigned to support the programme.

A combat Hawk with these modifications was apparently proposed to the UAE but, for India, the aircraft is being marketed as the 'Advanced Hawk'.

By involving Indian industry in the supply chain, BAE Systems hopes to ensure that the new variant costs the same as, or even less than, the existing Hawk, which would make the aircraft very attractive to a wide range of potential customers.

In its full-year results statement for 2015, released on February 18, BAE Systems revealed that Saudi Arabia had signed for a second batch of 22 more Hawk 165s, and there are hopes that Saudi Arabia could eventually be a customer for the new 'Advanced Hawk'.

By March 2016, the first two Hawk Mk 165s were flying in Saudi national markings, wearing the same two-tone air superiority blue grey camouflage as is applied to the air force's Eurofighter Typhoons and new Boeing F-15SAs, having only been seen previously in yellow primer with British national markings.

The pair departed the BAE factory airfield at Warton on April 1 and arrived on delivery to King Faisal Airbase on April 6. They wear serials that suggest an assignment to the 21st Squadron, one of four Hawk 65/65A-equipped units at King Faisal Air Base Tabuk. The other units are the 37th, 79th and 88th Squadrons. The 88th Squadron is also known as the 'Saudi Hawks', the national formation aerobatics display team.

Under the terms of the agreement, the 22 (and now 44) Hawks were to be accompanied by 55 Pilatus PC-21 turboprop-powered basic trainers, an order which meant that the RSAF should eventually be the operator of the world's largest PC-21 fleet.

The PC-21 is a new-generation successor to the previous PC-9, with a much expanded performance envelope (allowing it to better replicate fast jet handling and performance characteristics), an advanced digital glass cockpit, greater flexibility, and superior maintainability.

The aircraft features an embedded simulation and training suite, which provides cross-platform cockpit emulation, weapons simulation, a stores management system, simulated radar and electronic warfare systems, a tactical situation display, and data link functionality.

Pilatus began delivery of the first PC-21s to Saudi Arabia in June 2014, dispatching the first three aircraft from Stans on June 2 and three more a week later. By the end of 2015, 46 PC-21s had been delivered, replacing PC-9s with the 9th and 22nd Squadrons, which form part of the King Faisal Air Academy at Riyadh/King Khaled Air Base.

Third element

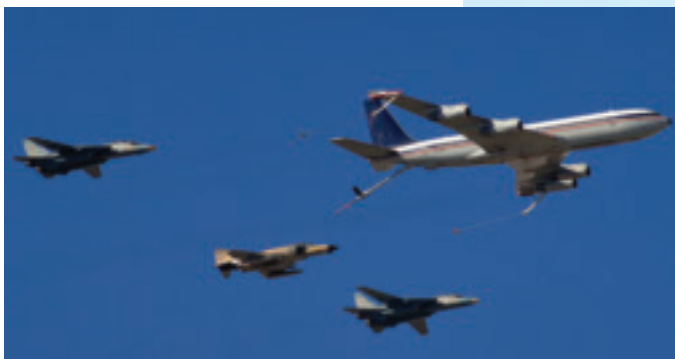
The third element within the new Saudi training system is being provided by 25 all-composite Cirrus Aircraft SR22 piston-engined primary/elementary trainers.

The SR22 aircraft is equipped with all the active and passive safety features standard on every Cirrus aircraft, including the Cirrus airframe parachute system (CAPS) and airbag seatbelts.

The aircraft is fitted with Garmin's Cirrus Perspective avionics suite.

Saudi Arabia is now the third air force that has recently ordered Cirrus SR20 or SR22 aircraft for primary training, after the United States and France.

The Saudi aircraft will provide primary flying training to the RSAF at the King Faisal Air Academy in Riyadh, replacing the mix of Cessna 172s and PAC Super Mushshaks that currently serve with the 8th Squadron.



Right: Twelve IRIAA Agusta Bell AB.206Bs and eight Bell AH-1J International Cobras in triple formation flights over the parade. Because of being flown above President Hassan Rouhani, the pilots were ordered to fly a safe distance from each other. Picture: Shahram Shams.
Above: IRIAF's KC-707 (Boeing 707-3J9C) with deployed refuelling baskets and boom, a 31 Squadron F-4E and a pair of 83 Squadron's F-14As, which were both recently overhauled at the Iranian Aircraft Industries overhaul centre.

PICTURE: KEYVAN TAVAKKOLI.



Iran shows its strength

Iran's annual military parade demonstrates the depth of the country's force in the air.

Babak Taghvaei
witnessed this year's display.

The Iranian Air Force (IRIAF) and Iranian Army Aviation (IRIAA) come together once a year for Iran's Military Day parade but this year's display was missing some key players.

The event included 24 IRIAF fighters together with a KC-707 tanker, which took part in eight formation flights over the parade.

The IRIAA involvement included 50 helicopters – comprising 12 AB206A/Bs, eight AH-1J attack helicopters, 22 Bell 214As and eight CH-47Cs.

Due to the construction work in Mehrabad International Airport, which usually hosts the IRIAF aircraft, only the F-5Fs, Saeghes and MiG-29s were forward deployed this year.

F-4Es flew in from the third Tactical Fighter Base (TFB) at Nojeh (Shahrookhi), near Hamedan, and the eighth TFB Babaiee (Khatami), at Isfahan.

In total the 37 IRIAF aircraft were drawn from seven different bases.

Nine came from the second TFB, made up of two 21 Squadron F-5Fs, a 22 Squadron MiG-29B and MiG-29UB, four 23 Squadron Saeghes and a Saeghe II, forward deployed to Lashgari at Mehrabad.

Two days later, TFB6 Yassini at Bushehr and TFB9 Abdol-Karimi at Bandar Abbas, deployed three 61 Squadron and two 91 Squadron F-4Es respectively to TFB3 Nojeh.

TFB3 also assigned seven of its F-4Es to the air parade programme and TFB8 specified five FT-7Ns and seven F-14As, while TFB1 assigned two MiG-29s and two Boeing 707-3J9Cs, including one electronic intelligence (ELINT) variant.

During the parade, while 12 of the assigned aircraft were

standing as reserve, 25 others participated in eight formation flights. The highlight, the last formation flight of the day, consisted of a KC-707 with deployed aerial refuelling baskets and boom, while one F-4E and two F-14As were flying behind and under its wings to demonstrate aerial refuelling.

IRIAA assigned 31 helicopters from the Assault, Attack and CH-47 Battalions of the fourth General Support Group (GSG) Base at Isfahan. These consisted of four AB.206s, four AH-1Js, 15 Bell 214As and eight CH-47Cs.

There was also an AB.206 and three Bell 214As assigned from the fifth GSG Base at Abyek, and 15 aircraft assigned from Vatan-Poor training centre.

Before the parade, all 50 helicopters had been deployed to IRIAF's Primary Flight Training Centre at Qiyam Air Base in Kushk-e-Nosrat, 88km south of Tehran.

During the parade all helicopters flew in 17 triple and twin formation flights.

One of the most important absentees was 72 Squadron Su-24MKs. Previously, a minimum four of them had always been assigned to the air parade.



CH-47Cs were central to helicopter display.

According to the unconfirmed reports from pilots at 7TFB, six Su-24MKs, accompanied by a pair of the seventh Independent Transport Base's C-130Hs, are forward deployed to the Syrian Arab Air Force's Tiyas Air Base in Syria.

There they are providing close air support for the Iranian Army or Ground Force (IRIGF) 65th Airborne Special Forces Brigade's commandos, who were deployed to Aleppo on April 5 2016 in order to participate in the Syrian Arab Army's Aleppo offensive against Al-Qaeda affiliate the Al-Nusra Front.



The UN panel of experts charged with monitoring compliance with the United Nations Security Council arms embargo against Libya noted that the Libyan Air Force has been partially re-equipped with aircraft, helicopters, weapons and equipment sourced externally in breach of the embargo and has investigated reports that Egypt and the Sudan were responsible for unauthorised transfers of aircraft and helicopters. For its part, Egypt categorically denied the charge.

The UN Security Council originally imposed its arms embargo on Libya in 2011, before the present civil war, when Colonel Gaddafi cracked down on pro-democracy protesters.

The embargo remained in force during the Libyan uprising in 2011, when most of the Libyan Air Force's aircraft were destroyed by NATO airstrikes, and during the subsequent years, as Libya descended into chaos.

This has left the nation in the grip of bitter factional fighting between two competing governments and a bewildering array of militia brigades and Islamist militants and insurgents, all fighting for control of the oil-producing country.

After the Libyan revolution, the new Free Libyan Air Force was left in a parlous state,

Have Egypt and Sudan been re-equipping the Libyan Air Force in violation of a UN Security Council arms embargo? Jon Lake investigates.

Mystery as Libya's 'new' aircraft fly in

operating handfuls of disparate aircraft types, including MiG-21bis fighters, and MiG-21UM two-seat trainers, augmented by MiG-23MLs and MiG-23UBs, as well as the two Mirage F1EDs that defected to Malta.

These were augmented by small numbers of Soko G-2 Galebs, J-21 Jastrebs, and L-39s, some An-32 and C-130H transports and a handful of Mil Mi-8, Mi-17 and Mi-35 helicopters. Most were in need of overhaul, and serviceability was poor.

A second civil war began in 2014, and was fought between forces loyal to the internationally recognised government of the

Council of Deputies that was elected democratically that year, (sometimes known as the 'Tobruk Government') and forces allied to the rival Islamist government of the General National Congress (GNC), (sometimes called the 'National Salvation Government'), which rejected the results of the 2014 election and which is based in Tripoli.

Libya's internationally-recognised Government in Tobruk is supported by the Libyan National Army and enjoys the support of Egypt and the UAE, while the rival Tripoli government has been supported by Libya Dawn, Ansar al-Sharia and Islamic State militias and insurgents, and has been supported by Qatar, Sudan, and Turkey.

Fear of the Libyan Islamist uprising spreading to Egypt led to great concern within the Egyptian Government of Abdel Fattah el-Sisi, which has been quick to support the Tobruk Government and General Khalifa Haftar's Libyan National Army.

The Libyan Air Force was inadequate to provide sufficient air support for the Libyan National Army, and the chief of staff of the air force, Saqr Jarushi, has worked hard to restore its operational capabilities, sometimes in compliance with the terms of the UN arms embargo, and sometimes possibly in violation of it.

To augment its three serviceable MiG-23s (at



RAFALE MAKING STEADY PROGRESS IN THE MIDDLE EAST

The Dassault Rafale's fortunes have changed. After initially struggling to gain an export order, the aircraft now has three – two of them in the Middle East. Jon Lake reports.

Egypt became the Rafale's first export customer when it ordered 24 aircraft (16 two-seaters and eight single-seaters) in February 2015.

The first three were formally handed over on July 20 2015 and were delivered to Egypt the following day, in time to take part in a flypast celebrating the inauguration of the expanded Suez Canal, on August 6.

Egypt took delivery of a second batch of three on January 29 2016. The jets then performed an air display over Greater Cairo.

Armed forces spokesman, Brigadier General Mohamed Samir, described the country's growing fleet of Rafales as "a huge addition to the air forces' fleet", which has enhanced the combat capabilities and readiness of the armed forces.

Like all Rafale customers so far, Egypt is already an operator of the Dassault Mirage 2000, the Rafale's forerunner. In fact, Egypt's links with Dassault go back even further, also encompassing the Mirage 5 and the Alpha Jet.

The significance of the Egyptian Rafale deal is greater than the modest number of aircraft might suggest. Though offered at a bargain price, with generous financing terms, the sale represents a real break from what had become something of a US monopoly over arms sales to Cairo, and has opened the door to a sale of 46 Russian MiG-35s to Egypt.

Hard on the heels of the Egyptian contract, Qatar signed a deal for 24 Dassault Rafales (18 single-seaters and six two-seaters), with options on 12 or 24 more, plus MBDA SCALP stand-off weapons, Exocet anti-ship missiles and Meteor air-to-air missiles.

The €6.3 billion (\$7.1 billion) deal included weapons and training for 36 pilots and 100 ground crew. Deliveries are set to begin next year.

Dassault Aviation finally received a long-awaited down payment from Qatar on December 16, bringing the contract into effect. The delay was caused by the sharp fall in energy prices and the ensuing need for Qatar to raise a loan through US banks.

Qatar has an eventual reported requirement for 72 new generation fighters, but US reports suggest that Rafale

was selected for the first batch only because of US delays in approving a sale of the F-15 Eagle, while Stephen Phipson, head of UK Trade and Investment's Defence Support Organisation (UKTI DSO) told journalists that he was still optimistic about the Eurofighter Typhoon's chances in Qatar.

"We're getting all the signals that they're still considering whether or not to push forwards with Typhoon, and we will continue to work on that very closely with the Qatari Government and give them the option of Typhoon for the next time they buy," he said. Phipson said that an order for more aircraft would probably be placed this year.

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Dassault sources remain confident that, having won the order for the first tranche of aircraft, the company remains in the strongest position to fulfil the entire requirement, scoffing at suggestions that dual- (or even triple-) sourcing would bring Qatar any useful benefits.

Whatever happens in Qatar, there are other fighter requirements in the region. In December 2015, French sources reported that Prince Muhammad bin Salman, Defence Minister of Saudi Arabia and the Deputy Crown Prince, was expected to submit a proposal for the supply of 72 Dassault Rafale fighter aircraft 'within weeks'. While this would seem improbable, there is continuing interest in the Rafale from the UAE.

Though the UAE very publicly rebuffed a planned Rafale deal in November 2011, labelling it "uncompetitive and unworkable", contacts with Dassault continued, even as alternative fighters were evaluated and assessed.

In November 2015, Reuters reported that Major General Ibrahim Nasser Al Alawi, commander of the UAE Air Force and Air Defence, had said that the UAE was in final negotiations to purchase 60 Rafales, though, more recently, it was reported that Sheikh Mohammad Bin Zayed Al-Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, was "showing no enthusiasm" for Rafale negotiations, and had turned his attention to the F-15.



least two of which were subsequently lost) the air force restored one Su-22UM-3K, one Mirage F1AD and one MiG-23ML to flying condition, and began a long-term project to make 10-12 older decommissioned Su-22Ms at al-Watiya Air Base operational. These had escaped destruction by NATO in 2011, because they had already been withdrawn from use and were stored pending scrapping!

But, in addition to these efforts, there have been a number of non-notified transfers of aircraft and helicopters to the new air arm.

The Libyan Air Force reportedly received two Mi-35 attack helicopters from Sudan in 2012, but one of these crashed soon after, leaving only one in service.

Markings were consistent

In October 2014, the Libyan Air Force received three Mig-21MFs and three Mi-8s, whose markings were consistent with those owned by Egypt. Two further ex-Egyptian Mig-21MFs were delivered at Gamal Abdul El Nasser Air Base in March 2015, alongside four new Mi-35P helicopters for the Libya National Army.

On March 6 this year, a formation of six new MiG-21s and six new Mi-8s reportedly arrived at Gamal Abdel Nasser Air Base.

All wore Egyptian-type camouflage and their arrival brought the Libyan National Army's strength to about 27 helicopters (circa 21 Mi-8s, one Mi-171 and five Mi-35s) and brought the Libyan Air Force inventory to 18 fighters (one Mirage F1AD, 15 MiG-21s, one MiG-23ML, and one Su-22UM).

The UN panel of experts questioned Egypt about the transfers. In its response, Egypt stated that it had not provided Libya with any Mi-8 helicopters, nor any MiG-21MF aeroplanes, and said that the panel's information regarding the transfers was incorrect. Egypt maintained that it was fully committed to the implementation of resolution 1970 (2011) and subsequent relevant resolutions.



A COCKPIT TABLET TO INZPIRE CONFIDENCE

A UK company has already impressed the Royal Jordanian Air Force with its technology. Now it is also offering training services across the Middle East.

Inzpire, a UK-based supplier of defence-managed services and mission systems, was at July's Farnborough International Airshow to showcase its upgraded graphical electronic cockpit organiser (GECO) to the global market.

The equipment is already being used by the Royal Jordanian Air Force (RJAF).

"The GECO is a military-grade rugged touchscreen tablet mission system, which enhances safety, improves situational awareness and increases mission performance," explained Inzpire sales and marketing director Chris Stevens.

"In its air variant, it enhances safety, improves situational awareness and increases mission performance. The tablet can be hand-held, knee-mounted or integrated directly into the aircraft. It is suitable for almost any platform – from fighter aircraft to helicopters – and is ideal for legacy and modern platforms.

"It is ideally suited to enable the integration of modern wireless-enabled weapons, such as the Al-Tariq. The screen is viewable in all conditions and it provides the military user with a high degree of utility through its use of glove-friendly touch screen technology and its intuitive user interface."

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Designed by Inzpire's team of engineering experts, and supported by aircrew, GECO's suite of features assist the pilot with everything from pre-flight planning, navigation, take-off and landing, to mission management, situational awareness, tactical level operations and post mission analysis.

The technology integrates GPS, digital mission maps, satellite imagery, hazard warnings, and situational awareness aides.

The user can embed tactical data, such as targeting imagery and weapon/missile threats, and GECO records missions to assist with training and analysis during debriefs. Additional capabilities, or 'apps', can be incorporated and run simultaneously to meet mission, platform and role specific requirements.

"GECO is combat-proven through use on UK MoD aircraft in Afghanistan and Libya," said Stevens. "It is in use with the British Army Apache helicopters, RAF Tornado and Typhoon jets, and has been selected by Joint Helicopter Command (JHC) for use in nearly all UK MoD helicopters."

It is also used by the RJAF on its F16 fast jets and across its military helicopter fleet.

An RJAF spokesperson said: "We have been using GECO since 2013.

Our situational awareness and efficiency when flying have been vastly improved since using the system, which we find extremely user friendly."

When deployed on land, GECO enables a range of missions, including dismantled and vehicle situational awareness, joint fires targeting and survey mensuration.

Inzpire also offers a range of training and managed services to armed forces personnel around the world, including in the Middle East.

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Stevens said: "Volatility in the region has led to significant investment in defence and training capabilities and Inzpire's managed services group covers a broad spectrum of niche military aviation requirements, cutting-edge tactics and training delivery.

"Inzpire provided mission-specific training for many of the Royal Artillery batteries and fire support teams in the British Army before deployment on to Operation Herrick in Afghanistan. This experience and feedback means Inzpire is very well positioned to transfer knowledge and provide training to partners in the Middle East during the current precarious security environment."

The company provides all aspects of military flying training, including ground instruction, course design, synthetic flying training instruction, and collective training, as well as live flying. The company's qualified helicopter flying instructors teach all aspects of Apache helicopter conversion. One Apache has supported a helicopter integrated defensive aids system demonstration for the Kuwaiti Air Force.

The company has also delivered training, alongside 3SDL, to the UAE Royal Guard in its operation of unmanned platforms.



GECO is combat-proven through use on UK MoD aircraft in Afghanistan and Libya.

Delivery dates for Algeria's batch of Mi-28NEs have not been revealed.



Increasing tensions in North Africa have seen Algeria increase an order for Russia's Mil Mi-28NE Night Hunter attack helicopters from eight aircraft to 42.

The Mi-28NE, the export variant of the Mi-28N used by the Russian armed forces, will provide a significant boost to the Algerian Air Force capabilities.

The larger order came almost simultaneously with the latest example of Daesh terrorists attempting to create a caliphate in North Africa. In March, they launched a coordinated attack on army, national guard and police positions in the Tunisian town of Ben Guerdane, near the country's border with Libya.

Significantly, it is understood that Algeria came to the assistance of the Tunisian forces, beating back the insurgents in a three-day engagement.

Growing co-operation

"It's said that Algerian attack helicopters flew in at low level to be used against the insurgents," said Professor George Joffé, of the University of Cambridge in the UK, one of the country's leading authorities on the Middle East. This operation was "part of growing co-operation between Algeria and Tunisia" in the anti-terrorism field.

Algeria currently has a fleet of around 35 earlier-generation Mil Mi-24 Hind attack helicopters, whose cockpit systems were upgraded around a decade ago by South African company Advanced Technologies and Engineering.

Whether the new Mi-28s will replace or supplement their predecessors is unknown.



Algeria banks on Russian craft to ease pressure

Algeria's substantial order for Russian combat helicopters indicates concern about both terrorists and international rivals, according to specialists on the region. Alan Dron reports.

Manufacturer Russian Helicopters referred all questions on the Algerian order to the country's arms export agency, Rosoboronexport, which declined to give any details.

Details of customisation of the Mi-28NEs for Algeria are scant, although, according to Russian press reports, they will be modified so they can be flown from both the pilot and the navigator/weapons operator's cockpits.

The Mi-28 is well-suited to patrolling Algeria's vast southern borders against infiltration by Daesh militants. These borders, said Joffé, were "very porous"; although the Algerian armed forces now maintained quite strong control in areas they feared vulnerable to infiltration. Many of Algeria's vital oil and gas facilities are in the remote Saharan regions of southern Algeria.

As well as the Mi-28's chin-mounted 30mm cannon, it can carry laser-guided anti-tank missiles, unguided rocket pods, cannon pods or mine dispensers on its stub wings.

A subsidiary motive for acquiring the Mi-28s, Joffé added, was increasing tension between Algeria and Morocco. The countries have a long-running, smouldering dispute over Western Sahara.

Western Sahara, a former Spanish colony, was annexed by Morocco in 1975 and remains under de facto Moroccan control. However, its indigenous Saharawi people, led by the Polisario Front, declared the area to be the Saharan Arab Democratic Republic in 1976. This is now recognised by many governments and is a full member of the African Union.

The Mi-28s, said Joffé, would be used to deter

Morocco from attacking Polisario Front-controlled refugee settlements near the Algerian town of Tindouf, which lies close to where the borders of Algeria, Morocco, Mauretania and Western Sahara meet.

Tensions have heightened recently between Morocco and the Polisario, with Morocco having recently expelled a large part of the United Nations monitoring force in the region, explained Joffé. Algeria saw it as its duty to protect the camps near Tindouf.

Another specialist on the region, Riccardo Fabbiani, senior analyst on North Africa for the Eurasia Group political risk consultancy, said that while "In general it's true that Algeria's main security concern is the southern border and the security situation around the oil fields... it sounds like this is part of the arms race between Algeria and Morocco."

Increased order

Recent reports that Morocco's armed forces had overtaken those of Algeria in capabilities may have had a part in the increased order for the Mi-28s, with Algeria keen to keep a balance of forces with its western neighbour.

The attraction of the Mi-28 to Algeria may have been aided by reports of the helicopter's recent performance against Daesh forces in Syria, where it has fired AT-9 Spiral 2 missiles and other weaponry against ground targets.

Additionally, Russia's defence ministry claimed that the helicopters' jamming equipment had proved effective against a variety of man-portable air defence systems deployed by Daesh, including the Soviet-made Strela-1, Igla-1 and the Chinese Hong Ying-5.



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CARE IN THE AIR

Superior medevac services have taken wing in the Middle East. Liz Moscrop rounds up what's on offer.

Medical evacuation services are now a major revenue stream for business operators.

The Middle East has a long history of being leaders in medicine. Indeed, hospitals came into being during the early Islamic era with the advent of establishments called Bimaristan, which is a Persian word meaning 'house of the sick'.

Today, as many countries in the region establish cutting-edge medical institutions, there are still some conditions that are better treated on other continents. This is where air ambulance services excel.

People can fly out to the world's foremost specialist medical institutions. In order to do so they need state-of-the-art "flying hospitals" – medevac aircraft.

Typical equipment can include neonatal and adult and paediatric intensive care units, which can be configured in hours from the initial request. Depending on the size of the aircraft, you could find cardiac monitors, defibrillators and pacemakers, ECG machines, IV equipment

and fluids, ventilators, stretchers and oxygen tanks, spine and torso immobilisation devices, splints, catheters, dressing materials for wounds and advanced burn care full neonatal resuscitation equipment.

Operators also offer teams of specialist medical practitioners to accompany patients on board, from emergency physicians and anaesthetists through to intensive care specialists and paediatricians.

The key to a successful medevac operation is being able to offer a rapid turnaround from request to take off.

US company Spectrum Aeromed, which is based in Fargo, North Dakota, provides specialist equipment required to transform a cabin into an emergency room. Around 75% of the firm's customers are outside of the US, so it has designed a modular system that can turn an ordinary aircraft into a state-of-the-art operating theatre if necessary.

Continued
on Page 48

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The firm’s account representative for Europe, Middle East, Russia and Asia, Thomas Redder, explained: “Next to the certification processes, at Spectrum Aeromed, we have designed our systems in a way that allows operation in accordance with regional standards around the world. We can provide a customised solution globally, including all required certifications.”

This means, for example, that the electrical sockets in its module are identical to the public electrical system used in the aircraft’s country of operation, and gas outlets are identical to gas outlets used in hospitals in the country of operation. He continued: “We pay attention to these details to make the process smoother for the users.”

Although the Middle East is a vast geographical area, it is well served with paved runways and airfields, so many regional and international operators offer medevac services, primarily using large cabin aircraft (or larger rotary aircraft for hostile areas).

Strong market

Gama Aviation is confident that there is a strong market for such services in the Gulf. Martin Ringrose, the company’s Middle East MD said: “We predict a significant increase in aero medical evacuation services in the UAE. We believe this will be fuelled by economic growth, a growing population, a rise in tourism as Dubai builds towards the 2020 Expo, and the on-going development of the country’s world-leading aviation, financial services and healthcare sectors.”

He added that, since it is developing some of the best hospitals in the world, the UAE would increasingly be a beacon for people in the region needing urgent medical assistance or specialist healthcare.

UK Gama already provides air ambulance services to the Scottish National Health Service and Duncan Daines, the firm’s chief marketing officer, believes this will help it deliver medevac in the Middle East.

He said: “With an expanding population, a large internal road network and all the modern maladies of our 21st century sedentary lifestyle, the use of



aeromedical services within the UAE and the wider GCC region is undoubtedly set to expand. Survival rates for heart attacks, road traffic accidents, and other critical incidents are all improved with a combination of fixed and rotary support. It really is a case of when, not if, these services become more widespread within the GCC.”

Gama believes that aircraft movements in the UAE are expected to double between today and 2030, and says that over the past three years there has been a complete overhaul of healthcare provision in the country, with huge investment in the sector seeing lots of speciality hospitals opening, with more on the way.

Economic growth

Ringrose continued: “The UAE is seeing strong economic growth and attracting more business visitors, tourists and expats. All of this will fuel growing demand for aero-medical evacuation services and this is one of the key reasons why we continue to invest in developing suitable aviation infrastructure in the UAE.”

In June, Abu Dhabi-headquartered Royal Jet subsidiary, Royal Med, took home the prize for the ‘medevac service provider of the year – UAE at the 2016 Oil & Gas Awards organised by MEA Markets.

The firm also sponsored a healthcare convention in Abu Dhabi in May. Chaired by HE Sheikh Hamdan bin Mubarak Al Nahyan, the company has delivered more than 1,000 medical

“The use of aeromedical services within the UAE and the wider GCC region is undoubtedly set to expand. Survival rates for heart attacks, road traffic accidents, and other critical incidents are all improved with a combination of fixed and rotary support.”

MARTIN RINGROSE

evacuation flights. It employs 15 paramedics and intensive care nurses, as well as 10 doctors and consultants, and can turn its aircraft into intensive care units.

Another local player is Dubai-headquartered RMSI, an international rapid deployment medical and rescue service, specialising in 24/7 complex and high-risk missions. Primarily operating in unstable war or conflict-affected territories and areas of extreme natural or man-made hazards, it offers a dedicated fleet of medevac rotary and fixed-wing aircraft that support both civilian and military personnel. Deployed with intensive care medical staff and equipment, they can be dispatched within minutes and safely transport patients to the nearest appropriate medical facility.

The firm set up shop in 2008 and was the first licensed air ambulance operator in Dubai. It offers remote on-site medical staffing and clinical facilities, topside medical support through the Dubai-based 24-hour mission response centre, and both ground and air ambulance services.

CEO Rob Lamb said: “Geographically, Dubai is the centre of the world and, from both a logistical and commercial aspect, the only place I would consider anchoring RMSI’s operations. Being based in Dubai allows for quick, efficient and smooth deployment of RMSI’s air ambulances to our clients across the region, with world-class medical care in Dubai enabling us to bring patients here for emergency treatment. The healthy business environment in the city, coupled with innovative vision of its leaders, makes it an attractive place to call home.”

High-speed intensive care

The firm’s high-speed intensive care jets (operated by Empire Aviation) are deployed within minutes of receiving flight clearance. Every stage of the journey is monitored with high-tech satellite tracking, and communication is maintained between the air ambulance and the mission response centre.

FAI Rent a Jet is one of the world’s leading air ambulance suppliers and averages two intercontinental medical evacuations per day.

Last December, the German operator added a fifth Challenger



FAI's Lear Jet 35 ready for air ambulance duties.

604 to its fleet of air ambulances, which are used for medevac missions worldwide, and often hired for private use in the Middle East.

Chairman Siegfried Axtmann said: "We took the decision to add a fifth Challenger as the model fulfils the unique requirements of long-range patient transport. With its spacious cabin, capacity for multiple missions and long-range capability, it is a valuable addition to the mix and supports our growing air ambulance activity."

Hiring the right crew is essential. All FAI's pilots and medical personnel have to be willing to fly into areas of conflict if necessary, although the firm stresses that it adheres to guidelines and will not operate in no-fly zones and areas deemed completely unsafe by the international aviation community.

According to Axtmann, the number of medevac flights to and from the Middle East has remained stable for the last year, "neither growing nor decreasing". Other than medical repatriation for insurance companies, clients fly to and from the region for specialist medical care that is not yet available in the Gulf.

Meanwhile, Turkey's Redstar Aviation has introduced a Learjet 45 to its medevac fleet, which it has converted into a two-stretcher air ambulance, replacing its older Jetstream 32.

This March, it received European Aviation Safety Agency (EASA) third-country operator (TCO) authorisation to conduct commercial air transport

operations into, within or out of, any EU member country, as well as EU overseas territories and four European Free Trade Association states. The TCO will be mandatory for air carriers from November 2016.

While medevac operators require highly specialised skills and equipment, so, too, do brokers who source such flights.

Experienced brokers understand that it is crucial to obtain a medical report or a contact number for the doctor treating the patient. Without this, the air ambulance operator cannot determine the best solution for the patient, or whether they are stable enough to fly.

Trust is vital, alongside due diligence. Medical flights involve sick and dying people and come with understandably emotional family members.

Specialist treatment

British broker PrivateFly includes air ambulance flights in its offering. CEO Adam Twidell said: "We do arrange some medevac flights to and from areas in the Middle East, such as Dubai and Abu Dhabi. Typically, these are clients needing repatriation or specialist treatment in the Europe and the US."

The equipment may have changed exponentially, but ancient Islamic values and practices still hold true when dealing with sick people in the aeromedical field. Bimaristans were secular. They served all people regardless of their race, religion, citizenship, or gender. The ultimate goal of all physicians and hospital staff was to work together to help the well-being of their patients.



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New deal as air ambulance centre goes from strength

Jon Lake looks at the progress of the Jordan Air Ambulance Centre (JAAC).

In April 2016, MenaITech, a Jordanian computer company, announced that it had signed a partnership and sponsorship agreement with the Jordan Air Ambulance Centre (JAAC).

Under the deal, MenaITech will cover the cost of transporting some underprivileged patients from remote areas to hospitals in Amman.

Helicopter emergency medical services (HEMS) are critically important in Jordan, where fast ground transportation is limited by distances and by the state of the road network, and where many outlying settlements lack hospitals with specialist facilities. Transferring emergency cases to hospital by helicopter can cut travel times dramatically – from four hours to one when moving patients from the far south of Jordan to hospitals in Amman, for example.

Helicopters allow more patients, from a larger area, to receive medical treatment within the so-called golden hour – something that significantly improves survival prospects.

The Jordan Air Ambulance Centre (JAAC) was launched about two years ago as part of a Royal initiative to provide specialised aeromedical evacuation and air ambulance services to transport patients from remote areas to hospitals in Amman.

Commitment to upgrading

The initiative reflected King Abdullah II's commitment to upgrading the services extended to his subjects, and also reflects the long-standing air-mindedness of the Hashemite dynasty.

A keen pilot, like his father, the late King Hussein, Abdullah II bin Al-Hussein is a qualified helicopter pilot, having been trained to fly AH-1 Cobra attack helicopters during his military service.

The JAAC's helicopters land at all of Jordan's 45 heliports and then deliver patients to those specialised hospitals in Amman that have a helipad. The Jordan Air Ambulance Centre will also provide medical evacuation

from neighbouring countries, including the northern part of Saudi Arabia and Palestine. The centre also provides specialised rescue services.

The centre has signed contracts with parties wishing to benefit from its services, including insurance companies, private hospitals, and international commissions. By charging fees for its services, the centre can cover its expenses and pay employees' salaries.

The establishment of the JAAC was designed to help boost the competitiveness of Jordan's health sector and facilitate medical tourism, a key source of national income.

JAAC is equipped with a pair of AgustaWestland AW139 helicopters fitted with state-of-the-art medical equipment. The helicopters were equipped for their new role by Austria's Air Ambulance Technology, and carry heart monitoring equipment and defibrillators, as well as respirators and oxygen monitoring equipment.

Donated by the king

Donated to JAAC by the king, the two aircraft are capable of providing intensive care unit (ICU) standards of medical care.

JAAC employs 42 personnel, including six pilots (most of them ex Jordanian Air Force) and eight paramedics, who have trained in the US. Two pilots fly the AW139s with two paramedics, or one paramedic with a doctor.

Though presently based at Marka Airport in Amman, JAAC also plans to open a second base at Aqab's King Hussein International Airport, and the two AW139s will also be deployed to the southern and eastern regions of the kingdom in order to improve emergency response times. JAAC has an unfunded requirement for a third AW139.

Though it presently operates only two helicopters, JAAC already has the infrastructure characteristic of a much larger HEMS operation, with a fully integrated headquarters, and well-equipped operations rooms. The centre has already formulated standards for helipad construction and has distributed these to hospitals.

The JAAC board of directors was founded in 2014 and it held its first formal meeting in January 2015, chaired by Prime Minister Abdullah Ensour. It appointed retired Brigadier General, Mohammad Btoush, as director general of the centre.

Key stakeholders include the Royal Jordanian Air Force, the Royal Medical Services, the Health Ministry, the Private Hospitals Association (PHA) and the Civil Defence Department.

King Abdullah launched the Air Ambulance Centre on Thursday August 20 2015 and, on October 4, one of the unit's helicopters flew its first mission, transporting a Russian tourist from the southern city of Aqaba to Amman. The patient was suffering very high arterial pressure due to a cerebral haemorrhage and needed an advanced operation that was not available in Aqaba's hospitals.

JAAC has achieved a response time of 15 minutes from callout, and is expected to handle some 250 medical evacuations during the course of its first year, with demand rising to about 400 a year by 2020.

JAAC helicopters land at all of Jordan's 45 heliports.





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Boeing Business Jets along with Kestrel Aviation Management and Greenpoint Technologies unveiled the first fully VVIP Boeing 787 at EBACE – the European business aviation show – in Geneva. Alan Peaford reports on this and other highlights from the 2016 event.

The first privately-owned 787 Boeing Business Jet (BBJ) lands at Geneva.



Living the dreamjet

The largest ever VVIP aircraft to appear at the event made a grand entrance on Geneva's static display as the first privately-owned 787 Boeing Business Jet (BBJ) - dubbed the "DreamJet" after the type's commercial Dreamliner nomenclature - made its global debut.

The aircraft was subsequently delivered to Chinese operator Deer Jet and expected to enter service in the late summer.

It is the first B787 to feature a complete VVIP cabin. Two other 787s already in Government service include one in the Gulf which is in airline configuration and the other in Mexico with a central VIP cabin but otherwise an airline cabin.

"This has been a remarkable partnership on a steep learning curve," says Stephen Vella, chief executive of the project manager, Kestrel. "The project took 18 months from first touch to delivery."

The DreamJet is designed to carry 40 passengers between any two points in the world in a calm and comfortable environment.

Designed by Pierre Jean Design Studio the cabin features soft colours and tones with no sharp edges. "This along with a quiet cabin and cabin pressure of 6,000 feet – make the 17h flight really comfortable, said Vella.

Speaking at a launch event, BBJ president David Longridge said the 787 BBJ is unlike any other business jet on the market. "If you do a range chart out of Geneva, just about the only major city it can't do is Sydney.

"From the passenger's point of view, number one, it's fast with a Mach 0.85 long range cruise speed, so it's the same as a Gulfstream," he said. "When we launched the first BBJ 20 years ago we



said it was three times larger than a Gulfstream. Well, with 2,415 square feet of cabin space, this 787 is three times larger than those BBJs.

"There are huge windows and a bunch of technology that makes it very different to today's business jets. None of these are made with carbonfibre. None have electric brakes. There is technology on the 787 that literally is on no other aircraft," he added.

Included in the new technology features is a smooth flight system that will reduce the impact of moderate turbulence. "All this leads to a much better flight experience for those really long haul missions," Longridge said.

The DreamJet made the 5,000nm trip from the Greenpoint completions centre in Seattle to Geneva in 9.5 hours, cruising at 45,000ft at Mach 0.85 - with former BBJ chief executive Steve Taylor at the controls - and landed with enough fuel for another 3,500 miles according to Longridge.

The design by Pierre Jean Design includes a bedroom and private bathroom area off of a

private corridor; there is the main VIP cabin and a separate super business class cabin with lay flat beds for guests. A third cabin area has also been designed for staff and crew.

The crew have their own rest areas but there are also self-service areas incorporated into the design to keep passengers moving through the long flights.

In the 20 years since Boeing set up its dedicated business jets division, the airframer has sold 164 BBJs, most of them 737s, and delivered 162. It has taken orders for 10 BBJ versions of the 737 Max, with the first set to be delivered into completion in late 2018.

Boeing has sold 15 BBJ 787s in total, nine of which have been delivered to completion centres. Thirteen of them are based on the smaller 787-8, and two on the -9.

"We are working on a couple more deals," says Longridge, who says Boeing is targeting "one to three" sales a year of its widebody range, which also includes the 777 and its 777X successor, as well as the 747-8.



HondaJet gets approvals

HondaJet received type certification from EASA with the company announcing the achievement during a press conference at EBACE.

"We are excited to achieve EASA certification for the HondaJet. This certification signifies the HondaJet meets the highest European safety standards," said HondaJet CEO Michimasa Fujino. "Our customers have shared that this aircraft has not only high performance, but intelligent, fun to fly and very sophisticated. HondaJet deliveries in Europe have begun, and we are excited to see the HondaJet enter service in this important market."

Alzeer sitting comfortably with GDC's complicated solutions

GDC Technics say that a slowdown in the number of VIP aircraft completions has resulted in excess capacity in the market. But the Middle East-owned company believes its ability to engineer and install increasingly complicated solutions puts it among a small handful of companies that are up to the job.

"There is a lot of hangar space out there but the question is, will you go to a qualified company that is able to do the sophisticated projects? This narrows the field drastically," GDC Technics general partner Mohammed Alzeer said.

"I'm not downplaying the fact that the number of available projects is not as much as four or five years ago, but the nature of the work is becoming more complicated. Once you define capacity as people who are able to perform the work on new-generation aircraft and install and certify very complicated solutions, you find that capacity is much less than what you might see on the market."

Alzeer gave as an example the installation of in-flight connectivity systems, which GDC has invested heavily in.

"We're investing \$20 million in connectivity and we will be bringing solutions in the next eight months," he says, adding that "90% of private aeroplanes fly with out-dated connectivity."

The company announced during EBACE that it is making "excellent progress" on developing supplemental type certificates for the installation of Honeywell Aerospace's JetWave Ka-band hardware on various Airbus and Boeing aircraft types. JetWave supports Inmarsat's upcoming Jet ConneX business aviation satellite-based connectivity solution.

GDC still plans to open a facility in Morocco as part of its drive to be closer to customers and Alzeer says the company is "in the process of selecting the right location". He expects to settle on a location "by the end of the year", with construction expected to conclude 36 months later.

GDC is working on three widebody completions and will start work on a Boeing 787 early next year. Alzeer said GDC is in "final negotiations" on two additional widebodies, which are "coming in 2018".



Mohammed Alzeer: "90% of private aeroplanes fly with out-dated connectivity."

Airbus latest VIP helicopter gets first showing



Airbus Helicopters presented an exclusive first showing of the H160 VIP variant.

Customers were able to view the cabin exterior, electrical footstep and hinged doors through a virtual reality immersion tool.

"Since the recent launch of the commercialisation at Heli-Expo this year, we have already signed some letters of intent for the H160. With EBACE marking the unveiling of the H160 in its VIP version, we expect to sign additional LOI with private and corporate customers," said Bernard Fujarski, senior vice president.

Pegasus Design won a design contest in October to create the H160 VIP cabin interior.

G650 Sim for Dubai

The Emirates-CAE Flight Training centre in Dubai will be targeting operators of the Gulfstream G650 across the region and beyond.

At the EBACE event, CAE said the European Aviation Safety Agency (EASA) has qualified its CAE 7000XR Gulfstream G650 full-flight simulator (FFS) to Level D - the highest qualification for flight simulators.

The Dubai-based training programme for the Gulfstream G650 will utilise the latest and innovative training tools including CAE Simfinity XR Series ground school training solutions, featuring classroom software, distance learning and a tablet application for course materials and pre-study tools.



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Uzoamaka sees great opportunities for his Sharjah business in Africa.



Sharjah's Amaka targets Africa as the land of Promise

West Africa is emerging as a business aviation growth market as the region continues to develop industries based on its natural resources, according to the Middle East's only African-owned aviation company.
Barbara Saunders reports.

Promise Uzoamaka, chairman of Sharjah-headquartered Amaka, which focuses on sales, acquisitions and business aviation consulting, says he envisions higher demand for private aviation from the region and that his company will soon expand into Africa.

Despite a widespread view in Africa that private jets are “symbols of excess”, Uzoamaka says their vital business role on the continent will spur demand.

“For instance, in the oil and gas industry, flying commercially to the production areas calls for three to four connections over multiple days and costs thousands of dollars,” he said. “For years, energy executives in Africa and the Middle East have saved time and money by sourcing private jets to reach remote areas. Private jets are a necessity in the oil and gas industry’s transportation.”

Uzoamaka said business aviation has to stand ready to seize opportunities emerging through change in the African industry landscape.

“At the moment, aviation in Africa is going through a transition and development process. There are changes to regulations; airlines are forging relationships with international alliances. Low-cost airlines are testing the waters... or the sky, to be more specific. I see a lot of potential that will require the business aviation sector to compete with the speed of economic development.”

Uzoamaka admits Africa remains a challenging market for a plethora of reasons, including lack of investment. “The infrastructure currently in place, in comparison with more established markets, certainly requires more investment – to develop facilities such as maintenance, repair and overhaul (MRO), training and education. We are also trying to familiarise ourselves with changes to regulations and this is slowing progress down a little at the moment.”

Uzoamaka is bullish about the Middle East’s business aviation sector despite “global economic hurdles, a sizeable grey market and lack of airspace” being “pressing concerns.”

The sector, he says, needs to step up its human resource recruitment to cope with an anticipated upturn.

“Business aviation in Africa and the Middle East is continuing its predicted trend and growing year on year, and the demand for new pilots may soon exceed supply. According to the International Air Transport Association (IATA), over the next 10 years the aviation industry, both commercial and business, will need 17,000 new pilots per year worldwide.

“Currently global pilot training programmes can train only about 15,000 per year, which would leave a shortfall of more than 3,000 new pilots annually. I personally think that is a conservative estimate and the actual numbers of new pilots required could be significantly higher. As such, commercial operators are stepping up their recruitment efforts and so should the business aviation sector.”

Careers in aviation

Amaka has set up its own foundation, which Uzoamaka says will assist students pursuing careers in aviation as pilots, mechanics, and aviation administrators, who are attending aviation programmes worldwide.”

Within the Middle East, Uzoamaka has identified the GCC’s heli-travel sector as having huge potential “particularly for the region’s advancing tourism sector”.

“Though the region has a proliferation of helipads on major buildings, particularly in the five-star hotel and resort segment, helicopter travel is held back by a lack of dedicated infrastructure and operating systems. The sector is still in its infancy yet the whole region needs it.

“The issue needs to be addressed by original equipment manufacturers (OEMs) with infrastructure and regulatory operations requiring a combined approach by interior ministries, civil aviation regulators and operators, tourism regulators and planners, and hotel owners and operators. For example, Saudi Arabia could particularly benefit from heliports to get people from major airports to other cities quickly and cost-effectively, suggesting more infrastructure could be built into VVIP terminals.”

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Are seaplanes making waves again?

Is the seaplane industry staging a comeback?

And, if so, is the Middle East about to benefit?

Barry Dunstall
investigates.

Seaplanes were once a glamorous and cutting-edge way to travel, an exciting symbol of progress in the 1930s. But the practical realities of only being able to take off and land on water – often used as the definition of a true ‘seaplane’, as opposed to amphibious aircraft which can also operate on runways – did not really meet the ambitions of the aviation industry in the mid-20th century. The kind of ‘flying boat’ seaplane built around a single hull, taking off and landing on its belly, was simply not as aerodynamic as conventional aircraft. If the ‘jet age’ did not quite consign seaplanes to history, no one was calling them “cutting-edge” any more.

Nonetheless, current manufacturers are eager to tell us seaplanes and amphibious aircraft still have a role to play in the aviation industry. From tourist

flights to passenger services, is the Middle East seaplane market awash with potential?

The arguments are persuasive. Many modern tourists love to visit ‘unspoilt’ destinations not served by airports, and holidaymakers taking an aerial tour often find the experience of taking off and landing on water memorable.

Seaplanes also offer operators the chance to test out new routes without needing to build expensive ground infrastructure. The cost of establishing a new island resort is clearly reduced if a runway is not needed (even if the space required for a runway is available in the first place). And there are also environmental arguments in being able to operate aircraft to remote locations without having to build more facilities.

Seawings is top flight

Launched in 2007, Dubai-based seaplane tour operator Seawings is now an established favourite among visitors to the UAE.

The company’s most popular sightseeing tour, for example, is the 40-minute ‘Silver Tour’, which soars over old and new Dubai. But Seawings also offers charter flights to more than 20 destinations within the UAE.

The company has a fleet of three Cessna Caravan amphibious aircraft (operated by Jet-Ops FZE, which leases the aircraft to Seawings).

Borislav Georgiev, general manager – Jet-Ops, Dubai, said: “Seawings has been fortunate to see the tremendous economic growth in the Middle East for the past nine years. Be it scenic tours, short excursions or short-haul journeys across the region, people have started accepting the seaplane as a possible mode of transport for their holidays.”

Seawings has been able to build on the economic strength of the region and in 2014, for example, launched ‘Seawings Lifestyle’, an extension of the business designed to offer particularly luxurious, bespoke tours around the UAE.

The tours (not all of which involve a seaplane flight) focus on aspects of life in the UAE from fine dining and the beach to family adventures and the desert.

Demonstrating the practical value of amphibious aviation, the ‘Seaplane Safari’ journey to the island of Sir Bani Yas in the Persian Gulf only takes 70 minutes from Dubai in a Cessna Caravan. The alternative journey by road and sea takes more than four hours. The safari also proves the seaplane’s capabilities for accessing ‘unspoilt’ parts of the world, with Sir Bani Yas being a wilderness haven for thousands of endangered mammals.

Expanding beyond scenic tours and charter

Launched in 2007, Dubai-based seaplane tour operator Seawings also offers charter flights to more than 20 destinations within the UAE.



services, Seawings also offers scheduled flights between Dubai and Abu Dhabi.

Georgiev said: “We are constantly looking to diversify our operation to support the demands of the market. We identified the need and opportunity for business travellers to have another option for connecting between these commercial hubs and created daily shuttle flights to meet this need.”

The service leaves from Dubai Creek and arrives at the Abu Dhabi Corniche.

Georgiev believes the logic of operating seaplanes in the Middle East is clear. “There are many locations across the UAE and Oman that are otherwise difficult

to access. But we have landing rights to 15 waterfront locations and 11 land airports, which allows us to operate into far-flung parts of the region. The GCC holds great potential for allowing travellers to experience destinations by seaplane.”

Inevitably, no seaplane business is guaranteed success.

Turkey’s Seabird Airlines ceased operations in 2015 but an ambitious seaplane operator might surely still see potential in Turkey’s long coastlines.

Perhaps the greatest argument for a resurgence in the seaplane and amphibious aircraft industry is the fact manufacturers are acting, not just talking.



Textron Aviation's range of amphibious aircraft includes the Cessna Caravan, which can be used for missions from aerial survey to air ambulance.

Series production is under way on Dornier Seawings' Seastar amphibious aircraft, with the first customer delivery scheduled for 2018.



Dornier banks on Seastar

In February this year, Dornier Seawings revealed series production is under way on the company's Seastar amphibious aircraft.

Dr Albert Halder, chief executive officer of Dornier Seawings, said: "After two years of upgrades and developments, and with the positive response from customers globally, we are confident the Seastar will be a commercial success."

The Seastar's options include 12-seater commuter, nine-seater corporate, seven-seater VIP, cargo and ambulance configurations.

Powered by two Pratt & Whitney PT6A-135A turboprop engines, mounted above the wing to stop water ingestion, the aircraft will offer a maximum cruising speed of 180 KTAS. With an all-composite airframe, the Seastar will offer a maximum range of 900nm.

It will initially be assembled in Oberpfaffenhofen (Germany), with plans to also set up assembly facilities in Wuxi (China). The first aircraft is scheduled for customer delivery in 2018.

Viking unveils 400S

As Dornier Seawings revealed plans for the Seastar, so Canada's Viking Air introduced the Twin Otter 400S Seaplane to the world this February.

The existing Twin Otter can be fitted with floats for amphibious operations but the 400S will be a dedicated seaplane, able to carry up to 19 passengers.

Evan McCorry, Viking's vice president of international sales and marketing, said: "By optimising the Twin Otter for seaplane operations with the 400S, we see our market share expanding."

In developing the 400S, which is designed for commercial operation and will be offered at a list price under \$6 million, Viking has unsurprisingly paid particular attention to the challenge corrosion causes for water-based operations. Corrosion-resistant packages for the airframe, powerplant and fuel system have been incorporated as standard equipment in the 400S.

Customer deliveries are scheduled to start in the first quarter of 2017.

Textron Aviation optimism

TJ Whitfield, director, special missions at Textron Aviation, says the manufacturer is eager to support the development of the seaplane industry in the Middle East.

The company's range of amphibious aircraft includes the Cessna Caravan and the Cessna Grand Caravan EX, and Whitfield said: "The ideal characteristics for an amphibious aircraft are mission flexibility, dependable design and low operating costs. The Caravan product line, for example, can be used for missions from aerial survey to air ambulance."

So is there potential for market growth in the seaplane industry in the Middle East and North Africa?

Whitfield thinks so, noting: "There are many islands in the Red Sea and Persian Gulf.

Seaplanes are a great option for travelling from the mainland to these islands quickly, which is especially important in medevac situations."

He continued: "The Middle East seaplane market has not yet fully matured. There could, for example, be a market for conventional passenger transportation to support the oil industry or between geographically close cities such as Dammam [Saudi Arabia] and Manama [Bahrain]. We'll continue to deliver aircraft as the market grows and we look forward to strengthening our relationships with seaplane operators to better understand their needs."

So the age of the seaplane may be far from over. One may be coming to a river... or a lake... or a coastline near you very soon.

Solar aircraft books its place in the Sun

Solar Impulse lands at Al Bateen in Abu Dhabi to complete its record circumnavigation.

Steve Nichols
reports on a world-record breaking venture from a solar-powered aircraft.

On July 26th Solar Impulse 2 made history as it completed the first circumnavigation of the globe by a solar-powered aircraft. The aircraft touched down at Al Bateen Airport in Abu Dhabi 16 months after its departure from the airport on its 35,000 km round-the-world trip. The aircraft completed its record-breaking journey using only solar power.

The team behind the venture achieved their objective of completing the trip in either late July or August.

Speaking from the team's Monaco headquarters, Yves Heller, Solar Impulse mission engineer, said that it had been vital for them to complete the trip by September in order to make the most of the maximum daylight hours available in the northern hemisphere.

"We need the sunlight to power the aircraft and charge its batteries," Heller explained. "We fly through the night on batteries alone, so the shorter the night the better."

Pilots Bertrand Piccard and Andre Borschberg took it in turns to complete the many legs needed to fly around the globe.

Breathtaking flight

The aircraft started its breathtaking flight from Abu Dhabi in March 2015. We visited the control centre in Monaco when Solar Impulse had just completed the Atlantic leg with a 71-hour flight from John F Kennedy Airport in New York to Seville in Spain.

Heller said: "The Atlantic crossing was more challenging than the Pacific leg as the weather and turbulence was more demanding."

The aircraft is more efficient when flying at lower altitudes due to the air density, but needs to fly above the clouds for maximum solar power.

Solar Impulse 2 takes advantage of the Sun during the day to gain as much altitude as possible. The solar power is enough to power the aircraft's four electric motors with reserve energy being used to charge the batteries.

At night it goes into a long, slow descent to save power before the Sun rises again.

"A typical night-time minimum flight height might be 3,000ft, but during the day it would be more like 28,000ft," said Heller.

After our visit, the aircraft continued across North Africa to stop in Cairo before completing its journey to the UAE capital.

Solar Impulse 2 is a single-seater aircraft made of carbon fibre with a 72m / 236ft wingspan (larger than a Boeing 747) and a weight of 2,300kg / 5,100lb (the equivalent of an empty family car).

The 17,248 solar cells built into the wings power four batteries (38.5kWh per battery) that in turn power the four electric engines (13.5kW / 17.5hp each). Solar Impulse 2 cruises at speeds ranging from 34mph to 62mph (55 to 100km/h).

The solar cells are about 23-24% efficient in terms of converting the Sun's 240W per square metre light energy that falls upon them.

The pilots had already broken eight world records, flown for nearly 400 hours and covered 30,000km in 15 legs.

Power nap

With no true auto pilot, Piccard or Borschberg could only 'power nap' for around 15 minutes before the ground team needed to wake them up, a regime that proved gruelling when the aircraft flew non-stop on the Pacific and Atlantic crossings.

Around a thousand sensors on the aircraft sent a constant stream of data back to the Monaco-based control centre (MCC) via satellite during the flight, including power, temperature information, and performance data covering every piece of equipment.

The telemetry was sent back to the MCC so that the team could monitor not only the aircraft's attitude and position, but also the all-important energy parameters including battery voltages, temperatures and charging status.

The aircraft's SITAONAIR/Inmarsat SwiftBroadband satellite system also allowed the public to experience the flights real-time via a video stream (visit the Solar Impulse YouTube channel) and messaging on social networks.

Biometric monitoring was also important. The team in Monaco could measure the pilot's vital functions, including pulse rate and blood/oxygen saturation.

The Solar Impulse 2 project aims to educate the world as to the possibilities offered by carbon composites and solar technology. The fate of the aircraft now it has finished its flight is uncertain. It may be displayed in a museum or go on to complete more solar-powered endurance feats.

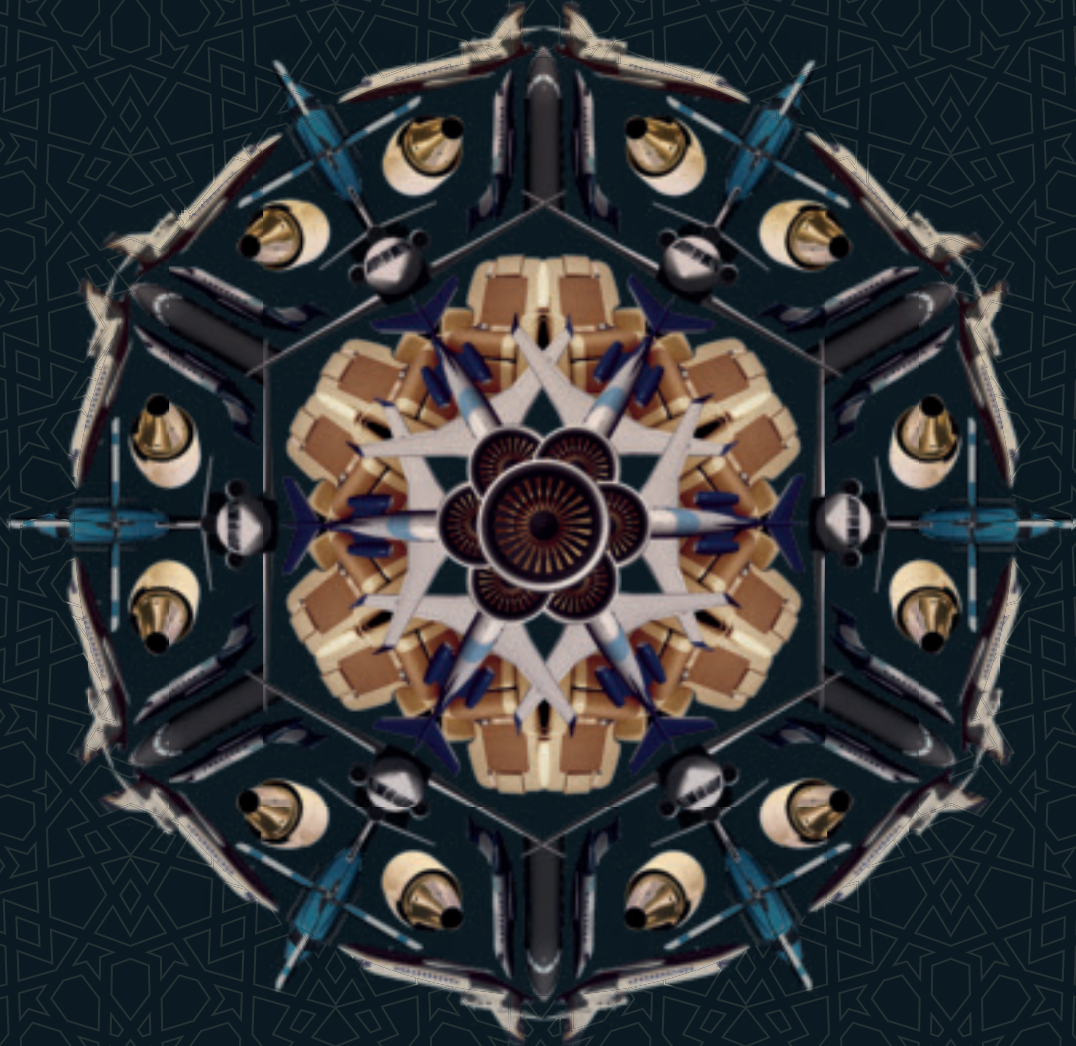
Solar Impulse crew in celebratory mood as the aircraft completes world record trip.



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Abu Dhabi International Airport achieved record traffic figures last year, further strengthening its position as a hub in the region.

Keith Mwanalushi reports that successes also come with challenges.

THE GROWING COST OF GROWTH

In March, the global aviation community converged on the United Arab Emirates for the Abu Dhabi Air Expo 2016. It's a week-long event that includes several exhibitions, conferences and seminars across all aspects of aviation and aerospace, from general, through commercial, to military and private sectors.

Visitors attending such events are among the 25 million passing through Abu Dhabi International Airport (AUH) every year. In 2015 the airport experienced a 17.2% increase in passenger traffic compared to 2014, with the first quarter alone showing 21.1% growth, according to data from operator Abu Dhabi Airports.

"We continue to witness double digit traffic growth at AUH. To cross the two million mark for the first time in our history, for four months of the year, is a testament to the airport's ability to connect the world," commented Abu Dhabi Airports COO, Ahmad Al Haddabi, when announcing last year's numbers.

Biggest infrastructure project

Fresh from celebrating its 10th anniversary, Abu Dhabi Airports disclosed that billions (AED) have been spent on capital development projects during the past decade across all of its airport sites. The biggest infrastructure project undertaken so far, the midfield terminal complex, will increase capacity at AUH to 45 million passengers per year.

In February this year, passenger numbers jumped 8.7% in comparison to the same period in 2015 to reach more than 1.8 million for the month. "Traffic between India, the UK, Thailand, Australia, the USA and a number of others, all witnessed increased passenger figures from AUH," Al Haddabi reported.

John Grant, senior analyst at air travel intelligence company OAG, said there were not many major airports in the world that have recorded 50% growth in the number of scheduled services over the last five years, but AUH was one of those few. In percentage terms, it



John Grant: Growth in the LCC sector highlights the challenges facing Abu Dhabi.

has outpaced its closest rival, Dubai International.

"However, such high levels of growth are only one part of an intriguing picture in the region between the three prominent hubs of Abu Dhabi, Dubai and Hamad in Doha," said Grant.

OAG data shows scheduled capacity growth of some 6.5 million seats over the last five years from Abu Dhabi and more than 25,000 additional scheduled flights a year over the same time period. Grant felt that, without a doubt, the performance at the airport had been exceptional by almost any measurable standard.

Except, of course, for the presence of two very near competing hubs that have grown their respective scheduled capacity in Dubai by a staggering 17.7 million seats (OAG) and in Doha by an equally impressive 10.5 million. "In such a context, both the success and challenge facing the future growth of Abu Dhabi is daunting," Grant indicated.

During the first quarter of 2015, Abu Dhabi Airports opened expanded facilities in Terminal 1 at AUH as part of a broader capacity enhancement programme to meet passenger needs.

A large proportion of the increase in traffic is attributed to the strong performance at Etihad Airways. The national airline carried 17.4 million passengers in 2015, 18.4% more than it did in 2014. The expansion of its network, through Alitalia and Jet Airways, inevitably contributed to passenger figures to Italy, India and the USA.

The airline has also announced expansion of its services to Istanbul during 2016, with a new four-times-weekly service to Sabiha Gokcen airport starting in July.

Market demand

Etihad already operates a daily service to Istanbul Ataturk Airport, but market demand has created an opportunity to deploy additional capacity into Sabiha Gokcen. The route will be serviced by an A330-200.

New A380s on the Etihad Abu Dhabi to London Heathrow route helped to deliver a strong increase in passengers to the UK, with 27.5% growth registered in 2015. Other busy routes from AUH included Australia, up 30%, Germany up 15% and significant increases on services to the USA.

Clearly Etihad is working very hard to develop frequency, both in its own right and via its strategic equity partnerships with Air Serbia, Air Seychelles, Air Berlin, Alitalia, Jet Airways and Virgin Australia.

Grant concurred. The important expansion of long-haul services to three additional US markets, the doubling of destinations in Australia and the launch of services to Sao Paulo, are all important flagship operations that reflect the ambition of the airport and its base carrier, he said.

"However, perhaps of greater strategic importance, is the growth of regional services to India as a consequence of the Jet Airways equity partnership with Etihad, and the increase in



The midfield terminal will be ready for traffic next year. PHOTO - ADAC

services to other markets in the Middle East, which enhance the connectivity of Abu Dhabi and underpin the longer haul services," he suggested.

Etihad, itself, now has more than a 79% share of all scheduled flights operated at the airport, according to OAG, compared to 63% in 2012. When its partner services are added, those percentages increase to 84% of all flights.

"This percentage share highlights Etihad's dominance in Abu Dhabi and also, perhaps, the vulnerability of the network to a single carrier or group position where, for comparative purposes, the combined Emirates and Flydubai network accounts for a very strong, but slightly less dominant 67%, in the Emirate," said Grant.

The rapid growth of low-cost airlines in the region, specifically in Dubai and Sharjah, further highlights the challenges facing Abu Dhabi, despite its recent levels of success, Grant said. Over the last five years, across the three major airports in the UAE, OAG has seen low-cost services increase to some 84,500 scheduled flights, compared to 32,500 in 2012.

"Abu Dhabi now has only a 2% share of the low-cost frequency across the three airports against a 5% share in 2012 and less than 2% of all scheduled flights operated from the airport are from low-cost carriers. This represents a significant shift against the global market trend for low-cost carrier growth at most unrestricted airports," Grant analysed.

Abu Dhabi's diverse geographic network serves some 115 destinations through its connections, and the structure of the Etihad network is key to the traffic at the airport, even more so when the competing local airports in Dubai and Sharjah can serve the local Emirati market.

In the last quarter of 2015, Grant said more than 1.5 million one-way passengers connected via Abu Dhabi, which both highlighted the importance of this traffic to the airport's future and the inherent risk of any airport where hub traffic plays such a vital role in the commercial operation.

At the start of 2016, Abu Dhabi Airports announced a partnership with global IT provider, SITA, to introduce its latest technologies across AUH's three terminals. The transformation is part of the airport operator's preparations for AUH reaching a capacity of 45 million passengers by 2017.

Strongest year-over-year demand

Middle East carriers had the strongest year-over-year demand growth in January 2016 at 10.9%, according to the International Air Transport Association (IATA), helped by on-going network and fleet expansion.

This upswing in airline capacity has put considerable pressure on the region's hubs to meet the rapid growth in passenger numbers and expansion of their airport facilities. "However, expanded facilities will only get you so far," hinted Hani El-Assaad, SITA president for Middle East, India and Africa.

As part of the five-year contract, SITA will provide a range of fully integrated airport systems. One of these includes its airport management solution, which will allow Abu Dhabi Airports to proactively manage the operation of AUH by providing real-time information from across all facilities. This will enable the operations team to plan for events before they happen, while ensuring resources are fully optimised.

"Technology can play a key role in meeting the growing passenger numbers, ensuring smooth flow through the airport, and providing a memorable experience to each and every passenger," said El-Assaad.

"Abu Dhabi Airports has recognised the importance of using technology smartly to get the most out of its facilities and has turned to SITA to help transform air travel at the airport through the use of technology."

He expressed his admiration for AUH's ability to meet the rapid growth it has experienced over the past few years without compromising the service offered to passengers. El-Assaad added: "We have worked alongside the team at the airport to provide the technology to manage everything from check-in and airport management systems to self-boarding gates, across the existing terminals. Abu Dhabi Airports has recognised the value we bring as an IT partner which can deliver not only improved operational efficiency, but also an enhanced passenger experience."

SITA is currently working with the airport to implement a complete airport management solution in the new midfield terminal, expected to open next year. El-Assaad explained that the solution would assist AUH in simplifying its operations, while improving profitability. He said an integral part of this solution was SITA's 'AirportCentral', the airport operational database, which will allow the airport to centralise all its data into a single repository of operational information.

"The investment in SITA's latest innovations will bring the airport's entire IT infrastructure in line with



AIRPORTS

CONTINUED FROM PAGE 63

the systems that SITA is already implementing in the new midfield terminal, currently under construction. These new technologies will help improve the airport's operational efficiency while providing a seamless passenger experience across all terminals."

The first boarding bridges have now been installed at the midfield terminal, deploying smart airport technologies. Each will interface with the visual docking guidance systems, which direct aircraft to their gate parking positions.

Eight of the bridges have been specifically designed to serve the upper deck of the Airbus A380, with the longest bridge capable of extending by up to 45 metres.

SITA has provided the airport with a new traveller document authentication system, using boarding pass validation technology, which should enhance security, accelerate processing and reduce waiting times for passengers by automatically verifying all types of boarding passes, including mobile and home-printed passes. The use of this technology at AUH will be the first deployment of the product in the Middle East.

In addition to these systems, new automated boarding gates and flight information display systems will be installed, El-Assaad reported.

Looking ahead, SITA plans to continue



AUH will rely a lot more on its home carrier than perhaps Dubai or Doha.

working with Abu Dhabi Airports to explore new solutions that will address emerging challenges as the airport continues to grow.

"They have always been keen to explore new technologies that help streamline their operation and create a great passenger experience," said El-Assaad.

"For SITA, this gives us a tremendous opportunity to provide technology that will help the industry fully unlock its potential and further elevate the experience that passengers have come to expect from the region's airlines and airports."

In the meantime, AUH has been awarded the ISO 22301 management system certificate for business continuity management. Abu Dhabi Airports said it was the first in the region to gain that certification.

The award is the international benchmark of good practice in business continuity management and recognises the steps that Abu Dhabi Airports has taken to implement processes that will provide continuity of its operations during disruptive events.

There is no doubt that the future of Abu Dhabi and its continued growth, like so many other airports, rests with the continued success of its base carrier – Etihad in this case.

As Grant puts it, what is perhaps not realised is just how strong that reliance is in today's competitive environment, perhaps more so than either Dubai or Doha.

"Attracting new carriers to the airport and encouraging growth of new segments, particularly in the form of low-cost carriers, are some of the challenges that the airport will face as the new midfield terminal comes online at the end of 2017.

"All of which has to be set against a major competitor less than 80 miles away with a 25-year growth advantage," Grant concluded.



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CHARGES OF THE FLIGHT BRIGADE...

The introduction of a 'passenger facilities charge' at several UAE airports will raise costs for travellers.

Alan Dron
reports.

From July 1, passengers departing from Dubai International Airport (DXB), as well as all airports in Abu Dhabi (Abu Dhabi International, Al Ain, Al Bateen, Delma and Sir Bani Yas) have been paying an AED35 (\$9.50) government-imposed charge to use them – even if they are just connecting on to another flight.

Airlines will add the new charge to their ticket prices and then pass the money on. In the case of Abu Dhabi, it will go straight to Abu Dhabi Airports Company (ADAC).

Sharjah has announced the introduction of a similar fee but, at the time of writing, had not indicated when this would be implemented.

Asked for the reason behind the charge, Dubai Airports issued a statement noting that it has “invested heavily” in expanding its infrastructure, products and services to accommodate growth.

“We have expanded capacity by 50% since 2008 (from 60 to 90 million) while keeping aeronautical fees among the bottom quartile compared to similar hub airports around the world.

Exempt of this charge

“Passengers using the same aircraft and same flight number when transiting are exempt of this charge (eg tech stop flights, or transit flights).” Children under two years and on-duty airline crews are also exempt.

It said any further comment had to come from Dubai’s finance ministry. Repeated attempts by *Arabian Aerospace* to contact the relevant officials at the ministry were unsuccessful.

ADAC declined to comment on the new charge.

In recent years, several European nations have introduced passenger taxes that have met strong opposition from airlines, airports and passengers, usually because they go straight into government coffers.

“However, there is a fundamental difference between a tax and a charge,” said Stefano Baronci, director of economics

for Airports Council International, which represents more 1,850 airports worldwide. “A tax is imposed by national or local government to raise revenue, while a charge is usually levied for financing the development of airport infrastructure and services provided at the airport.”

The aviation community had been united in fighting taxes, which harmed the positive economic and social effects generated by aviation for the wider economy, he said.

“The experience in Europe shows that these decisions are sometimes very short-sighted and there are examples in Denmark, the Netherlands and Ireland where taxes have been finally withdrawn.”

In those three nations, it quickly became apparent that a passenger tax was having a detrimental effect on local airports, with many travellers prepared to travel considerable distances – even across national borders – to escape it.

“In respect of Dubai, however, we are talking about a passenger facility charge, which is not a tax. Last year confirmed the Middle East as the fastest-growing region in terms of passenger numbers, with an increase by 10.7% year-on-year. It is clear that, for meeting current and future demand, airports have sooner or later to finance capital intensive investments through aeronautical revenues,” said Baronci.

Competition between hubs

But the move could backfire: “There is strong evidence of competition between hubs to attract passengers. Accordingly, a decision to increase this charge strengthens the competition of other airports in the region (eg Doha) and of other global competitors.”

However, factors other than cost played a role in consumers’ choices, such as an airport’s efficiency and quality of service. “Dubai will continue to offer a high quality service to the passenger,” said Baronci.

Another observer of the Middle East aviation scene believes that money raised from the new Dubai charge will help pay for the development of Al Maktoum International Airport, or Dubai World Central (DWC).

“I think it’s part of the scheme to generate extra revenue to feed the investment over at DWC,” said Saj Ahmad, lead researcher at London-based consultancy Strategic Aero Research.

“The pace of development has been horrifically slow. Flydubai is moving there next year and Emirates by the early 2020s. The infrastructure doesn’t seem to be keeping pace. There isn’t enough passenger traffic there at the moment to plough into its expansion and development.”

The charge of AED35 on Dubai International’s 70 million annual passengers would raise well over AED 2 billion, a useful sum that could be used to improve DWC’s facilities, he said. An AED35 charge was unlikely to deter passengers from using Dubai International.





TECHING THE SMART PATH TO THE FUTURE

When air transport IT specialist SITA held its annual summit in Spain to showcase the latest trends in travel technologies, it was clear to see that airport operators in the Middle East are getting smarter at every step. Keith Mwanalushi reports from Barcelona.

A number of airports, airlines, government agencies and ground handlers in the Middle East have recognised the importance of using technology, whether to make their operations more efficient or to improve the passenger experience.

This is not surprising considering the scale at which new airports today are embracing savvy new solutions.

As revealed at the Airports Show in Dubai earlier this year, facilities in the region are investing millions of dollars in technology and system upgrades to ensure a seamless and secure passenger experience.

From smart gates, beacon technology, mobile devices to navigate the airports and face recognition systems, to air traffic management, baggage and check-in management, IP-based security monitoring, communications, ticketing, and information systems, airports are actively adopting new technologies.

According to a study by research organisation Technavio, the global market for smart airports is estimated to reach \$13 billion by 2019, at a combined annual growth rate of 6%.

In addition, SITA's 2016 passenger IT trends survey shows the benefit of technology to provide a better travel experience. It revealed that passengers across the globe are so comfortable with technology today that they are choosing to use it rather than interacting with people. Out of every 100 passengers, 85 had a positive travel experience using technology, up from 80 last year.

"SITA has worked with several airports and airlines in the region to introduce new technologies that help improve the passenger journey through the airport," said Paul Murphy, the company's vice president sales.

For example, SITA is working to trial 'smart path' a new technology that allows passengers to move through the airport and board the aircraft simply by presenting themselves for a biometric check. "Once verified there is no need for the passenger to present a boarding pass, a passport or travel documents again," said Murphy.

He explained that smart path works by having the passenger's biometric details captured through a facial scan at the first touch point in the

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on Page 68



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CONTINUED FROM PAGE 66

journey. The record is checked against the passenger's travel documents, typically the passport, and a secure single token is created. Then, at each step of the journey – from check-in, to aircraft boarding or border control – passengers gain access simply with a facial scan and without having to show their passport or boarding pass.

“By capturing passengers’ biometrics and travel information into a single digital record, travellers will soon be able to use this token as identification at each step along their journey,” Murphy explained. “It will also provide the ability to combine some travel steps into a single interaction, vastly speeding up the time needed to complete these formalities.”

Fast growing airports such as Abu Dhabi International (AUH) are implementing a number of smart airport technologies.

Ahmad Al Haddabi, chief operations officer at Abu Dhabi Airports said the airport had recently inaugurated the smart travel system. He explained: “The pioneering system consists of self-check-in and baggage drop facilities, automated passport control gates equipped with biometric verification functions and facial recognition technology, and smart boarding gates, allowing passengers to check-in and move through immigration and security, interacting only with innovative technology.”

The smart travel process at AUH involves five-steps: self check-in, self-baggage drop, e-registration, e-gate, and self-boarding with signage across the airport’s terminals identifying each step.

Haddabi said: “These processes will enhance passenger experience by decreasing processing times within the airport by up to 70%, meaning less time in queues for travellers and more time to enjoy the airport’s retail, leisure and food and beverage facilities.”

Abu Dhabi Airports is currently installing 25 e-registration stands, 58 e-gates, and 76 self-boarding gates distributed at arrivals and departures over the airport’s two terminals, with full implementation being complete this summer. Additionally, the airport is already operating 10 self-check-in kiosks and two self-baggage drops.

Investing in more efficient baggage systems will also be crucial as airports in the region gear up to handle increasing passenger numbers.

SITA is also working with Abu Dhabi Airports to implement smart solutions at the midfield terminal building (MTB), which is due for completion in the fourth quarter of 2017. This will be the largest building in the Emirate of Abu Dhabi.

The MTB will be 700,000sqm and visible from more than 1.5km away. It’s being designed



Paul Murphy: SITA has worked with airports and airlines in the region to introduce new technologies. Above: SITA IT summit in progress in Barcelona.

with sustainability in mind. The form, shape, materials used and sophisticated energy and water monitoring systems, have all contributed to the terminal building’s status as an outstanding three-pearl design rating from the Estidama (sustainability) pearl building rating system (PBRS).

SITA has also recognised that further improvements in baggage handling will require a step change. Bag tracking is highlighted as an initiative that will be in the spotlight in the coming years. The International Air Transport Association (IATA) resolution 753 will require airlines to track each bag on to the aircraft, into arrival areas and even transfer systems, and must be implemented by June 2018.

Murphy said SITA continues to work with partners across the region to streamline and improve baggage handling. Most recently, Sharjah Aviation Services introduced a new automated baggage management system at Sharjah International Airport, the SITA ‘bag manager’. “With more than 4.5 million

departing bags handled at UAE’s third busiest airport each year, the new system will provide the airport’s ground handler with the latest baggage reconciliation services and full visibility and tracking capabilities within the airport,” Murphy stated.

Similarly, Abu Dhabi International has also implemented the same bag solution to help streamline its processes.

Looking forward, SITA is geared to play an important role in assisting airlines in implementing new technologies to meet the requirements of IATA Resolution 753 – “in other words to keep tabs on every item of baggage from start to finish,” added Murphy.

This new requirement demands intelligent tracking capabilities such as those offered by SITA’s ‘bag journey’. “This provides a precise picture of a bag’s current location, no matter how many airlines or airports handle it. SITA is therefore well positioned to continue assisting Middle Eastern airlines in the coming months,” said Murphy.

Self-service kiosks have proven to be an extremely versatile interface for a wide range of airport functions and services, and they are now installed at airports globally. These technologies have now been around for a while and it’s imperative that they continue to adapt to meet changes in travel patterns and incorporate new technologies.

Bahrain International Airport will soon be using SITA’s new self-service kiosks. Murphy

confirmed that the kiosks installed at Bahrain International were aimed primarily at meeting a specific need for increased self-service check-in options at the airport.

“They are the latest generation of SITA kiosks,” he said, and added that they were powered by the SITA air transport industry (ATI) cloud, which allows passengers to complete a range of other travel tasks including bag-tagging, as well as make payments for additional services.

SITA’s new-generation kiosks around the globe are increasingly being used to complete various travel steps and, more recently, to download entertainment while on the move.

The company recently began trialling a new kiosk at London’s Heathrow airport, where passengers departing from Terminal 5 are able to access recent Hollywood movie releases on their iPhones or iPads from Heathrow’s ‘entertain me’ kiosks.

“What started out more than a decade ago as a quick and efficient platform to check-in for a flight has evolved to include numerous functions across the airport journey, increasingly completed in from a single kiosk,” concluded Murphy.

UMBRELLA ORGANISATION FOR AVIATION SERVICES

A new organisation for the world of aviation services was launched in Geneva at the European business aviation convention, EBACE, with a goal to help bring consistency to the sector in developing regions.

Liz Moscrop reports.



IASO board members from left: Roy Barnett, Samir Sajet, Munir Khalifa and Ali Alnaqbi.

The new International Aviation Services Organization (IASO) is the brainchild of founder and president Munir Khalifa.

He has spent 25 years at the forefront of supply chain service and understands the challenges and pitfalls of the industry.

The association aims to provide a unified voice for aviation services companies at airports all over the world, establishing a set of common standards to regulate the industry.

One of its key offerings will be a highly confidential risk mitigation database that analyses and gathers information on ground handling and aviation services companies. The resulting data should generate risk factors and highlight the highest quality providers.

Another important offering will be a highly skilled team of lawyers, who will assist members in the event of disputes. If a disagreement arises between members, the legal team will help both parties resolve their issues.

Tendering processes

The organisation also aims to help companies with tendering processes, organise other benefits, such as cheaper insurance, audit support and better fuel pricing, and act as an incubator and facilitator for new ideas and technologies that will benefit the industry.

IASO was unveiled at a special event at the European business aviation convention (EBACE) in Geneva.

The non-governmental organisation will have its main headquarters in Geneva, regional offices in Canada, Sweden, the UAE and the USA, and it is in the process of opening four regional offices in Africa and Asia plus North and South America.

It will, according to Khalifa, provide a direct representative link with other established associations, including the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO), and the

Middle East and North Africa Business Aviation Association (MEBAA).

Founding board members include Chamsou Andjorin, director Africa and Middle East, aviation safety and regulatory affairs Boeing Commercial Airplanes, Captain Samir Sajet from the World Food Programme (WFP), and former Federal Aviation Administration (FAA) manager Roy Barnett, who is the new group's operations-vice president.

Barnett pointed out: "IASO has board members who are actively enrolled in ICAO work panels and remain on the cutting edge of the new technical and regulatory innovation in our industry."

He continued: "We want to create a global voice for all our members and are committed to implementing best practices throughout the industry."

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FROM SPARE BEDROOM TO A SPARES BEDROCK

As component service provider Avtrade marks 30 years in the aviation world, its Middle East office continues to play a significant role in the company's expansion.

Alan Dron reports.



It's the business world's equivalent of a Hollywood 'feel-good' movie: an individual sets up a company in their spare bedroom and builds it up to having a leading role in its sector. In the modern corporate world, it's a path that is becoming less-frequently trodden.

For UK-based Avtrade, however, that route – which has led to the Middle East as the company has steadily expanded – is one that has brought success as it enters its fourth decade.

The company literally started in the spare bedroom of founder Graeme Brooks' home in a small village south of London. A previous European vice-president of sales for a US parts and equipment company, he decided to branch out on his own, with his new company, Avtrade, initially trading in Boeing 737 rotables.

Five years down the road and it had expanded its inventory considerably, although still concentrating on the widely used Boeing twinjet. The business had also grown into the field of component leasing.

By the turn of the century, the company's interests had encompassed the Boeing 747, 757 and 767, as well as members of the Airbus A320 family, the larger A330 and the BAe 146 regional jet.

Path to growth

Its first foray into the Middle East came in 2009, when it opened an office in Dubai. Since then, the company's presence in the Gulf has helped it continue its path to growth.

"The case for Avtrade having a physical presence in Dubai was clear," said commercial director Jamie Brooks, the founder's son, who opened up the office there. "We recognised that, to service this part of the world properly, we needed to be here, to build relationships and to give customers the best possible service. Customers want to be assured of continuity of service and being here helps with this."

The Dubai office initially expanded, primarily through relocation of experienced staff from the UK, to increase the level of service and support to customers in the Gulf. However, since moving into new offices in 2013, it hired more employees who already lived in Dubai, whose local

knowledge and customer relationships were particularly helpful in growing the business.

This expansion has included a further increase in the number of Boeing and Airbus types for which it provides support, as well as also holding inventory for Embraer aircraft.

Avtrade selected logistics specialists Kuehne + Nagel to provide warehousing and distribution services from its aerospace hub in Dubai Logistics City, close to Al Maktoum International Airport.

Kuehne + Nagel's services include inspection, warehousing of spares and inbound and outbound logistics, which has improved Avtrade's ability to provide immediate availability of critical aircraft components and services.

Component repairs

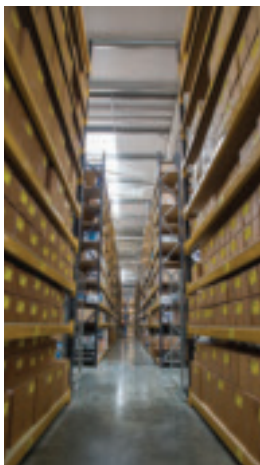
The Dubai operation, which is also responsible for Africa and India, handles component repairs through its own maintenance, repair and overhaul (MRO) team using both original equipment manufacturer (OEM) and independent repair workshops.

The importance of the region to Avtrade was recognised in 2015 when it appointed a dedicated regional MRO manager based in Dubai, but with responsibility for Africa and Asia.

Using local vendors means that repairs to customers' components benefit from reduced turnaround time and costs. By locally repairing units, Avtrade can get the restored parts back into stock without the delays that would be incurred through having to ship them to the UK or US.

However, despite the company's ambitions in the Middle East and elsewhere, it will turn down work if it has concerns that it will not be able to deliver to the required timescale or a client's requirement: "We're not afraid to say no," said Brooks.

Further expansion in the region is likely to come through a widening of its spares pool, rather than opening new offices, says Avtrade. Its focus is on expanding its support for new types, such as Boeing's 787 long-range twinjet.



Avtrade offers immediate availability of critical aircraft components.



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Jordan's C130s are regular visitors to JAC's hangars.

Jon Lake looks at the Jordan Aeronautical System Company (JAC), the Jordanian approved maintenance organisation (AMO) operating from Marka Airport, a joint civil/military airfield in Amman.

JAC specialises in providing support for Royal Jordanian Air Force C-130 aircraft, for Boeing 737 operators in the region, and for locally-based AgustaWestland AW139 helicopters.

The country's central, strategic position gives JAC access to a number of potential customers and clients, and the company is also the beneficiary of Jordan's long-standing political and economic stability.

Marka was built by the British and was RAF Amman from 1922 until 1948, when the Arab Legion Air Force was established. The facilities were shared until 1957, when the RAF handed control over to the RJAF.

Marka was the Royal Jordanian Air Force's main fighter base for many years and also served as Jordan's main civil airport until Queen Alia International Airport opened in 1983.

Today, Marka is Amman's main civil charter and VIP airport, with a military enclave, known as King Abdullah Air Base, housing the RJAF General Headquarters as well as an air lift wing consisting of Nos 3, 7, 8 and 14 squadrons and the Royal Squadron (Jordan's VIP transport unit), plus elements of the Prince Hashim Bin Abdullah II Royal Aviation Brigade – a dedicated special operations support unit.

The base also houses the RJAF's Prince Feisal Technical College and Gliding Club and a police helicopter wing, and is home to the biennial Special Operations Forces Exhibition and Conference (SOFEX) trade show.

Two further facilities at Marka are private companies that are owned and run by the air force – Jordan International Air Cargo (JIAC), operating Ilyushin Il-76 freighters, and JAC.

The organisation that eventually became JAC can trace its roots back to 2000, when Marshall



JAC IS A TRUMP CARD FOR JORDAN

Jordan Ltd was established as a joint venture between the RJAF and Marshall Aerospace of Cambridge (UK). Its aim was primarily to support RJAF C-130 transport aircraft; drawing on the UK company's expertise with the Hercules aircraft and offering line and base maintenance up to and including programmed depot maintenance (PDM). As well as supporting Jordan's C-130s, it was hoped that the company would compete for foreign business, winning contracts to service the C-130 aircraft of other regional air forces.

JAC, itself, was established in 2003 as a private company, operating on a commercial basis, albeit one that was completely owned by the RJAF. JAC was registered in the Marka Private Free Zone and, as such, enjoys some tax and customs exemptions.

JAC became qualified on the Boeing 737-200 in 2006, performing maintenance up to and including C-checks, as a first step towards being able to support the Boeing 737 family more widely. In 2009, it upgraded its capabilities to offer maintenance on the Boeing 737-300/400/500 (classic) aircraft.

The company further expanded the scope of

its services in 2012, when it became an approved service centre for the AW139 helicopter, offering line maintenance and base maintenance up to and including two-year inspections. It also provides maintenance services for C-130 and Boeing 737 powerplants, including removal, installation, trouble shooting, inspection, parts replacement, adjustment, rigging and operational checks. Engines covered include the Allison T56-A-7/-15 and Allison 501-D22A turboprop used by the C-130/L382 Hercules (and the associated Hamilton Sundstrand 54H60-91 propeller), the Pratt & Whitney JT8D low bypass turbofan used by the Boeing 737-200 and the CFM International CFM56-3 series high bypass turbofan used by the Boeing 737-300/400/500. The company also maintains Pratt & Whitney PT6C-67C turboshaft engines used by the AW139 helicopter.

As well as line and base maintenance services, JAC provides avionics and electrical and instrumentation (E&I) capabilities, cabin interior maintenance services, sheet metal and painting services, training courses and parts.

Today, JAC is one of the region's leading maintenance, repair and overhaul (MRO) organisations, providing the civil and military aviation market with complete maintenance solutions.

The company has Federal Aviation Administration (FAA) and European Aviation Safety Agency (EASA) Part 145 approval, as well as holding approvals from many other national aviation authorities. It is proud of its reputation for delivering high-quality, cost-effective and on-time solutions to meet the needs of its customers, while also benefiting the local community and participating in the Jordanian economy.

Attracting and retaining millennials – those born between 1981-2000 – is key to coping with the Middle East’s projected MRO growth, according to a senior business leader. **Barbara Saunders** reports.

OLD WAYS NOT GOOD ENOUGH FOR YOUNG MRO RECRUITS



Is the aviation marketplace aspirational enough for the next generation?

That was the question posed by Ramzi Mansour, Joramco’s director business development & strategy, when he addressed delegates at this year’s Airline Engineering & Maintenance Middle East conference.

Mansour said that millennials will be the crucial driving force to regional maintenance, repair and overhaul (MRO) growth – now said to be rising at 6.7% a year and likely to account for 11 million man hours a year within the next five years. However, he warned, those with less than five years’ experience, now accounted for 67% of total voluntary attrition in the industry with 14% of them leaving the sector completely due to frustration with the pace of career advancement.

Mansour pointed out that the industry has, at 35%, a higher-than-average ratio of ‘baby boomers’ – those born between 1946-1964 – but rates low, at only 17%, for millennial employees.

Mixing and managing three generations of employees – baby boomers, generation X (1966-1976) and millennials is critical to ensure business continuity and knowledge transfer, he said.



Millennials, it seems, are shunning aerospace in favour of jobs in financial services, communications, media and banking. This, said Mansour, posed a big question: “Is the aviation marketplace aspirational enough for the next generation?”

Mansour said experts estimate that the Middle East will require some 66,000 new technical personnel up until 2034, which accounts for 11% of the industry total, and sourcing the skills won’t be easy. Industry stakeholders and strategists, he said, need to “address hidden issues beyond the regular concerns of the difficulty of accessing qualified talent”.

It boiled down, he said, to a key issue: “How can we build and guarantee an adequate pipeline of labour?”

Mansour said attracting the best workers was critical to the future of the labour-intensive MRO sector in the Middle East. “We need to identify, understand and accommodate the characteristics and aspirations of the millennial generation, especially in an industry of highly complex regulations, which impede young talent from entering the profession.”

The first task, said Mansour, was for the industry to understand millennials; an IT-savvy, techno generation, which valued a flexible approach to work.

“They tend to be uncomfortable with rigid corporate structures and expect rapid progression, very regular feedback and encouragement,” he explained. It is a generation that values development

and a work/life balance over financial reward, looks for employers with corporate social responsibility (CSR) values that match their own, has a strong desire to work overseas and is loyalty-light.

“They want fulfilment from work, a collaborative leadership, digital real-time communications and a balanced work/family lifestyle,” said Mansour. “We should encourage cross-mentorship, galvanise through inspiration and information. Organisations need to think meritocracy, not hierarchy.”

The millennials also want access to the best technology and great training opportunities. “Embrace emerging technology, mobility, virtual teams and online platforms and revisit training and development approaches,” suggested Mansour. “Offer apprenticeships and collaborate with educational and training institutions.”

Airlines and MRO organisations will have to tap into

the right motivators with Mansour advising: “Think creatively about reward strategies. Is it time to shift focus from cash bonuses to other things that matter most to them? Incentivise through learning and training.”

Companies will also have to develop a more free culture with flexible work regimes, mobility opportunities and virtual working models. And employers will also have to help millennials grow with job rotation. “Introduce a steady stream of new assignments and learning opportunities,” suggested Mansour.

But, even if all the advice is taken on board, employers should expect their investment in millennials to have a shorter life-cycle than to date. Answers could be in attracting foreign talent, developing cross-industry and public/private collaboration and establishing global mobility programmes to import and deploy talent wherever it is needed, Mansour suggested.

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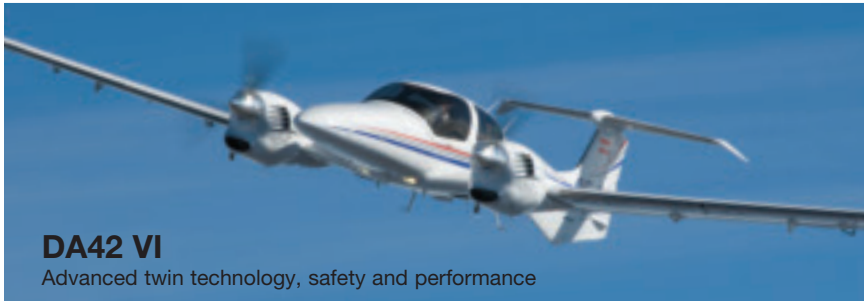
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Clean climb to the top of a lean, green market

Paris-based Safety Line has developed OptiClimb, which offers a way of saving up to 10% of the fuel used during an aircraft's initial take-off climb. Steve Nichols looks at the implications.

Safety Line says the OptiClimb system works by optimising the climb profile for a particular aircraft type to make it as fuel-efficient as possible.

Air France-KLM's low-cost operation Airline, Transavia, trialled OptiClimb for four months and posted regular fuel savings of up to 10% during the take-off phase, equivalent to about 100kg per flight.

The Paris-based start-up developed the OptiClimb fully optimised climb profiles for each of Transavia's individual aircraft, based on historical performance data, the route and the flight conditions on that particular day.

Once these profiles were prepared, changes to the speed and climb characteristics could be made for each aircraft's subsequent flight. The results were fuel savings across the board.

Pierre Jouniaux, CEO of Safety Line, said: "The climb phase is the most fuel-consuming phase of a flight. OptiClimb uses black box data – which is available at zero cost – to very accurately determine and analyse each aircraft's aerodynamic characteristics.

"These can vary from the manufacturer's original specifications as the aircraft gets older. By carefully analysing the actual data from real flights, we are able to optimise the climb rate to give the lowest fuel consumption.

Complex calculations

"We did complex calculations on the ground by analysing the data from each aircraft and the various parameters, such as the take-off weight, temperature and wind. The result was a customised climb profile for the aircraft, rather than the standard manoeuvre that is normally fed into the flight management system."

In December 2015, at the UN Climate Conference (COP21) 195 countries agreed, by consensus, to the Paris Agreement to reduce greenhouse gases.



Pierre Jouniaux: "On a yearly basis the fuel savings can be up to several million euros, depending on the size of the airline."

They agreed to reduce their carbon output "as soon as possible" and to do their best to keep global warming "to well below two degrees C".

Two months after COP21, Transavia decided to apply OptiClimb to its medium-haul scheduled flights as a step towards greener aviation.

Its decision was part of the airline's eco-friendly approach, aimed at reducing greenhouse gas emissions in air transport.

The OptiClimb software has been designed in association with the French Institute for Research in Computer Science and Automation (INRIA).

The ideal climb profile for a particular aircraft is determined ahead of each flight – Safety Line says the slight modification to the flight path does not affect passenger safety or comfort.

"On a yearly basis the fuel savings can be up to several million euros, depending on the size of the airline," said Jouniaux. "Applied across the industry, this could also result in a significant reduction in CO2 emissions."

Saving per flight

Its figures show that, for a big airline with 1,000 flights per day, a 2% fuel saving would represent a 200kg saving per flight, 260 tonnes per day and an annual cost saving of €66 million (\$73.5m).

Jouniaux said that the work it completed for Transavia was based on the Boeing 737, but it is now keen to work with Airbus narrow-bodies as well, especially the A320.

He said that it is currently talking to Lufthansa about potential tests with the airline.

Jouniaux added that 60 million tonnes of CO2, the equivalent of the annual CO2 emissions of Portugal or Vietnam, could be avoided if all airlines in the world were to use OptiClimb.

"We have had a lot of interest from low-cost carriers (LCCs) as each of their aircraft may perform up to seven or eight take-off climbs each day," said Jouniaux, adding that LCCs stand to benefit the most from OptiClimb's profiles.

"The initial results seem hard to believe as the figures are so good. But the only real change is that pilots may have to make two speed changes during the climb phase rather than one – that's not really a lot to ask of them," he concluded.

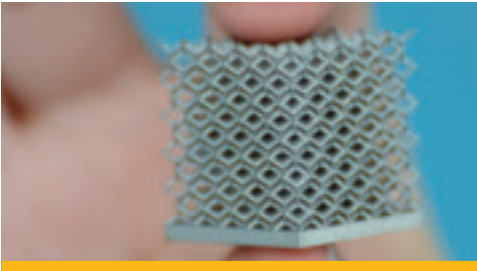
Other companies agree. Safran and Safety Line recently signed a memorandum of understanding to "group their technologies and areas of expertise for the greater benefit of all airlines". The objective is to integrate Safety Line's OptiClimb solution into the SFCO2 service offering from Safran.

Transavia's Boeing 737-800NG.
PICTURE: TRANSAVIA



*Honeywell Aerospace in Phoenix, Arizona, recently threw open its doors to our technology editor **Steve Nichols**, who was invited to view the company's current and future technologies that aim to make flight safer and easier.*

A TASTE OF HONEY



Honeywell is proud of its history and even more proud of what it is bringing to the market over the next few years.

The chances are that, if you've flown on an aircraft, it had Honeywell technology on it, from auxiliary power units, engines, glass cockpits, advanced avionic safety systems and now broadband connectivity.

And it relishes telling you little-known facts.

Did you know, for example, that Honeywell has had systems and equipment flying on both the Space Shuttle and the International Space Station? Or that Captain Chesley B 'Sully' Sullenberger was only able to control his A320 aircraft and land on the Hudson River in New York after losing power from both engines by using hydraulic power from a Honeywell auxiliary power unit, which could be started in flight?

But Honeywell isn't resting on its laurels. This year sees the launch of Inmarsat's broadband Global Xpress (GX) Ka-band satellite system that is being enabled by Honeywell equipment. It is producing the two JetWave fuselage-mounted and tail-mounted antennas for GX and it says the connectivity will open up new markets that haven't even been thought of yet.

Carl Esposito, Honeywell's vice president strategy, marketing and product management, says it is working on supplemental type certifications (STCs) for 20 different aircraft types. "There isn't a product in our portfolio that doesn't or couldn't have a connectivity component," he added.

"GX opens up a whole new avenue for ideas. For example, we are working on 'crowd sourcing' the weather radar data from our RDR-4000 system.

"This could allow you to 'see' what the pilot in an aircraft 200 miles ahead of you is detecting, before you get to the same point.

"We are also working with manufacturers like Rolls-Royce and Gulfstream to see what real-time engine or other technical data could be transmitted back to the ground.

"This could be used for future fault detection or to help prepare ground crews before an aircraft lands."

Tablet-based applications

Honeywell's GoDirect has a number of tablet-based applications available or in development, including My Maintainer, which offers maintenance crews a wireless link with the aircraft for diagnostics and in-flight reporting, and Flight Preview, which gives pilots the opportunity to 'fly' an approach before getting on the aircraft.

Honeywell takes future technology very seriously.

It already offers its SmartView synthetic vision system, which fuses data from multiple sources with the mapping database from its enhanced ground proximity warning system (EGPWS). The result is a pilot display that gives an "arcade-like" view of the world outside the aircraft, whatever the weather or visibility.

Coming up in synthetic vision systems (SVS)

2.0, currently set for launch in 2018, is a new 3D airport map upgrade that can help pilots navigate when they are on the ground.

Tom Lawler, Honeywell's Primus Epic product line director, said: "We've already mapped 300 airports and plan to get that up to 500 by the time the system is certified in 2018. We expect to have up to 700 by the end of the decade.

"SmartView has taken the world by storm," he added. "Once pilots have flown with SVS they don't want to fly without it again."

Honeywell also shows it isn't a one-trick pony with its gas turbine engine designs – so much so that its compressor technology, honed using computation fluid dynamics software running on one of the world's biggest supercomputers, is used in the automotive sector to make turbocharged cars even more efficient and reliable.

The company's work on the Federal Aviation Administration's (FAA's) continuous lower energy emissions and noise (CLEEN) programme is also looking at new combustors, fuels, components, coatings and seals for its engines.

Honeywell's acquisition last year of software company, Aviaso, is also helping in the fields of fuel economy and emissions.

Aviaso's software products gather data on aircraft usage and identify and communicate the ways airline customers can save on fuel consumption. Even single-digit per cent efficiency improvements can save airlines tens of millions of dollars.

Or what else? Well, what about the company's



Honeywell's aviation technology, from left:

Additive manufacturing can now produce highly intricate metal parts.

An image from SmartView's 3D moving maps display.

Honeywell's Boeing 757 test aircraft, complete with an HTF7700 engine for the Cessna Longitude on the pylon.

Craig Balls, VP engineering, Honeywell Transportation.

new runway overrun alerting and awareness system (ROASS) that knows whether an aircraft is capable of safely landing on a runway and issues warnings if it isn't?

Try to land too fast or too steep on a short runway and its voice will alert you before it is too late.

Honeywell is also leading the field in new additive manufacturing technology, known more popularly as 3D printing.

The company has taken this to a whole new level, using electron beam and laser fusion technology to produce metal components and moulds.

Metal lasersintering

The process of direct metal laser sintering, or powder-bed laser fusion, builds components a layer at a time, using a yttrium aluminium garnet (YAG) solid-state laser or high-power electron beam to weld and fuse microscopic metal particles to a computer-generated design.

The results look like cast or forged parts, but the level of fine detail that can be achieved verges on science fiction.

Donald Godfrey, a Honeywell engineering fellow, says it has spent millions developing the technology, but is now reaping the rewards.

"We can now prototype metal parts in days rather than months," he said. "Or make intricate moulds for traditional metal castings by fusing silica.

"One recent casting project was completed in

four days – previously that would have taken 10 months."

Honeywell says it is just scratching the surface of what additive manufacturing can do and is furiously filing patents.

"The possibilities are only limited by our imagination," said Godfrey. "We can now alter the porosity or density of just one small part of a metal component, or produce 20 different prototype parts, each with a slightly different electron beam signature, to see what works best."

Honeywell sees itself using the technology for producing non-safety critical, non-rotating new parts. But it has also successfully used the system to repair wear on the edge of a gas turbine blade.

"This technology is only a few years old and is developing all the time. Who knows what we will be able to do in 20 years," mused Godfrey.

Some of Honeywell's other research work looks like it belongs in a Star Wars movie. How about thought-controlled flight, where your brain waves are monitored to decide if you want to turn or climb? Honeywell already has it working.

Or speech recognition systems that can understand air traffic control radio commands and display them on an iPad? Yes, that too is already working – with uncanny accuracy.

Then there's software modelling to predict what the impact of a sonic boom from future supersonic aircraft would be on the ground so that pilots could avoid built-up areas or slow down to minimise their impact?

The difficulty with writing this feature has not been deciding what to put in, but what to leave out.

Honeywell is also pushing the boundaries of gas turbine design, operating metal parts beyond the point at which they should melt. Craig Balls, VP engineering, Honeywell Transportation said it uses 1,000 degree Fahrenheit (538 degrees C) air to cool the turbine.

Running a gas turbine at very high temperatures makes it the most efficient, but NOX emissions can then be worse. Hence, Honeywell is doing even more research into advanced, alternative fuels and combustion processes to minimise emissions.

Hydrogen pump

But the last word is a look at how future automotive technology could spill back into the aerospace sector. Honeywell has designed a new turbo-powered hydrogen pump that is being used in a fuel cell aboard the new five-seat Honda Clarity electric car. The car may have a range of 300 miles and be capable of being refuelled in just three-five minutes.

The technology could see small hydrogen fuel cells being used on business aircraft instead of batteries.

The truth is, at the moment the company doesn't know whether it is feasible or desirable. But that isn't stopping it from taking a good look, with its "what if" approach to aerospace technology development.

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Philip Chandler with the Phenom 100E.



EY flies ahead with multi-engine core training

The Etihad Flight College, a subsidiary of Etihad Airways, is committed to using multi-engine aircraft in the core phase of its innovative multi-crew pilot licence (MPL) training and believes others may now follow its lead.

Barbara Saunders reports.

The Etihad Flight College at Al Ain International Airport in Abu Dhabi was established in September 2014 when Etihad Airways acquired the fixed-wing training division of Mubadala Aerospace Company's Horizon International Flight Academy.

It broke new training ground when it became the world's first organisation to use multi-engine aircraft in its core MPL training programme, an approach general manager Philip Chandler believes is a pacesetter.

"We are the only college to use a multi-engine aircraft for the whole of the core phase, but others will follow," he said.

Chandler says the multi-engine approach came out of a strong dose of common sense. "In simple terms, the majority of airline pilots who followed the traditional air transport pilot license (ATPL) route will never fly a single-engine aircraft again, so why would we teach our cadets in the same way? Our design philosophy was to start from the right-hand seat of an A320 and work backwards. We concluded that starting with a single-engine aircraft, in a single pilot operation, was not necessary or desirable. Whereas, in the multi-engine aircraft, multi-crew operations are introduced very early on and each lesson is relevant to an A320 operation."

Having recently taken delivery of a new six-seat, twin-jet Embraer Phenom 100E, which Chandler describes as ideal "to prepare our students for line operations" and which goes into training service next month, the college is readying to take imminent delivery of a second Phenom with another two due early next year.

Once the 2017 deliveries are complete, the college will have a fleet of 22 aircraft, which includes 10 Cessna 172SP Skyhawks, six Diamond DA42NGs and two Extra300s.

The college is primarily focused on providing pilots for Etihad Airways, with cadets qualifying as second officers

on completion of the line flying under supervision programme, and qualifying to become first officers after another four months of supervised line flying.

The college demands all local cadets achieve an aviation science degree from Abu Dhabi University prior to enrolment, but also trains for its stakeholder partners, including Alitalia and Air Seychelles.

Etihad employs 2,236 pilots, not including cadets, and operates a fleet of 122 Airbus and Boeing aircraft. With another 204 aircraft on firm order, its pilot demand is heavy.

The college currently has 168 students under training – 114 of which are Emiratis.

Flying course programmes

Forty-seven cadets, who were in various stages of flight training when Etihad acquired the college from Horizon, graduated from legacy integrated ATPL and basic flying course programmes last March and the first 12 cadets from the new MPL training, seven of which are Emiratis including one woman, will graduate by the end of this year.

"We are the sole training provider for Etihad Airways but we are conscious of the fact that we have partner airlines who are increasingly interested in adopting our training philosophy," said Chandler. "We currently have four Air Seychelles cadets doing ATPL, and 24 Alitalia students doing MPL, with another 40 Alitalia recruits expected later this year."

Expansion of the colleges is, according to Chandler, continually being evaluated, though is constrained by the UAE's "increasingly busy skies".

Etihad Airways pilots currently represent 101 different nationalities, including 193 UAE nationals. Sixty-two of its pilots are women.

Barbara Saunders visits Abu Dhabi Aviation, the Middle East's largest helicopter operator, which will this year open the region's first dedicated helicopter training centre.

ADA BREAKS NEW GROUND FOR ROTOR TRAINING

As a business sector grows, training provision is vital. Abu Dhabi Aviation (ADA) is paving the way with the construction of the first specialised helicopter training centre in the Gulf.

The new 7,250sqm facility in Khalifa City will provide multi-product training for ADA's own in-house requirements and those of third-party operators.

The imminent opening was confirmed by the company's chairman, Nadir Al Hammadi, who said the facility, construction of which began last year, will have a complement of at least 12 simulators when in full utilisation with two simulators – one for an AW139 and another for the Bell 412 – already purchased for start-up.

"The rest of the business will be a combination of leasing some of the bays to joint ventures with some original equipment manufacturers (OEMs)," explained Al Hammadi.

International hub

ADA plans to evolve the centre into an international hub for helicopter training. "It will offer multi-product training for our own pilots, including Emirati recruits who come to us from the armed forces, and is available for third-party training," he explained. "Clients in the Middle East will be able to use this facility instead of going to Europe."

The chairman said training had been identified as a growth area for the company, which this year celebrates its 40th anniversary. "Another is real estate and we are planning a new company to enter this segment," said Al Hammadi. "We want to consolidate our business to ensure we are sustainable. I hope the company will be up and running within six months and it will operate in the commercial real estate sector with an international approach leveraging the real estate assets the group already has."

He said the consolidation approach was identified before the international oil price downturn and was not in response to it. "It is along-term growth strategy."

The chairman also confirmed that ADA is in contract negotiations for expansion into the South American and Far Eastern markets and anticipates further growth from planned expansion of its maintenance, repair and overhaul (MRO) activities.



"Clients in the Middle East will be able to use this facility instead of going to Europe."

NADIR AL HAMMADI

Meanwhile, the company has been celebrating reaching one million hours of successful operation of its Bell Helicopter fleet.

ADA, which has been operating Bell Helicopter aircraft since 1976, now has a Bell fleet of more than 44 aircraft comprising 212s and 412s that fly an average of 100 hours per day. "With outstanding customer support and service maintenance, we have managed to achieve an operational readiness of 100% during the past two years," said ADA general manager Mohamed Ibrahim Al Mazrouei.

Fly-by-wire flight controls

ADA has also issued letters of intent to buy 10 of the medium-lift Bell 525 'Relentless' helicopters – the world's first commercial helicopter to incorporate fly-by-wire flight controls. The first delivery is due next year immediately after the aircraft's certification. ADA is Bell Helicopter's largest Middle East customer.

ADA operates a fleet of 60 helicopters and four fixed-wing aircraft. It employs more than 1,200 people, including 150 pilots and 285 engineers and technicians, providing offshore oil support and other services worldwide, with a core focus on Abu Dhabi's oil and gas production sector.

Its current service offering also includes VVIP passenger transportation services, search & rescue services for the United Arab Emirates, crop spraying, aerial construction, seismic support, health emergency medical services in the UAE and Saudi Arabia, fire fighting in Spain and third-party maintenance support.



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Business is booming at Turkish Aerospace Industries (TAI), which has grown into one of the biggest aerospace companies in Europe. Alan Warnes looks at the reasons behind the success.

TAI's prototype T129, P6, was involved in hot and high trials in Pakistan during late May. It flew seven sorties in three different locations. The Turkish Army is now flying 12 T129 ATAKs.

PICTURE TAI.



GREEN FOR GO – HOME AND AWAY

The Turkish Government wants to become self-sufficient by supplying its own products to fulfil its domestic aerospace market.

At the same time, Savaunma Sanayii Mustesarligi (SSM – Undersecretariat for Defence Industries) has been instructed to start exporting more, to offset the costs of catering for the domestic market.

Located in Ankara, TAI facilities cover an area of 5 million square metres with 300,000sqm under roof. The company's capabilities range from manufacturing parts to aircraft assembly, flight tests and delivery.

Today, TAI acts as an important partner in many international aerospace programmes, including A400M, F-35 Joint Strike Fighter, A350XWB and Boeing 787. It is partnering with international businesses including Airbus, Boeing, Lockheed Martin, Northrop Grumman and Sikorsky.

A considerable part of its export revenue stems from foreign partnerships and international projects. Additionally, there are numerous upgrades programmes as well as a large presence in space systems.

In 2014, TAI's turnover exceeded \$1 billion for the first time. Then, last year, it increased by 3.2% to \$1.035 billion – 54% coming from military sector and 46% civil.

It's all a long way from the \$80-90 million



it started out at in the mid-80s. Back then TAI was a sub-contractor, a company with no products of its own, which allowed original equipment manufacturers (OEMs) to make use of its capacities.

Today TAI is a prime contractor on a lot of military products – the Anka unmanned aircraft system (UAS), T129 ATAK advanced attack and tactical reconnaissance helicopter and Hurkus basic trainer aircraft are among the jewels.

■ ANKA UAS

TAI views the Anka medium altitude long endurance (MALE) UAS as a multi-role

Working with the F-16 over four decades has helped TAI build up its expertise and knowledge in new technologies.

intelligence, surveillance, target acquisition and reconnaissance (ISTAR) system. It will operate with a 200kg payload for 24 hours at up to 30,000ft.

The payload includes a synthetic aperture radar (SAR) and electro-optical infrared (EO/IR) turret sensor capable of tracking targets at long distances. The Anka is also equipped with a line of sight (LOS) datalink that can facilitate ranges up to 125 miles (200km) from the ground data terminal.

There are three versions. The first Anka Block A prototype successfully performed its 14-minute maiden flight from Sivrihisar Air Base in Eskisehir Province, on December 30, 2010. Equipped with an ASELFLIR 300 electro-optical reconnaissance, surveillance and targeting system and basic data link/comms, the acceptance test campaign was completed in January 2013.

Today there are two Anker As surviving from the four prototypes built.

The prototype Anka-B, which is the second phase of the programme, made its first flight on January 30, 2015. It adds an Aselsan SARPEN synthetic aperture radar (SAR), with an inverse SAR and ground moving target indicator (GMTI) capability. It has since been converted to an Anka S.

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The beyond-line-of-sight (BLOS) Anka-S is now being developed with a next generation Aselsan or Star Safire 380 HD EO/IR/laser payload and equipped with satellite communications, thus not being restricted by the data-link's range. It is expected to make its first flight later this year.

The Turkish Police has six Anka Bs on order, while the air force has a requirement for 10 of the S models.

T129 ATAK AND OTHER HELICOPTERS

On September 7, 2007, the SSM signed a contract with AgustaWestland, Aselsan and TAI for the Turkish Land Forces Command ATAK tactical reconnaissance and attack helicopter.

The \$1.2 billion deal comprised 51 T129s for the Turkish Army, with options for a further 40.

TAI is the prime contractor, while Aselsan and AgustaWestland are the major sub-contractors. TAI also has worldwide export rights – except for Italy and the UK.

An additional contract was signed with AgustaWestland on November 8, 2010, for nine T-129A combat support early development helicopters (EDH) variants to enable early delivery of these basic versions.

These are in addition to the 50 that the Turkish Army has ordered and the single prototype (P6), used for test and development.

All nine EDH T129As are now operational with the Turkish Army along with three serial production T129Bs. TAI plans to deliver between 15-17 ATAKs next year.

The CIRIT laser-guided air-to-ground missile has been integrated on the T129Bs and is now operational with the Turkish Army, while the UMTAS anti-tank missile and Stinger air-to-air missile qualifications are on-going. The former is expected to be operational by the end of the year and the Stinger will then follow.

As part of on-going negotiations with the Pakistan Army, TAI's T129 P6 spent 10 days undergoing hot and high evaluation trials in that country during late May. It saw the ATAK operating in temperatures of 50° C and being flown by a Pakistani Army Aviation pilot alongside a TAI test pilot.

In 2010, the Pakistan Army was close to ordering 15 T129s but the deal never materialised.

Turkey's SSM signed a \$3.5 billion agreement with Sikorsky Aircraft on February 21, 2014, which will allow TAI to assemble an initial batch of 109 T-70 Black Hawks for the domestic market.

The T-70 is a version of the S-70i Black Hawk International developed specifically



for Turkey, selected as the winning contender for the Turkish utility helicopter programme (TUHP) requirement.

The deal also includes options that could eventually lead to production of up to 600 such helicopters over the next three decades, around half of which would be for the export market.

On June 7 this year, TAI, as the prime contractor, signed agreements with SSM and Sikorsky Aircraft, along with three key Turkish aerospace contractors – Alp Aviation, Aselsan and Turkish Engine Industries (TEI).

Over the next 10 years these companies will deliver 109 T-70s to six different Turkish end-users, with first deliveries planned for 2021 and the final helicopters in 2026.

TAI will be responsible for manufacturing the helicopter cabin, cockpit, tail cone, horizontal and vertical tail, composite main and tail rotor blades, including all major airframe structural components, plus final assembly, testing and integrated logistics support, while TEI will produce the T-700 engines under license from General Electric.

Aselsan will develop and integrate basic avionics and, in addition, the company will co-develop with Sikorsky an enhanced digital cockpit, known as the integrated

New fighter for T-FX

The Turkish Government is seeking a new fighter for its T-FX programme. Widely tipped to be twin-engine, it should make its first flight in 2023, to coincide with the 100th anniversary of the state of Turkey. The Turkish Air Force and SSM are working on a schedule for the sequence and scope of the contracts that need to be signed. BAE Systems has been selected to work with TAI in the aircraft's design.

modular avionics system (IMAS).

Alp Aviation will manufacture and assemble undercarriages, gearbox components and dynamic parts.

The first flight of a TAI-assembled T-70 is expected to take place 45 months after the contract signature, with delivery expected 10 months later.

TAI is also in the early stages of developing a five-tonne twin engine Turkish Light Helicopter (TLH), aimed at the paramilitary, civil and military markets.

The company's Gorkem Bilgi said: "They will replace the UH-1 in Turkish military service, which serves the Army and Air Force in big numbers.

The prototype, powered by the same engine as the T129 – the LHTEC CTS 800 – is expected to fly in 2018. We believe there is a requirement for up to 300 TLHs."

TAI is building a new helicopter facility on its Ankara site, phase by phase, with the new rotor and transmission department being opened by the end of 2016.

HURKUS

Another of TAI's future hopes is the Hurkus basic trainer aircraft. It has been designed by TAI to meet the training and light attack/armed reconnaissance aircraft requirements of the Turkish Armed Forces.



Far left: One of the Anka-A prototypes, with its Aselsan 300 EO/IR FLIR under the nose, parked in one of the hangars at TAI.

Far left, bottom: Technicians work on one of the nine EDH versions, which were assembled at TAI. All of them are now flying with the Turkish Army.

Left: The Hurkus A was rolled out in June 2012 and made its flight in August the following year. Along with the other flying prototype, it is being used for EASA certification. Two more variants, the Hurkus-B/C are now being developed.

Left, bottom: As part of a deal to upgrade 68 T-38As, TAI worked on five prototypes spanning various generations. Kits were then transferred to the Turkish Air Force at Eskisehir, which completed the T-38AM upgrade. The last four are due to be completed in September.

Hurkus-A is the basic version, being certified by the European Aviation Safety Agency (EASA) for the civilian market. There are four prototypes – two flyable and two for structural testing.

The first, TC-VCH, flew on August 29, 2013 and was followed on September 10, 2014 by the second, TC-VCI. The third is being used for static tests and the fourth for fatigue and damage tolerance tests.

Özcan Ertem, senior executive vice president of the aircraft group said: “The flight test programme is expected to be certified by the Turkish Civil Aviation Authority and EASA by the end of July. So far, around 500 sorties have been flown, which have included stalls, spins, in-flight engine shutdowns etc.”

The contract for the Hurkus-B new generation basic trainer was signed between SSM and TAI on December 26, 2013. The Turkish Air Force will take delivery of 15 with another 40 on option.

The first one, fitted with a military glass cockpit and three multi-function displays per seat, is expected to fly by the end of 2017.

Ertem added: “All the sub-systems are currently on order and the production process is on-going with a capability of two aircraft per month. The process is on schedule as per the contract signed in June 2014, with the first delivery expected in

June 2018, and the last in June 2019.”

The third Hurkus-C derivative is the new generation light attack/reconnaissance aircraft with an armoured cockpit and a 1500kg external store capability, which will include 250lb and 500lb laser-guided and conventional bombs, rocket pods, .50 calibre machine gun, an EO/IR sensor and external fuel tanks.

■ F-16 WORK

TAI cut its teeth on the F-16 after the Turkish Government selected the fighter to defend its skies in the 80s. It has been a great success, both for TAI and the Turkish Air Force. The skills and technologies used by TAI have without doubt driven the company on to greater success.

Under Peace Onyx I/II and IV, TAI built 258 F-16s and has also upgraded Jordanian and Pakistan Air Force jets in addition to Peace Onyx III's 165 Turkish Air Force F-16C/D Block 40/50s.

More work is to follow, according to Ertem: “TAI already has a turnkey contract with SSM to perform life extensions for all 35 Block 30s. Lockheed Martin will supply kits to TAI, which will then perform the modifications and do the ground/flight testing. Upon collecting the kits, in 2017, two lead-the-fleet aircraft (1xC, 1xD) will start modification. Serial

modifications will begin in 2018. After this, Block 40 life extension could take place.”

As a subcontractor to Northrop-Grumman and sole source outside USA, TAI is also building the forward fuselage (behind the cockpit to mid fuselage) of F-35A models. TAI supports both final assembly lines located in the USA and Italy.

■ UPGRADES

Meanwhile, TAI continues with developing and implementing upgrades to much of the Turkish Air Force fleet. Four Hercules – one C-130E and three C-130Bs – have been modernised with the Erciyes kit, while three more, a C-130E, C-130B and former Royal Saudi Air Force C-130E, are being upgraded by the Turkish Air Force facility at Erkiilet with kits supplied by TAI. The company is also working on additional software capabilities as requested by the air force.

The T-38 upgrade programme is now close to completion. The company modified five prototypes from different generations before the kits were transferred to the Turkish Air Force maintenance facility at Eskisehir, where the work is being done. Work on the last four of the 68 T-38s will be completed by September 2016.

The skills and technologies used by TAI have without doubt driven the company on to greater success.



In March this year, Turkish Technic was named maintenance, repair and overhaul (MRO) company of the year in the prestigious *Air Transport News* (ATN) awards.

It was, in many respects, a remarkable achievement for a company also celebrating its 10th anniversary this year.

However, the award could also be viewed as a logical consequence of the company's focused pursuit of its objectives and goals and a milestone on a much longer path.

Turkish Technic traces its roots to the founding of its parent, Turkish Airlines (THY), in 1957. By the time of its own incorporation in 2006, it had already amassed nearly half a century of experience and expertise on aircraft ranging from the DC-3 to the latest Airbus and Boeing passenger jets.

What makes the ATN award significant and highly regarded is that finalists for each category are selected in a poll of their peers, with the winners decided by a panel of eight respected industry figures.

Chief executive Ahmet Karaman, speaking at the award ceremony in Salzburg, Austria, said: he was honoured to accept such an "iconic award" that recognises Turkish Technic as "the world's new rising brand" in MRO.

Wide range of capabilities

Many outside the industry would be surprised to learn that Turkish Technic is one of the largest MRO providers in Europe and the Middle East, thanks to its wide range of capabilities approved by the European Aviation Safety Agency (EASA), the Federal Aviation Administration (FAA), and Turkish Directorate Civil Aviation Authority (DCCA), as well as at least 18 other national authorities.

It also provides base maintenance, component maintenance and pool services for THY and a growing list of third-party customers, who are beating a path to its showpiece aviation maintenance and repair centre (HABOM) at Istanbul's Sabiha Gokcen airport.

Officially opened in 2014, the HABOM complex of hangars and workshops has the space to provide MRO services to 14 aircraft – 11 narrow-bodied and three wide-bodied – at the same time. The company invested \$500 million to create what amounts to a modern MRO campus.

HABOM has allowed Turkish Technic to separate its third-party work for close to 70 international and 15 domestic

Turkish Technic, the MRO arm of Turkish Airlines, is looking to cast itself as a 'next generation' company, incorporating production alongside maintenance, plus a sense of social responsibility. **Chuck Grieve reports.**

THE BRAND NATIONAL...



customers from its support of the THY fleet, which it carries out at Istanbul's other airport, Ataturk International. It employs about 4,500 people, of whom 75% are classed as technicians.

In 2014, the company carried out work on 2,776 aircraft, the vast majority from the THY fleet.

Turkish Technic makes no secret of its aspirations to become one of the dominant players in the competitive MRO market. It is also an innovative company, looking for ways to gain competitive advantage.

One area where it is having success is production. In the 2014 annual report, then-chairman Hamdi Topçu outlined the company's ambitions to take what he described as a "next generation" approach, which would enable it to introduce competitive products. Turkish Technic, he said, would become an 'MROP' provider, the P standing for production.

Armed with EASA and Turkish DGCA



Ahmet Karaman: honoured to accept such an "iconic award".

approvals as a design and production organisation, it has proceeded mainly in the areas of cabin interiors and in-flight entertainment (IFE) solutions.

Last March saw one of the first signs of success with this approach when the wireless IFE system, SKYFE – the first 'made in Turkey' IFE system – developed jointly by Havelan and Turkish Technic was selected by competitive tender to equip 44 aircraft in the Turkish Airlines fleet.

Two other Turkish Technic joint venture affiliate companies, Turkish Cabin Interior (TCI) and Aircraft Seat Production (TSI), manufacture aircraft seats and galleys; engine and turbine services are provided through Goodrich Turkish Technic Services and Turkish Engine Centre (TEC), a partnership with Pratt & Whitney.

Success in economy class seat manufacturing efforts encouraged Turkish Technic to invest in setting up a company in the US in 2014 to



manufacture business class seats for wide-body aircraft.

The company is well aware that its geographic location at the hub of three continents, and with 55 countries within a 3.5 hours flight of its base, brings advantages and scope to expand as the industry does. Middle East air traffic and airline growth are expected to be “well above the global average” for the next 10 years, David Stewart, head of ICF’s aerospace and MRO team, told MRO Network, resulting in “a more than doubling of spend on MRO”.

Collaboration agreement

Earlier this year, with a senior Boeing executive telling a UAE newspaper that the Seattle-based airframer expected “some good things” from Turkey in the near future, Boeing signed a new collaboration agreement with THY that would enhance both the airline’s industry leadership and Turkey’s aerospace and technology capabilities, through Turkish

Technic.

It will also enhance the relationships that Turkish Technic enjoys with long-term customers, such as Indian carrier SpiceJet. It provides component support, including landing gear repair and overhaul, for the airline’s Boeing 737NG fleet under contracts running for 5-10 years up to 2023.

Among regional opportunities for which Turkey is well positioned is the re-emergence of Iran, after years of isolation, and the re-equipment of its civil fleet with modern commercial airliners. Turkish Technic was reported in late 2015 to be in discussion with Iranian interests on a joint MRO venture. In discussions, the emphasis was reportedly on training and transferring knowledge to the Iranian workforce.

This is part of the third-party business that Turkish Technic relies on to help it achieve its target of £1.5 billion in annual revenue. “We feel justifiably proud to wave our flag in faraway countries and to

be able to call ourselves a global brand,” said Topçu in the 2014 annual report.

For all its outward-facing world view, Turkish Technic takes its domestic responsibilities seriously, recognising that as one of the largest companies in the country’s transport sector, its leadership is important for the success of its supply chain, which ultimately will contribute to the success of Turkey itself.

Turkey, a member of the Emerging 7 (E7) global economies, expects to move up the world league table from No 16 to become one of the top 10 economies by 2050. Its multi-faceted ‘vision 2023’ plan envisages expanding gross domestic product (GDP) to \$2 trillion by 2023, its centenary.

In the transport sector, the country aspires to produce its own aircraft, unmanned aerial vehicles (UAVs) and satellites.

Turkish Technic supports the goals of ‘vision 2023’, Topçu said, and understands that its initiatives will have an impact, directly and indirectly, on the targets set out in the plan. That is why, he said, the company was committed to considering “national concerns” such as creating employment opportunities as well as normal commercial criteria in its decision-making.

Non-Turkish nationals

It is notable, among Turkish Technic’s direct competitors in the Middle East, that its workforce contains very few non-Turkish nationals. The company believes this is a strength. It encourages its own engineers help build the company’s talent pipeline by teaching courses in aircraft systems at Istanbul Technical University and basic aircraft knowledge and avionics systems at Yıldız Technical University. The courses are intended to give students a flavour of the industry through a combination of theory and applied information.

Karaman, speaking at the Paris Airshow in 2015, said Turkish Technic is “forward-focused on the next decade” and has “significant investment plans, such as new facilities at Istanbul Grand Airport (IGA)”, which is planned as the world’s largest airport.

“Turkish Technic stands behind its vision of becoming one of the most preferred maintenance centres in the global MRO market,” said Topçu.

“With its human and environmentally conscious approaches, as well as its focus on innovations and sustainable standards, the company takes firm steps toward carrying its national market leadership into the global market.”

Knowing the drill: The HABOM complex of hangars and workshops has the space to provide MRO services to 14 aircraft.



Airports are complex organisations and Turkey is taking bold steps in building a new mega-hub.

Keith Mwanalushi looks at the scale of the project.

HUB WITH HIGH EXPECTATIONS



IGA Havalimani Isletmesi AS – the company building Turkey’s new airport to the north of Istanbul – has its work cut out.

With a capacity to accommodate 90 million passengers per year at its opening in the first half of 2018, Istanbul New Airport will be one of the largest in the world.

The facility will be built over an area of 76.5 million square metres and the construction will be carried out in four phases, of which the first will be finalised in two years’ time.

The project is the biggest public-private partnership ever undertaken in Turkey, with a 25-year concession period. IGA is committed to pay the state €22.1 billion (\$24 billion), plus taxes, over 25 years starting in 2017. Private and state banks are financing the first stage of the project, worth a total of €4.5 billion.

As a result of the strong and consistent development of countries such as China, India, Russia, Indonesia, and Turkey, the growth axis of the world has shifted from the west towards the east. This development has also caused a shift in the dynamics of the aviation industry on the same axis.

“Each year, approximately 40 million tourists visit Turkey; around 70% of them travel by aircraft,” declared IGA’s CEO, Yusuf Akçayoglu.

Turkey has a population of 76.6 million and half of those are under 30, generating 150 million passengers in 2013, which is a five-fold increase in the last decade, according to data provided by IGA. Flagship carrier Turkish Airlines has also been expanding rapidly in recent years.

“The importance of the Istanbul New Airport is now evident,” said Akçayoglu, adding that, with this mega project, Turkey had taken an enormous step towards meeting the challenges that the world aviation industry will face in the coming years. “The current airports are also unfit to serve the latest-generation wide-body aircraft,” he said.

Absence of capacity

John Grant, senior analyst at air travel intelligence company, OAG, said there was an absence of capacity, especially in the peak hours, at the country’s existing airports – particularly in Istanbul.

“Our schedules data at OAG reveals that Istanbul Ataturk Airport is running in excess of 25 arrivals and departures every hour across the whole day and Sabiha Gokcen is not far behind; which indicates that future growth in the peak hours may already be constrained and for any emergent market, that is clearly something that needs to be addressed,” he said.

The new ATC unit will tower 90 metres high.

Right: Phase one will cater for 90 million passengers.

In the last decade, Istanbul has grown into a major hub, with Turkish Airlines now serving more countries than any airline in the world. “Combine that with a really strong low-cost market sector and healthy domestic market, then Turkey, specifically Istanbul, remains one of the few hub airports that will be able to challenge the likes of Dubai in the next decade,” said Grant.

OAG data shows that, in 2006, Turkish Airlines scheduled some 64,482 flights from the two Istanbul airports; in 2016 the planned schedule reflects 193,564 – three times as many in a 10-year period.

Phase I of the project is expected to be completed in 2018 and Akçayoglu reported that the installation of the terminal steel roof started in January this year. He added that the roof covering works started at the end of June and the construction of the air traffic control (ATC) tower would also start soon.

“This summer construction works on third-party company buildings, such as catering, cargo, ground services and aircraft maintenance buildings, will start,” the CEO confirmed, adding that runway construction had already begun.

This airport project has many standout features. Along with the largest terminal under one roof, the facility will feature



Europe's largest car park, with 18,000 spaces.

Unifree Duty Free will build the largest duty-free shopping area in the world, across 53,000sqm of space. The 20,000sqm express cargo area will be established by DHL and the airport will be operational on a 24-hour basis.

It is one of the biggest projects ever in Turkey, with an investment worth €10.3 billion, but new airport projects of this scale are complex and typically face a number of technical challenges.

"There are many challenges but, at the same time, many opportunities," Grant observed. He said it began with having available land resources and then building the subsequent supporting infrastructure. "In the UK, we are struggling to find a solution to the capacity issues in London and yet in Istanbul a new multi-runway airport is being built in record time."

Once the infrastructure plan is well advanced, it then becomes a major logistical project, moving airlines, reallocating slots, adjusting schedules and undertaking all of the necessary marketing and communications around the new airport – how to get there, minimum check-in times and so on.

"It's also, of course, a challenge in terms of the work forces and migrating the



Yusuf Akçayoglu:
New airport will be a hub for passengers and a centre of IT innovation.

current staff to a new airport, many of whom will live close to one of the existing two facilities; factoring that into working hours and terms, and having to recruit new staff for the expanded airport. These are all positive challenges for such a facility," Grant stated.

Today's fast-growing airports are implementing a number of 'smart' technologies to meet the growing number of tech-savvy travellers.

Akçayoglu is certain that the new airport will be a hub for passengers and a centre of IT innovation. "IGA will offer a comprehensive set of IT solutions to enhance the passenger experience, such as

self-service equipment with biometric features," he said.

He mentioned a number of technologies, including smart kiosks, social media-enabled services, airport gaming, loyalty services, queue management, airport mobile applications and a seamless internet of things (IoT) framework to communicate with smart infrastructure in order to deliver a more efficient and effective user experience.

Also, so-called beacon technology will be established for indoor navigation – small gadgets, the size of a matchbox, localise passengers inside the terminal. Airlines can easily provide passengers with indoor directions, walking times to gates, lounge access, and boarding alerts. Visually impaired or handicapped people will be able to use the indoor voice navigation. In another innovation, passengers who possess biometric chipped passports will be able to use automated e-passport gates, avoiding long lines to get through passport control more quickly.

The new airport will make use of airport collaborative decision-making (A-CDM). Akçayoglu explained: "The A-CDM concept aims at improving air traffic flows and capacity management by

CONTINUED FROM PAGE 89

reducing delays, improving the predictability of events and optimising the utilisation of resources, which will be implemented to allow each partner (airlines, ground handlers, ATC, security, caterers etc) to optimise their decisions in collaboration with other A-CDM partners, knowing their preferences and constraints and the actual and predicted situation.”

To enhance the passenger experience, Akçayoglu is especially happy with the new bag drop solution. “It enables passengers to check-in their luggage quickly and easily. The system is simple. Having checked in online, or at the airport kiosk, passengers will be able to weigh their bags and use their boarding pass at the self-bag-tag kiosk to generate a label for their bag. They will then be directed to the designated bag drop zone, where they can transfer the luggage themselves,” he explained.

Keep passengers informed

The new airport will be fitted with around 3,000 monitors to keep passengers informed. These will be located in different zones, like check-in counters, gates and baggage claim carousels. “By providing cutting-edge technology with both hardware and software, the accuracy of flight information will be improved and the aesthetics of the terminal environment will be enriched,” Akçayoglu added.

Istanbul New Airport’s ATC tower is being developed by AECOM, a company that provides engineering, consulting and project management services for infrastructure projects, in conjunction with Pininfarina, which won an international design concept competition.

“In design, AECOM and Pininfarina’s aerodynamic and organic formations meet the shape of a tulip, which is well known as Istanbul’s symbol,” said Akçayoglu.

The tower is 90 metres high and is built on a 5,100sqm construction area. “As the air traffic will be controlled from two floors at the top, the technical management will be handled in the first two floors and in the basement,” he continued.

IGA is planning a next-generation ATC system with DHMI – which is Turkey’s general directorate of state airports authority.

Integrated controller working position (ICWP) will be in place covering advanced surface movement guidance and control systems (A-SMGCS), electronic flight strips, departure clearance, weather and equipment status information.

“The A-SMGCS implementation,



Turkish Airlines has contributed to soaring passenger numbers.

which is the main element of ICWP, will be the one of the biggest in the world.

A-SMGCS surveillance functions allow for the identification of aircraft on the movement area and transponder-equipped vehicles in the manoeuvring area. It provides for enhanced safety and protection of the runway as one means for avoiding runway incursions. One of its best benefits is to allow for enhanced low-visibility operations,” said Akçayoglu.

The airport will utilise an electronic flight strip and departure clearance (EFS&DCL) system in place of the paper strips in order to manage “departure clearance” demands coming from the aircraft.

Akçayoglu acknowledged that traditional paper strips have several limitations. “They are time-consuming to print and update, the information on the strips stays with the controller, and the possibilities for integration with safety nets are limited,” he explained. “At a modern commercial airport, where traffic and safety demands are continuously increasing, an EFS&DCL system is a highly customisable solution to support the specific needs of the controllers.”

In June, Boeing announced a new technical assistance agreement with IGA. Through the agreement, Boeing subsidiary, Jeppesen, will provide its total airport and airspace modeller (TAAM) solution to assist IGA and DHMI. This group will support the development of Istanbul New Airport airspace design, the airport operation optimisation programme and an operational readiness plan.

“We look forward to working with IGA and DHMI to find the most effective operational concepts for the Istanbul area, as part of the overall investment in the infrastructure of Turkish aerospace,” said Aysem Sargin, managing director of

Boeing Turkey. “Using our TAAM tool, we will be able to show the impacts of all operational concepts and assist the Istanbul New Airport team to make the most informed decisions possible for the new airport.”

Grant recalled having briefly worked on some air service development activity at Sabiha Gokcen when the new terminal had been developed and the low-cost sector was beginning to emerge. “Even then you could see that, over time, the two airports would be challenged for capacity and people were already discussing the new airport location and planning was at an early stage.

“In the UK, we were in our 10th year of discussion around the need for a third runway at Heathrow, which just shows how quickly the authorities have moved in Turkey to make the new airport a reality,” said Grant.

Unique market

He believes that Turkey is, in many ways, a unique market, which gives it the strength that is seen today.

“In Istanbul it has a very well-placed geographic hub, supported by a major airline, which, in turn, is part of the world’s largest airline alliance. It also has a considerable range of domestic destinations, which all connect in Istanbul and provide a healthy balance of local market demand and connectivity to the rest of the world.”

All of this surely places Turkish airports at a competitive advantage relative to their neighbouring markets. “The most immediate challengers are Dubai and Doha, and to a lesser degree Frankfurt, but Istanbul really does suck the traffic up from around the region and is the key hub for many neighbouring markets, purely because of the size of the local market and the services that it can support,” Grant summed up.



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Mehmet Nane, CEO of Turkey's second-largest airline, gives Alan Dron the lowdown on re-fleeting, expansion plans and an aircraft manufacturer's indecent proposal.

PEGASUS LEAPS INTO A BRAVE NEW FUTURE

Pegasus Airlines last month became the first airline in the world to operate the CFM LEAP-1A-powered version of the Airbus A320neo.

It was another milestone in the steady expansion of Turkey's largest low-cost carrier (LCC), which is now second only to giant flag-carrier Turkish Airlines in the strategically-positioned nation.

Pegasus and Turkish have ridden the wave of the nation's economy, which has expanded at close to 5% annually for the last three decades. That growing wealth, together with a youthful national demographic and a population of 80 million, has seen Turks taking to the skies in steadily increasing numbers.

Additionally, the explosion of inbound tourism to the country since 1985 has helped fuel Pegasus' growth.

Tourism has brought considerable benefits to Turkey, but is vulnerable to external factors. A series of terrorist bombings in Istanbul, Ankara and elsewhere this year as well as the three-month state of emergency following July's failed military coup has seen western European tourist numbers drop significantly.

At least as serious has been the diplomatic stand-off between Russia and Turkey. The two countries have backed opposing sides in the civil war in Syria, with Moscow giving military backing to President Bashar Assad, while Ankara supports opposition factions.

Tensions between Turkey and Russia – both headed by leaders who take a strong approach on international affairs – came to a head last December with the shooting down by Turkish Lockheed Martin F-16s of a Russian Sukhoi Su-24 that had intruded into Turkey's airspace. A diplomatic row erupted, with President Vladimir Putin slapping sanctions on Turkey and banning the sale of Turkish charter holidays to Russians. The seriousness of that move for the Turkish tourist economy can be gauged by the fact that 4.5 million of the 11 million visitors to Turkey last year were Russians.

The effect of both these developments could be seen in Pegasus Airlines' Q1 2016 financial figures. The carrier's net loss



widened to TL173.6 million (\$61.2 million) from TL50 million for the same period a year earlier, and it described the period as "difficult".

Nevertheless, turnover for the quarter was a substantial 19% up on the same period in 2015 at TL691 million and passenger numbers climbed at virtually the same rate, 18.6%, to 5.36 million, indicating that although yields had been squeezed, the popularity of flying – particularly within Turkey – had not.

Domestic traffic last year accounted for almost 14 million of Pegasus' 22.3 million passengers and the rate of domestic expansion was 15.4%, compared to growth of 9.8% on its international routes.

Internal passengers

In 2015, Pegasus flew 28.3% of all Turkish internal passengers and its figures for Q1 2016 saw it breach the 30% mark.

The country is ideal territory for the creation of a domestic market, said CEO Mehmet Nane, who succeeded Sertaç Haybat in March. "Turkey is a big country. Flying from Istanbul [in the west] to Van or Erzurum [in eastern Anatolia] takes almost two hours. That's the same time as it would take to fly from Istanbul to Vienna or Budapest."

Additionally, Turkey has a weak rail network, while buses, the traditional method of making lengthy domestic journeys, take 24 hours to cross the

Pegasus A320 - but in July the airline took delivery of the world's first LEAP-powered Airbus A320neo.

country. The latter are being replaced by air traffic and Pegasus serves no fewer than 33 domestic destinations.

That market remains strong and Nane believes that the geopolitical problems will be fixed sooner rather than later: Turkey would unite against terrorism, he said and he believed Ankara and Moscow were talking to each other to resolve their differences. He anticipated an improvement in the second half of the year.

Pegasus' international route map covers Europe and, increasingly, the Middle East and Central Asia. Nane sees all these areas, together with Russia and sub-Saharan Africa, as targets for further expansion. He declined to say where in Africa Pegasus might serve, but if it does launch itself into Africa, it will be following in the footsteps of Turkish Airlines, which has expanded aggressively there in recent years and has said its ambition is to be the largest carrier on the continent.

When interviewed by *Arabian Aerospace* three years ago, Nane's predecessor was cautious about involvement in the highly-competitive Gulf market, but Pegasus now flies into Dubai, Doha, Muharraq and Kuwait.

However, it is the large Saudi Arabian market that really attracts Pegasus and a significant development came earlier this year with the signing of a codeshare agreement with Saudi carrier Flynas.

Pegasus already operates into Jeddah and Medina, but the new agreement will allow it



“We are following very closely some low-cost carriers that are testing long-haul from Europe.”

MEHMET NANE

Switching a large fleet is not a decision taken lightly, but there was one simple factor behind the move, said Nane: “Airbus made an indecent proposal to us that we couldn’t refuse. They seduced us.”

Leaving aside the intriguing vision of Airbus’ chief salesman, John Leahy, as a 21st century Casanova, the new aircraft will deliver some 15% better fuel-burn than the current Boeings. The new 737MAX would have provided roughly the same improvement in fuel consumption but, at the time the order was placed, it was around two years behind the A320neo in its development timetable.

The financial deal behind the European single-aisle aircraft must have been extraordinarily good, because Pegasus is prepared to bear the costs and complexity of running a two-type fleet for several years into the future.

Keep on good terms

And yet, the airline ordered a further five 737-800s in March. Why? Simply because Pegasus wants to keep on good terms with both major manufacturers, said Nane. “We have a very good relationship with both companies. This [order] is demonstrating that good relationship.”

Regardless of which type is used, Pegasus is focusing on improving aircraft utilisation and efficiency. In recent years, turnaround times have been reduced from 45 to 25 minutes, through measures such as stocking the aircraft’s galley with sufficient food and drink for between two to four sectors at the start of a working day, eliminating restocking times at intermediate stops.

The company is also working hard to improve its ancillary revenues. The success of that policy could be seen in its 2016 Q1 figures, with ancillary revenues up 38% compared to a year previously.

Last year delivered considerably improved annual figures, with net profit rising to TL291.5 million compared to TL15.7 million in 2014. Pegasus is hoping the CFM-powered A320neos will help it further improve those figures.

to cast its net further afield, with Saudi-based customers now able to book through Flynas to the Turkish cities of Trabzon, Hatay, Adana, Ankara and Antalya, connecting through Pegasus’ hub at Istanbul’s second airport, Sabiha Gökçen.

It will stay at Sabiha Gökçen for the next few years at least, but with Istanbul’s giant new airport due to open progressively from 2018 to replace Ataturk International and building up to no fewer than six runways, Nane said he was open to the idea of moving there.

Also a possibility is long-haul flights: “We are following very closely some low-cost carriers that are testing long-haul from Europe,” said Nane. Norwegian, for example, is using a growing fleet of Boeing 787s to

operate from Scandinavia and the UK to several long-haul destinations, primarily in the US.

“If there is demand from customers, we will consider that. But there are no plans at the moment,” said Nane.

Pegasus has built its fleet on the Boeing 737-800, of which it has 59 (plus a single, older 737-400) but in December 2012 it stole a march on Seattle by placing an order for up to 100 Airbus A320-family aircraft.

Ten were in service by early June, with the first of the CFM-powered neo versions about to arrive. From July, all remaining deliveries will be neo variants. Of the 75 on firm order, 58 will be A320s, while 17 will be the larger A321. No decision has yet been taken on firming the remaining 25 options.



Turkish Airlines is sticking by its ambitious growth plans despite falling victim to a major terrorist attack in June. Martin Rivers talks to chief executive Temel Kotil.

Kotil still smiling as Turkish sets growth milestones

The triple suicide bombing of Istanbul Ataturk Airport in June was a grim but predictable escalation of the security crisis in Turkey – a country fighting terrorism on two fronts while also grappling with political upheaval at home and a burgeoning refugee disaster.

That the airport made an attractive target for suspected Daesh militants should come as no surprise. The Syria-based jihadists had already struck tourists twice in Istanbul this year, sending suicide bombers to kill mostly German and Israeli holidaymakers at two of the city's most popular attractions in January and March.

Dozens more Turkish citizens have been killed in attacks across the country as Daesh and Kurdish militant groups seek to destabilise the government of Recep Tayyip Erdogan.

For flag-carrier Turkish Airlines, which has transformed Ataturk Airport into one of the world's largest intercontinental hubs, the violence threatens to derail years of phenomenal growth matched only by the Persian Gulf carriers.

The airline had already posted its worst quarterly loss since 1999 at the beginning of the year, sinking 1.24 billion lira (\$421 million) into the red as tourists thought twice about booking holidays in Turkey. The exodus continued in May, with 35% fewer arrivals to the country than in the same month in 2015. Tourism figures for June had not been released at the time of writing, though the murder of 45 travellers in Turkey's main airport will only have accelerated the downturn.

With shares in Turkish Airlines down 20% this year, it is hard to put a positive slant on the flag-carrier's predicament.

If there is one man who can muster a smile on just about any occasion, though, it is Temel Kotil, the airline's ever-affable chief executive. Speaking just days before the attack on Ataturk Airport, he predicted that the headwinds will pass and Turkish Airlines will continue its seemingly unstoppable march of expansion.

"For us, growth is a must. If I don't have new frequencies ... the rest of the destinations we are serving become hungry," he said.

"What we are doing the last ten-plus years is putting a massive network together. The purpose is actually, if anything goes bad, then we can rely on the rest of the network. Right now Africa is booming, but the Chinese and Japanese and Koreans are not travelling that much anymore ... So we substitute Asian traffic with the Middle East, we substitute with Africa."

Rapidly expanded

Kotil drew parallels with 2011, when Turkish Airlines rapidly expanded its long-haul fleet despite waves of political unrest spreading across the Arab world. Worrying first-half results that year eventually gave way to an annual profit – albeit a razor-thin one of \$6.9 million (19 million lira) – and the airline chief expects much the same story to unfold in 2016.

Even as he seeks to reassure the market, however, Kotil is adjusting to new realities on the financial front.

The airline was already braced for lower

fares this year even before the airport attack, with demand falling behind its year-on-year capacity growth of 18%. Yield pressure will now intensify as sixth-freedom traffic rises from 50% to 60% of the business – cementing the flag-carrier's evolution into a Gulf-style operator heavily dependent on transfer traffic.

"Ten point increase means that we are being a real global player," Kotil said. "But the yield goes down by nature."

Although Turkish Airlines is often lumped in with Emirates, Etihad and Qatar Airways in discussions about connecting traffic, the flag-carrier actually has a more nuanced proposition than its Gulf counterparts.

Home market

The vast size of Turkey's home market is one distinguishing feature. Whereas the United Arab Emirates and Qatar have modest populations and even less territory, Turkey's 79 million citizens are spread across 770,000 square kilometres of land. Rising living standards have fuelled an explosion in domestic air travel, with 97 million people taking to the skies for internal flights last year alone – a lucrative market that Turkish Airlines shares with local rivals Pegasus Airlines, Onur Air, Borajet and Atlasglobal.

The country's world-famous cultural attractions and seaside resorts also make inbound tourism more of a factor for Turkish Airlines than for the Gulf players. About 36 million foreigners visited Turkey in 2015, versus 14 million for Dubai.

Until recently, Russians had been the second largest contingent of tourists in the country behind Germans. Their prominence came to an abrupt halt last November, when Ankara shot down a Russian warplane near the Syrian border and Moscow responded by banning charter holidays to all Turkish resorts. A belated apology by President Erdogan saw the restrictions wound down in June, though it is too early to know if Russians holidaymakers will return in the same numbers as before.

Falling tourism from North Asia is another

Turkish Airlines has transformed Ataturk Airport into one of the world's largest intercontinental hubs.





“What we are doing the last ten-plus years is putting a massive network together. The purpose is actually, if anything goes bad, then we can rely on the rest of the network.”

TEMEL KOTIL

Talks are even under way with Ethiopian Airlines about a joint venture aimed at tying up the Istanbul and Addis Ababa hubs – one of several partnerships on the table. “We are really open for the joint ventures with so many airlines, and hopefully we will get to them,” Kotil said. “We need these route-based joint ventures . . . They can cover the trunk routes and the rest of the network by feeding each other. We started discussions with LOT Polish already and Ethiopian is the second one we are considering.”

However, he rejected media reports suggesting that Turkish Airlines might help to revive Bosnia’s defunct flag-carrier, B&H Airlines, insisting: “There are no talks about that right now. There is no activity there.”

Mainline operation

On the fleet side, Turkish Airlines presently deploys 293 aircraft in its mainline operation. About one-third of those planes are wide-bodies: 58 Airbus A330s, including eight freighters; 32 Boeing 777-300ERs; three A310s; and one A340. Its narrow-body fleet is split – marginally in Airbus’s favour – between A320-family jets and 737s.

Interestingly, just three of the 183 aircraft currently on order are long-haul passenger jets. With the last of those units arriving early next year, the flag-carrier is overdue for making a decision about its wide-body requirements.

“There could be an additional order,” Kotil said coyly. “But not decided yet.”

Two weeks before the despicable attack on Ataturk Airport, local media reported that construction of Istanbul’s New Airport – the future home of Turkish Airlines – is 27% complete. The gateway will initially have an annual capacity of 90 million passengers, rising to 150 million in subsequent stages of development. Its planned opening in February 2018 will begin the next chapter of Turkey’s extraordinary aviation story.

Though shaken by the atrocity that befell travellers in June, Istanbul’s vision of becoming the epicentre of global aviation moves closer to reality with each passing day.

concern. Japanese travellers have been particularly sensitive to the terror threat in Europe, prompting Turkish Airlines to halve its Tokyo frequencies this summer.

Emphasising that other markets have shown more promise, Kotil highlighted this summer’s route launches to Bogota in Colombia (continuing to Panama City), Atlanta in the USA, and Hanoi in Vietnam.

“Demand over the Atlantic is doing very well. Bogota is perfect,” he enthused. “The fares are very suitable from Istanbul to Bogota. I am even getting the passengers connecting through Istanbul from Spain. There is direct connection from Spain to Bogota, but Turkish product is very good and price is very good. There will be more routes in the US – we have nine, more will come but not decided which ones yet – and more in Asia Pacific too.”

Other additions to the network over the past 12 months include Miami in the USA, Dubrovnik in Croatia, Kosice in Slovakia,

Khujand in Tajikistan, Maputo in Mozambique, Durban in South Africa, and Port Louis in Mauritius (continuing to Antananarivo in Madagascar).

While the steady drumbeat of growth looks set to continue – Conakry in Guinea and the Seychelles are also coming on-stream this year – Kotil admitted that his focus is shifting from new destinations to higher frequencies.

“In terms of routes the company is really developed,” he said. “Don’t expect us every year to launch 20 more routes.”

About 30 separate announcements of frequency hikes were published on the airline’s website during the first half of the year, and Kotil is already mapping out his next targets. Addis Ababa in Ethiopia, Khartoum in Sudan, and Mogadishu in Somalia will all be doubled to twice daily services in summer 2017, he confirmed, underscoring the flag-carrier’s steadfast commitment to Africa.



Despite its terrible challenges, Turkey is striving to build a strong business aviation community. Liz Moscrop reports.

Although Turkey is reeling under the onslaught of a spate of bombings, the failed military coup, and the fact that its major tourist industry – which accounts for 11% of its gross domestic product – has been slammed by Russian sanctions and European security fears, its leaders and business leaders are determined to continue to develop the country.

Last year Turkey shot down a Russian warplane near the Syrian border, causing Russia to impose sanctions. However, both countries are now saying that they need to fight the common Daesh (also called Islamic State – IS) foe and President Vladimir Putin has agreed to end the Russian ban on tourism.

According to players in the Turkish corporate aviation community, business is stable. Indeed, people are still flying in and out frequently.

Permit requests

Trip support provider, Universal Weather and Aviation, recommends that people arriving should leave three business days' lead-time. However, short-notice permit requests are possible at the Turkish Civil Aviation Authority's discretion. Universal does caution foreign operators to arrange aircraft security for the duration of stay. Aircraft guards can be arranged for airside security purposes, but this must be organised and approved prior to the day of operation.

There are plenty of domestic ground and trip support providers, too, such as Istanbul's Aerowings Aviation, which offers over-flight and landing permits, as well as fielding a team of English and Russian-speaking supervisors. It also offers fuel at competitive prices throughout the country.

The current political climate has meant that charter has suffered. However, as Air Partner Turkey account manager, Caglar Cag, explained: "We will likely get busier now the Russian ban is lifted and operators can fly there directly. The bombings have, sadly, had an impact on operations."

He added that there were many more operators than there is demand at the moment. "I hope this changes," he continued. "Generally, in the summer, we are very busy with lots of flights to places like Greece and Italy. For business it's a year-round steady state with plenty of flights to the US, the Middle East and Russia."

Captain Gurcan Malli, of Ataturk-headquartered Swan Aviation, is also cautiously optimistic about the future,

TRUST TURKEY



Redstar Aviation: the past 27 years has seen it develop several services across the business aviation arena.

Left: Air Partner's Caglar Cag: "Bombings have, sadly, had an impact on operations."

despite his sadness over the bombings. "We are on the opposite side of the airport but, of course, everyone is affected," he explained.

Turkey is building a brand new state-of-the-art airport and the present Ataturk is likely to become the base for business aviation, rather like Le Bourget is in Paris.

He continued: "We are seeing big investments in business aviation. There are strong developments in the oil and gas industry and there will be plenty of demand for more helicopters."



He cited Amac Aerospace's presence and investment in a new hangar, and suggested that some of the other large international maintenance, repair and overhaul (MRO) players were looking to expand into Turkey.

"As more helicopters enter the market, Airbus Helicopters, for example, will be looking for a maintenance organisation. Although our tourism market is affected, our country has a strong international reputation and it will take some efforts, but I hope it won't take long to normalise things."

He said that Swan Aviation had neither grown nor seen a decline in bookings for the last year. The company's aircraft sales business has changed, though, since it first came into being nine years ago. He pointed out that clients are now looking for bigger aircraft, such as wide-body midsize Bombardier Challenger 850 types, as they want to fly further afield to develop their businesses.

Today the firm operates 11 aircraft and is set to take its first helicopter in the second half of 2016. It also has a flight-training centre in Almaty, Kazakhstan.

Another major operator, Bonair, provides air taxi services, via its fleet of Cessna Citation XLS and Bravo types and an Embraer Legacy 500. It also specialises in medevac flights throughout Turkey and



beyond, staffed by doctors and nurses, and flown in both helicopters and fixed-wing types.

Turkeys' first air ambulance operator was Redstar Aviation, which started operations in 1989. Founded in Izmir, the firm relocated its headquarters to Istanbul Sabiha Gökçen Airport in 2002 and has been, since February 2014, a subsidiary of the Doha, Qatar-based Gulf Helicopters Company.

Core business

While its core business is to provide air ambulance services, the past 27 years has seen it develop several services across the business aviation arena, including regular charter flights and film and TV offerings.

MNG Jet Aerospace, meanwhile, is both an operator and MRO provider, offering tech support services for several Bombardier and Hawker types at Ataturk Airport.

It offers line and base maintenance, as well as engine inspection and replacement.

It is also an approved repair station for Bombardier, GE, Artex, Honeywell and Rockwell Collins supplemental type certification (STC) development, avionics installation and modifications, and can perform some completions services.

At the beginning of this year it opened its second business jet hangar in Ataturk Airport near to its existing main hangar.

The new hangar has a floor area is 4,050sqm (90 metres by 45 metres) and is able to accommodate 11 midsize aircraft.

It also has a segregated paint hangar for painting mid-size jets, which completes MNG Jet's nose-to-tail business jet service.

MRO is set to be big business as the country recovers. Management and fixed-base operations (FBO) services group, Genel Havalik, announced earlier this year that it is to operate the general aviation hangar complex and the general aviation apron at Sabiha Gokcen International Airport for the next 10 years. As a part of the agreement the firm will provide hangarage, cleaning and maintenance services in a five-bay complex with a covered area of 110,000sqft, as well as providing handling services on a dedicated general aviation apron.

The move will expand the company's presence in the Istanbul area, which serves as the hub for operations and maintenance for business and corporate aviation in a number of countries in the vicinity. Services in the 600,000sqft facility will include ground handling, parking, catering, fuelling, cleaning and maintenance services and a VIP lounge.

AMAC Aerospace, too, is developing in Turkey. The firm's newest hangar, located at Ataturk Airport, provides a regional

AMAC Aerospace's newest hangar, located at Ataturk Airport, provides a regional maintenance centre.

Right: Kadri Muhiddin: "AMAC Aerospace has gauged the market to make this exciting venture come to reality."

maintenance centre delivering scheduled and unscheduled line and base maintenance activities on Airbus, Dassault Falcon and Pilatus PC-12 types. It also has a line station facility at Istanbul Sabiha Gokcen Airport and recently signed a contract with the Turkish Airport Authorities to acquire 6,400sqm of premium land based at Milas Bodrum Airport to build a new MRO and hangarage facility for Airbus types.

Launch customer

CEO Kadri Muhiddin said: "AMAC Aerospace has gauged the market to make this exciting venture come to reality."

The launch customer will be Tailwind Airlines, which wants AMAC to perform 7C checks on its B737-400s and B737-800s aircraft.

AMAC is also the exclusive sales representative in the Middle East for the PC-12 NG and PC-24, and has a new hangar at Ataturk Airport dedicated to servicing and selling the type.

Alongside the operational and maintenance developments, Skyline Aviation Training is producing crew for the future. The firm has been a type rating training organisation since 2009 for the Agusta Westland AW-109, and Airbus Helicopters EC-135 and EC-145 types.

"We are seeing big investments in business aviation."

CAPTAIN GURCAN MALLI



Can Turkey navigate

Air traffic in Turkey is expected to grow significantly beyond 2020 necessitating the need for new air traffic management systems. Keith Mwanalushi looks at some possible solutions.

The appalling terrorist attack at Atatürk airport in June this year was a blow to Turkish aviation. But it is a testament to the sector's resilience that the airport was operating again within a few hours.

The global aviation community has condemned the attack and has shown overwhelming solidarity with Turkey.

Despite the tragic events, Rafael Schwartzman, European regional vice president for the International Air Transport Association (IATA) is in no doubt that Turkey is a nation going places – quite literally, in its growing desire to travel by air.

Latest IATA figures show that passenger numbers to, from and within Turkey are set to grow from 79 million last year to 171 million by 2035.

“That would make Turkey the 10th biggest aviation market on the planet,” Schwartzman commented. “It means that aviation will be an even bigger contributor to, and facilitator of, Turkey's economic strength. At present aviation supports more than €48 billion (\$53bn) in gross domestic product (GDP) and more than a million jobs. The potential is for these numbers to increase.”

Aviation infrastructure

But there are challenges. Schwartzman has observed that all this growth has big implications for aviation infrastructure. “The government has responded by planning the world's largest airport in Istanbul, but equally important is the infrastructure in the sky – the air traffic management (ATM) system,” he said.

In June, IATA representatives were in Turkey to highlight the value of aviation and focus on improvements to the country's air navigation services (ANS). “Air traffic control (ATC) across Europe is facing a crisis as failure to reform and modernise ANS is leading to greater delays, increased carbon emissions, and limits on capacity,” said Schwartzman.

“For many years, European governments have had a project – the single European sky (SES) – which is supposed to deal with these issues. But progress on SES is stalled. The result is that air travel in Europe is slower, more expensive, the continent is less connected



Rafael Schwartzman: If the Turkish government made it a priority to modernise ANS, the benefits are potentially huge.

than it could be, and Turkey is losing out in terms of jobs and economic development.”

Schwartzman reckoned if the [Turkish] government made it a priority to modernise ANS, the benefits were potentially huge. IATA forecasts that, in 2035, Turkey stands to gain an extra €10 billion in economic activity, including 111,000 more jobs. “Turkish consumers will benefit from fewer delays, shorter flights, and more connections. There will be fewer emissions and airlines will be more competitive thanks to lower costs. It is a win-win for everybody,” Schwartzman projected.

The modernisation of European airspace is a Europe-wide project, but each individual nation has its part to play, including Turkey. “What is needed is a national airspace strategy detailing the key milestones and with the support of airline stakeholders; how Turkey is going to reform and modernise its air traffic control to keep pace with demand. As Turkey takes its place among the foremost aviation nations, it has an opportunity to showcase not only a world-class facility at the New Istanbul Airport, but also a

world-class air navigation system,” he added.

Gianpiero Lorandi, SVP for the traffic control systems line of business, security and information systems division at Leonardo-Finmeccanica, feels his company's SMART system is exactly what Turkey needs, in terms of infrastructure and ATC capabilities, to successfully confront expected passenger growth beyond 2020.

“The system has been designed and implemented to allow a significant reduction of controller's workload, reduction in separation between aircraft, more efficient route charges, safety and security guaranteed in the voice-over-IP, radar network distribution, processing and multiple levels of operational contingency between sites,” Lorandi explained.

System performances

The SMART system supported the 21.4% growth in air passengers at Istanbul Airport last year, according to an Airports Council International (ACI) Europe report, with no operational issues or shortfall in terms of system performances, Lorandi pointed out.

“In terms of key technologies, we believe that the interoperability through secure networks and the digital communications are today enabling technologies for supporting the growth,” he continued.

A network centric approach and a dynamic airspace management is also enhancing the level of coordination he said. “Automation tools for better supporting the controller's decision process in assuring separation are essential. Reduced errors between the actual and planned flight trajectories increase predictability, and capacity-planning tools will also help to provide a better service to airlines.”

In the long term, he sees different technologies emerging as potential enablers of growth and safety. “But it will take time for them to be accepted in the market and by the regulatory bodies,” he added.

In general, Lorandi predicts that system-wide capabilities will outpace

ATC modernisation?

sensor capability. “Technology is clearly essential to drive the future air navigation to have low emissions, better performances and a reduced workload on controllers,” he said.

Regardless of location, to successfully manage air traffic growth one must focus on safety and efficiency. Modifications to existing ATM systems or procedures should be designed to address both of these important aspects, with efforts prioritised to target the areas with the most acute growing pains. Given the density of air traffic in the terminal airspace and on the airport surface, these areas of congestion need particular attention when traffic levels are increasing. This is the case in Turkey.

To enable safe and efficient ground movements at congested airports, air traffic solutions provider Saab recommends the installation or expansion

of advanced surface movement and guidance systems (A-SMGCS).

“By combining multilateration, surface movement radar, and advanced traffic displays, controllers in the ATC tower are provided with clear, predictable situational awareness and automated safety alert,” said Bengt Ekholm, VP, head of Eastern Europe at Saab Technologies.

At airports where traffic is expected to grow, Ekholm feels such a system is a must. “It not only benefits airlines and passengers, but a well-functioning air traffic system is a huge economic enabler for a region.”

While an A-SMGCS can be used in coordination with existing procedures and systems, one should also consider upgrading some of the important adjacent systems. For example, in many places in the world controllers still utilise paper strips to track the progress of a flight.



Gianpiero Lorandi:
The Leonardo-Finmeccanica SMART system is exactly what Turkey needs.

New technology can minimise controller workload and incorporate additional safety alerting functions.

To this end, Saab recommends augmenting A-SMGCS with electronic flight strips and other decision support tools. “This reduces the cognitive load placed on tower controllers and allows them to keep their heads up and their eyes looking out of the window,” Ekholm said.

He explained that additional traffic flow management tools, like a departure manager, could also provide enormous benefits. “They utilise computer algorithms to optimise aircraft sequences and throughput while requiring very little controller interaction. The result is a more optimal use of resources and more time for ATC controllers to do their primary job – issue clearances and ensure the safe separation of aircraft.”



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Jon Lake looks at the make up of the Turkish Air Force, the largest and most important of the seven military and parapublic air arms in Turkey.

With an active strength of 60,000 military personnel and operating approximately 668 manned aircraft in about 33 Squadrons, the Turkish Air Force is a major power.

Eleven squadrons operate a mix of Block 30, Block 40 and Block 50 F-16s, one of them equipped with DB-110 EO reconnaissance pods and assigned to recon duties, two remaining 'combat' squadrons operate about 49 F-4E-2000 Phantoms, in the upgraded 'Terminator' configuration, while the Türk Yıldızları (Turkish Stars) form a squadron equipped with 23 Northrop F-5A/B Freedom Fighters upgraded locally to NF-5A-2000 and NF-5B-2000 configuration. The Phantoms and some of the older F-16s will be replaced by 116 Lockheed Martin F-35A Joint Strike Fighters, and there are already two squadrons operating unmanned platforms, one flying armed Heron, Predator and Reaper UAVs and one flying ISTAR roled Heron, Harpy, I-GNATER and Anka UAVs.

Transport squadrons

Seven transport squadrons and three base flights between them operate two of the eight A400M on order, about 15 C-130B/E, 16 C-160 Transall and 43 CN235 transport aircraft, 20 AS532 Cougar and 59 UH-1H helicopters. There is also one tanker squadron with seven Boeing KC-135R air-to-air refueling aircraft, two squadrons operating three Boeing E-7T AEW&C aircraft and two CN235EW Elint/EW aircraft, as well as eight surface-to-air missile (SAM) squadrons. Six training squadrons operate about 36 SF-260 primary trainers, 40 KT-1T and 20 Hurkus B basic trainers, and 68 T-38M advanced/lead in trainers.

Until recently, the frontline squadrons were spread between two Tactical Air Force Commands, headquartered at Eskişehir and Diyarbakır, each with five main bases. In August 2014, the two Tactical Air Force Commands were merged into a single Combat Air Force Command, and the Second Tactical Air Force Command centre in Diyarbakır was closed.

Two transport bases come under Air Force Staff Division Command, while the training units are parented primarily by Air Training Command and Air Force Academy Command.

The Türk Hava Kuvvetleri (THK or Turkish air force) can trace its roots back 105 years, having been founded on 1 June

HOW THE AIR FORCE SWITCHED ON THE POWER

1911, when Turkey was still part of the Ottoman Empire. The infant air arm fought in the Balkan Wars (1912–1913) and World War I (1914–1918), which ended with the occupation of the Ottoman Empire by the Allies in 1919, and the effective dissolution of the air force. Since the foundation of the Republic of Turkey in 1923, the THK has grown in stature and capability.

The THK guarded Turkey's neutrality against neighbouring Axis allies and occupied nations during World War II before fighting briefly on the Allied side, and joining NATO in 1952, forming part of NATO's 6th Allied Tactical Air Force. Since then, the air force has engaged in air combat with Greek aircraft over the Aegean on numerous occasions, as well as supporting the invasion of Cyprus in 1974.

It was a mainstay of NATO air power during the Cold War (equipped with large numbers of mostly obsolescent, usually second hand aircraft types cascaded from richer NATO allies), and played a vital role in securing NATO's Southern Flank. The THK steadily began to 'catch up' with other NATO air arms, not least with the arrival of F-16C/D Fighting Falcons from 1987.

All but eight of the F-16s supplied to the Turkish air force were locally produced by TUSAS Aerospace Industries at Akinci (formerly Mürted). TUSAS stands for Türkiye Uçak Sanayii AS, or Turkish Aircraft Industries (TAI).

The aircraft were produced in four batches, under the Peace Onyx I, II, III and IV programmes, with progressively greater local content. In the initial batch, TAI manufactured 70% of the airframe of the F-

16 aircraft including aft and centre fuselages and wings.

210 surviving F-16s underwent a \$3.9 billion Common Configuration Implementation Program (CCIP) upgrade, with improvements including APG-68(V)9 multimode radar, the Joint Helmet-Mounted Cueing System, Link 16, and compatibility with a number of new weapons and targeting systems. The F-16s' weapons now include AGM-65A/B Maverick TV-guided air-to-surface missiles, CBU-103/105 Wind Corrected Munitions Dispensers, AGM-84H SLAM-ER and AGM-154 Joint Standoff Weapon cruise missiles and AIM-9X and AIM-120 AMRAAM air-to-air missiles.

The THK purchased AGM-142 Popeye attack missiles from Israel intending these to be used by the F-4E and the F-16, but so far they have been used only by the Phantom, though the smaller indigenous Roketsan SOM next-generation high precision cruise missile has been integrated on Block 50 and CCIP F-16s and F-4E 2020s.

Terminator standards

More than 200 Phantoms were delivered to Turkey from 1974, 54 of which were upgraded to F-4E-2020 'Terminator' standards by IAI with a new Elta EL/M-2032 multi-mode fire control radar, and an upgraded avionics suite, including a digital glass cockpit, and a Kaiser El-OP 976 wide-angle HUD and HOTAS system.

The Terminator is compatible with the AGM-142 Popeye/Have Nap missile, Litening-II targeting pods, and a range of other modern weapons. The AGM-142 was first used in anger on 16 December 2007 during Operation Sun, an incursion into Northern Iraq targeting the Kurdistan Workers' Party (PKK).

The Turkish air force has encouraged local industry to help it meet its equipment requirements, and has commissioned a wide range of indigenously designed and manufactured weapons, and licence-built and locally designed aircraft types and helicopters, as well as upgrade and modernization programmes that incorporate indigenously designed avionics and other systems. Some of these are now in full operational service, like the TAI Hurkus trainer, while others are still in development.

The Turkish air force has been an important participant in multi-national coalition operations in the Balkans,

Turkey's air arm is a major force.



Afghanistan and the Middle East, gaining a great deal of operational experience in the process. In 2006, four Turkish F-16s were deployed to take part in NATO's Baltic Air Policing operation.

Ongoing operations against the PKK in Northern Iraq, and against Daesh and other insurgent groups in Syria have kept Turkey's air force at a high operational pitch and the Syrian Civil War has provided plenty of opportunities for combat experience. On 16 September 2013 a Turkish Air Force F-16C shot down a Syrian Mi-17 that violated Turkish airspace, while on 23 March 2014 another F-16 shot down a Syrian Arab Air Force MiG-23 'Flogger'.

On 3 and 4 October 2015 Russian Air Force Su-30SM and Su-24 aircraft violated Turkish airspace in the Hatay region. Despite what the Turkish air force described as "clear, timely and repeated warnings" the Russian aircraft continued until F-16s on QRA (Quick Reaction Alert) were scrambled. During the incident on 3

October the Russian Su-30SM maintained a radar lock on one or both the F-16s for more than five minutes, an unusual and provocative thing to do. Following the incident the Turkish Government said that its air force would shoot down any aircraft violating their sovereign airspace in future.

Shot down

Accordingly, on 24 November 2015, a Russian Su-24 Fencer was shot down by a Turkish Air Force F-16 when it crossed the border from Syria, resulting in the death of one of the crew.

Following the shootdown, relations with Russia deteriorated, and Russian incursions continued. Russia equipped aircraft flying in Syria with air-to-air missiles for self-defence, and began to routinely dispatch Su-30s to escort Su-24 bombers and Su-25 fighter bombers, deployed an S-400 SAM missile system to Hmeymin airbase and dispatched the Moskva guided-missile destroyer

(equipped with S-300F SAMs) off Latakia, establishing a Missile Engagement Zone (MEZ) over Syria.

On 29 January, following a further border violation (this one by an Su-34 'Fullback' bomber), Turkey refrained from engaging the aircraft but did summon the Russian envoy for a formal 'dressing down'.

The Turkish Foreign Ministry commented that: "We are making a clear call to the Russian Federation not to violate Turkish airspace, which is also NATO airspace."

Turkey finally became a Level 3 partner of the F-35 Joint Strike Fighter (JSF) development programme on 11 July 2002 and joined the production phase of the programme on 25 January 2007, initially agreeing to purchase 116 F-35A Lightning II aircraft. It is also studying a future fighter requirement, known as TFX, which is to replace the F-16 with a domestically produced fighter after 2023.



A Turkish Air Force/162 Filo F-16C lifts off from the Konya runway during Anatolian Eagle 2016-2.

ALL PHOTOS, ALAN WARNES.

EAGLE EYES UP REAL-LIFE TRAINING SCENARIOS

Turkey has been hosting a big 'red flag'-style exercise, known as Anatolian Eagle, since 2001. This year's event had even more significance than usual, as

Alan Warnes reports.

This year's Anatolian Eagle (AE) attracted aircraft from Turkey, Italy, the Netherlands, Pakistan and Saudi Arabia – most of which are involved in conflicts of one sort or another.

The Turkish Air Force (TurAF) is flying missions against Kurdistan Workers' Party (PKK) separatists in the south-east along the borders with Iraq; the Pakistan Air Force (PAF) continues to fight militants in its federally administered tribal areas (FATA); Saudi Arabia is leading an Arab coalition against Houthi rebels who have ousted the Yemeni Government; and Italy has Tornados deployed to Kuwait in the intelligence, surveillance and reconnaissance (ISR) role, as part of Operation Inherent Resolve – the allied fight against Daesh.

None of the conflicts look set to end soon, so AE provided everyone with a chance to work on their mission profiles used during recent operations. An AE exercise commander explained: "This meant focusing on dynamic targeting, time-sensitive targeting and close air support [CAS] missions."

The TurAF had 32 of its F-16s flying in each wave of sorties alongside six F-4Es.

The exercise is well established, with a 49,000 square mile range that stretches into the Mediterranean Sea.

Colonel Mustafa Erturk, head of operations at Konya Air Base, said: "We have spent a lot of time and effort developing the base to make it different from similar exercise facilities. The mentality here is that we must be compatible with NATO, the US and Europe."

At Konya, participants have the chance to be part of a large-force deployment exercise with between 50 and 70 jets being launched in waves. Most participate in a combined air operation (COMAO), where aircraft work together to boost their survivability and interoperability. During these war games they are the blue force.

The opposing red force comprises aggressor F-16s as well as surface-to-air missiles (SAMs) and other ground threats. The aggressors use tactics employed by former Eastern-Bloc air forces and their allies to try to shoot down the blue forces. The threat from Sukhois and MiGs is still as prevalent today as it was at the height of the Cold War.

Konya houses a professional aggressor unit, 132 Filo

flying F-16s, while 131 Filo operates four E-7T Peace Eagle airborne warning and control system (AWACS) aircraft. Both units play a significant role in AE's air war.

No training exercise is complete without a vast range and the jets being fitted with air combat manoeuvring instrumentation (ACMI) pods. These enable key personnel to track both red and blue on a large screen at the base.

Erturk was also the detachment commander for the six 132 Filo F-16s that deployed to 'red flag' at Nellis Air Force Base in the US in March, along with two 101 Filo KC-135Rs. "Crossing an ocean is a huge challenge and I don't want to do it again! I think 'red flag' is too far for Turkish, European and Asian air forces," he said.

"We might not have B-52s or the sophisticated systems the US has, but we have something else. We really consider the requirements of our partners. The airspace at the Tuz range areas goes from ground level up to 50,000ft with no restrictions. In 'red flag' there are several area restrictions and if you stray into one of these you are sent home. In our area there is no commercial crossover during AE.

"The second advantage is we look at requirements of participants – some might need very basic requirements. So we set it up. If they want highly advanced tactics we just amend the scenario."

Crews and aircraft from 14 countries, as well as Turkey have racked up more than 34,000 flying hours, since the first AE in 2001.

The TurAF has also been involved in several bilateral exercises with Azerbaijan, China, Pakistan, Saudi Arabia and the USA.



The Royal Saudi Air Force sent eight Tornado IDS.

Foreign participants since 2001

Belgium (1), France (2), Germany (2), the Netherlands (2), Israel (5), Jordan (6), Qatar (1), Pakistan (7), Saudi Arabia (4), Spain (4), UAE (4), UK (4), USA (14).

Bi-lateral training/exercises:

Turkey-USA Anatolian Falcon – 2012/2016, Turkey-Azerbaijan – Turaz Sahini 2015, Turkey-Pakistan TUSAP Raiders – 2014/2016, Turkey-China – bilateral training, Turkey-Saudi Arabia, special forces – with other countries.

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ROCKETING UPWARDS

Jon Lake looks at Roketsan Missiles Industries, one of Turkey's top 500 industrial concerns.

On June 15 this year, Roketsan Missiles Industries and Airbus Helicopters signed a memorandum of understanding to integrate the Turkish company's Cirit 2.75in laser-guided rocket on the Airbus Helicopters H135M and H145M for marketing in Turkey and the international market.

This was only the latest in a long and growing list of integration contracts for the Cirit, which is one of Roketsan's best-known and most widely used products.

Skeleton team

Having started operations in 1988 with little more than a skeleton team, Roketsan today is a global defence company with more than 1,900 personnel, 52% of whom are engineers, with an invested capital of TRY4 billion (\$1,38bn) and an accumulation of technologies and engineering experience.

The company is currently widening its product range to cover the land, air and sea weapon domains, and has already branched out to provide systems to a wide range of international customers.

Roketsan started out by manufacturing the propulsion system of the FIM-92 Stinger man-portable air-defence system (MANPADS) infrared homing surface-to-air missiles produced within the framework of the international Stinger

European joint production project.

The composite-fuelled launching and flight motor was one of the critical subsystems of the Stinger missile, and Roketsan was established because the required composite solid fuel technology was not available in Turkey at that time, but would clearly be a cornerstone of any indigenous rocket and missile industry.

The company rapidly gained an enviable reputation within the Stinger programme, routinely making shipments with zero defects before the required deadline.

Participation in the Stinger project allowed Roketsan to gain experience, confidence and credibility, providing the foundations for subsequent solo projects and further collaborative ventures.

Between 1992-1995 it carried out an

ambitious missile design infrastructure development project, training personnel and developing design tools necessary for a new design-focused era for the company. This led to the development and production of the composite-fuelled, 11km-range TR-107 rocket and the 40km-range TR-122 rocket, as well as the Sakarya multi-barrel rocket launcher (MBRL) weapon system. All were produced for the Turkish Armed Forces before the Stinger project was completed in 1999.

Towards the end of the 1990s, the company's attention focused on the production of long-range rockets and missiles, which were intended to increase the firepower of Turkey's land forces. New technologies were acquired, and the company produced the Kasırga (Hurricane) and Yıldırım (Lightning) missile and weapons systems.

The first export contracts for rockets and weapon systems were signed in 2004, and the Cirit 2.75in laser-guided rocket project was initiated by the Ministry of National Defense the same year. The weapon incorporated a number of advanced technologies including laser guidance, intermediate stage guidance, and an insensitive rocket motor and warhead.

From 2005, Roketsan built up an extensive industrial structure and began the development of a number of original

Roketsan SOM J fired from an F-35.





Rocketsan produces numerous missile systems that can be fired from fixed wing and rotary wing aircraft.

missile systems, including the UMTAS long-range anti-tank missile, OMTAS medium-range anti-tank missile and H SAR-A low altitude air defence missile system.

These weapons introduced further new technologies, including on-board radio frequency (RF) data links, imaging infrared (IIR) seeker heads, multi-stage propulsion systems, and insensitive tandem warheads. They required more complex platform integration.

Air-launched

More recently, the company has produced the SOM-J air-launched cruise missile, already in service on Turkish Air Force F-4 Phantoms and F-16 Fighting Falcons, and offered to equip the F-35 Lightning II Joint Strike Fighter.

A production contract for the Cirit rocket was signed in 2011 and the weapon was introduced to service with the Turkish armed forces in May 2012.

Rocketsan strengthened its position in June 2012 by merging with Tapasan A (Fuze Industries Inc), which had been established to meet the fuze requirements of the Turkish Armed Forces as an affiliate of the Turkish Armed Forces strengthening foundation (TSKGV).

In 2013, Turkey Roketsan began the construction of its first satellite-launching centre, initially for low Earth orbit satellites.

As the Istanbul Air Show prepares for its 11th edition, the president of Mint Exhibition Organisers reveals what visitors can expect this year:

Marcella Nethersole speaks to Feyzan Erel.

ISTANBUL SHOW IN MINT CONDITION

Turkey has always been seen as a major geographic hub connecting eastern Europe and western Asia and currently, with much-increased investment, the country's aviation and airport industries are enjoying a huge upturn.

It's for this reason that Istanbul Air Show organiser, Mint, says it is expecting a record number of exhibitors and visitors to October's event.

"Having entered the era of restructuring and investment earlier than most nations in the region, Turkey sets a perfect benchmark for the regional markets and, thus, plays an important pioneering role for the aviation and airport industries in Eurasia and the Middle East," said Mint president Feyzan Erel.

"The air show has been designed to establish a business platform uniquely concentrating on the civil aspects of the aviation industry. Primarily it is to serve, contribute to, and meet the challenges offered by the Eurasian and the Middle Eastern markets."

This year's show will take place from October 6-9 at Istanbul Ataturk Airport. Erel says there is already high demand from exhibitors for the event.

"The show two years ago saw 151 companies exhibit, with 36,000 visitors. Currently, we have reached the same number in terms of participation and there are lots of applications on the way. The increase in numbers is expected to be more than 15%," he said.

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The event sets itself apart from other air shows as it is a single 'civil only' platform, which incorporates all aspects of civil aviation including commercial, business and general aviation. It also spotlights supply chain offerings to the airport industry.

This year's show will highlight the vast capabilities that Turkey has to offer.

"The manufacture of the national aircraft – the TR-JET – by 2023 is the country's top priority project," said Erel. "The project utilises a modernised version of the Dornier 328 and the new TRJ328 will act as a stepping-stone toward production of Turkey's first domestically-designed passenger aircraft."

"It opens a new page for the Turkish aviation and the aerospace industry, as well as the global aviation market. The project will create the first domestically-produced regional jet in Turkish history."

The aircraft will be built and certified at a new commercial facility in Ankara, owned by a subsidiary of Sierra Nevada Corporation (SNC), and using significant investments by SNC.

This alone, we believe, will attract major attention from visitors to the show," said Erel, who is also hoping to arrange an informative session about the new Istanbul Grand Airport (IGA).

"The IGA project will be a top attraction. The airport will have six runways, a 200 million passenger capacity and an investment cost of around 11 billion euros (\$12.2bn)," said Erel. "It is evident that both the TRJet and Istanbul's airport projects, which are in their final phases, will accelerate the development of the Turkish civil aviation industry."

"It is projects like these that are causing an increase in applications to the show this year."

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With the support and coordination of Turkish Technic, a new showcase for domestic parts manufacturers is to be organised. Erel believes this will be a big point of interest for international visitors.

Already confirmed manufacturers attending include Boeing, Airbus, Beechcraft, Dassault, Embraer, Gulfstream, Pilatus, Sikorsky, Bombardier, and Bell.

Newcomers include, Antonov, and the Turkish Air Force.

"Although a 'civil only' project, the Turkish Air Force has decided to participate, which, in turn, may be an interesting aspect for international visitors," said Erel.

"We also expect a significant number of pre-owned business aircraft to be at the show this year, and with the newly arising Iranian market and visitors who will be coming from there we expect to see a rise in numbers.."

As yet, companies have not fully confirmed which aircraft models they will be taking to the show but Erel said the static would be "a great visitor draw".



Saudi Arabia, along with the UAE and other Gulf allies, has backed the internationally-recognised Government of Yemen against a Houthi rebellion that swept much of the country from the north.

For more than a year, the country has been wracked by civil war and has become the target for countless Saudi-led coalition air strikes that have paralyzed air and sea links.

On April 28 2015, the Yemeni capital's Sana'a International Airport was bombed by Royal Saudi Air Force F-15S fighter-bombers to prevent an Iranian plane, belonging to Iranian Red Crescent Society (IRCS), from landing. The fighters had warned the plane to turn back, in an unsuccessful attempt to thwart its landing, but the Iranian pilot ignored the "illegal warnings", saying that, on the basis of international law, his plane did not need further permission to touch down.

All runways, the control tower and a Bombardier CRJ700 airliner operated by Yemen's Felix Airways, which was parked on the runway, were destroyed. The Saudi warplanes also struck the al-Dailami air base in northern Sana'a and destroyed the runway adjacent to the civil airport.

On April 5, the International Committee of the Red Cross (ICRC) announced that it had received permission from the coalition to fly medical supplies and aid workers into Sana'a and was awaiting permission to send a surgical team by boat to Aden. The coalition said it had set up a special body to coordinate aid deliveries to Yemen and, at the same time, the United Nations Humanitarian Air Service (UNHAS) was given permission to establish a regular air service from Djibouti.

Air strikes

However, continued air strikes frequently interrupted these services. On August 20, a relief plane landed at Aden International Airport carrying 10 tonnes of medical equipment and supplies, supervised by the King Salman Center for Relief and Humanitarian Aid and in coordination with the Supreme Committee for Relief. On the same day, the UNHAS flight from Djibouti to Sana'a was postponed due to airstrikes on targets near the international airport; the UNHAS flight resumed the following day. The airport at Sana'a was bombed again with the terminal building set on fire and its main 10,669ft (3,252 metre) runway damaged.

An official working in the airport said that, after every attack, they would try to fix what they could in order to ensure that the runways were safe for take-off and landing. "Since the operation started, we were able to make minor fixes, we will try our best but the runways are completely destroyed; it's very unfortunate that the runway is no longer functional and help can't be brought in for the people who are suffering."

After one raid, a Georgian A300 cargo aircraft attempted to land and blew a tyre. However, the smaller Embraer ERJ 135 used by UNHAS, was

The Djibouti-based United Nations Humanitarian Air Service (UNHAS) has been providing vital support to the war-torn Yemen. David Oliver reports.

The fight to get aid into war-torn Yemen



able to land safely by avoiding the worst of the runway damage.

Aden Airport was reported to be open but not fully operational. The only airline flying to Aden was Yemenia, which has two flights per week from Amman. Further United Nations Department of Safety & Security (UNDSS) assessments and clearance of Aden Airport were necessary before a decision could be taken for UNHAS flights to resume.

Reduced number of staff

Since the beginning of September 2015, the ICRC temporarily discontinued flights to Aden due to the reduced number of staff.

Upon request, the World Food Programme (WFP) aviation team was providing ad-hoc aircraft capacity for partners carrying emergency food rations and medical supplies from the International Medical Corps. The WFP also aims to pre-position an aircraft full time in Djibouti to transport humanitarian cargo when needed.

With no other way of reaching conflict-affected or isolated areas, UN and non-governmental organisation (NGO) aid workers are able to fly to Yemen with UNHAS. Currently,

UNHAS is providing flights between Djibouti and Sana'a and will continue as long as it is needed. The WFP aims to relocate its aircraft base to Sana'a if and when the security situation allows.

The UNHAS unit in Djibouti operates a single 39-seat Embraer ERJ 135ER twin-jet aircraft on wet lease from Johannesburg-based Solenta Aviation. The company specialises in contract charter operations and leasing services for other airlines across Africa, including the UN.

The lease contract calls for 60 hours a month but less than 30 have been flown to date. There are two Solenta crews assigned to Djibouti, four pilots, two flight engineers and two cabin crew on five-week shifts.

Four flights a week are scheduled, although departure times may vary due to operational requirements. Permission to enter Yemeni airspace has to be requested from the Saudi Air Force 72 hours prior to the flight. There is a three-hour window, a one-hour transit to Sana'a, a 400km sector, one hour on the ground and a one-hour return transit to Djibouti. There is no radar, air traffic control (ATC) or fuel at Sana'a. All the flights are daytime visual flight rules



Above: UN and NGO passengers board the ERJ 135 at Djibouti's international airport.
PICTURE: WFP.



Left: The ICRC also bases a Beechcraft 1900C leased from Aircraft Leasing Services (ALS).
PICTURE: DAVID OLIVER

Far left: The map of the Djibouti-based UNHAS unit's theatre of operations in the Horn of Africa.
PICTURE: WFP.

(VFR) but they have experienced few delays due to weather and none to date because of unserviceability of the aircraft.

There are also problems with operating from Djibouti International Airport, where commercial traffic has to share the single runway with military aircraft from the United States, France, Germany, Spain and Japan. Military traffic makes up more than 60% of the airport's annual 30,000 arrivals and departures. Its ATC and weather information is limited.

UNHAS shares the ramp with a 19-seat IRCR Beechcraft 1900C, a former European Commission Humanitarian Aid & Civil Protection (ECHO) Flight aircraft based at Goma in the Democratic Republic of Congo, which is on lease from the Kenyan company, Aircraft Leasing Services (ALS).

Due to the limited availability of flights to Yemen, UNHAS has strict rules for its passengers. Their respective organisations are responsible for security clearance and visas, while passengers are responsible for paying all applicable taxes at each airport. All passengers have to be at the airport two hours before scheduled departure time and UNHAS reserves the right to bump people off the

flight and replace them with stand-by passengers if they show up later than an hour before the scheduled departure time.

All passengers travelling with UNHAS must be involved in humanitarian activities in Yemen. Family members and dependants are not eligible.

UNHAS optimises routes and destinations for maximum effectiveness and efficiency, and, therefore, reserves the right to make changes to the published flight schedule.

Limited cargo capacity

The ERJ 135 has a limited cargo capacity of 500kg, depending on the number of passengers. They each have a maximum baggage allowance of 25kg. If an organisation's requirements are above 500kg, cargo can be completed in multiple flights. Above 1,500kg cargo, the organisations are advised to charter an appropriate aircraft on a cost recovery basis.

The UK has been a generous supporter of the World Food Programme and, in January this year, Desmond Swayne, Minister of State at the Department for International Development (DFID), said that DFID had provided £1 million to the UN Humanitarian Air Service to establish a

regular flight between Djibouti and Sana'a for the exclusive use of the humanitarian community.

UNHAS has provided 88 flights since the crisis began, carrying 2,129 passengers and 8.6 tonnes of essential medical supplies. Fourteen UN agencies and 28 NGOs were now using the service and the UK was also working with UNHAS to establish other regular flight services to Yemen.

Twice weekly UNHAS flights from Amman in Jordan to Sana'a began in February but after only two flights Saudi Arabia withdrew permission for UNHAS to overfly its airspace. However flights from Djibouti continue.

The United Nations has urged the Saudi-led coalition to stop targeting airports and sea ports, including Sana'a International Airport, in order to facilitate access of aid into the country. "Without access to the airports, aid agencies are unable to bring in staff, vital supplies of medicines and other critical life-saving assistance," said Johannes van der Klaauw from the UN Office for the Coordination of Humanitarian Affairs (OCHA).

Saudi Arabia's response has been to pledge to cover the entire \$274 million in humanitarian aid sought by the UN for conflict-torn Yemen.

WFP pioneers high-level food airdrops to Syria

David Oliver goes behind the scenes in Jordan to witness a vital food relief programme.

Earlier this year, high-level airdrops of food and essential supplies got through to Deir Ezzor, a Syrian city of more than 100,000 people besieged by Daesh – also called IS and ISIL – insurgents.

The successful airdrop was the first time the World Food Programme had managed to get aid to the city, located some 120km southeast of the militant group's de facto capital Raqqa, since the start of the siege more than two years ago.

The food, comprising beans, chickpeas and rice – enough to feed 2,500 people for a month – was collected for distribution in the city by the Syrian Arab Red Crescent.

The relief finally came after an International Syria Support Group (ISSG) meeting in Munich on February 12, 2016 between the US and Russia, which agreed a partial ceasefire in war-torn Syria.

Long history

The World Food Programme (WFP) decided to conduct high-level airdrops of food and essential supplies.

However, this was not as easy as it sounded. Although the WFP has had a long history of air dropping food in Africa, they had been carried out at low level over open rural spaces with direct communications with teams on the ground.

For the new high-level drops, a Russian aircraft, aircrew and loadmasters belonging to Moscow-based airline Abakan-Air, which has operated relief flights for the United Nations with a fleet of Il-76 long-range transport aircraft, was contracted.

Based in Jordan, at Marka Airport on the outskirts of Amman, the first test drops from 7,000 metres took place at a Jordanian military range in mid-March. They were not a success. The cause was the use of time-expired Russian parachutes that failed to open on release.

However, further tests using new Russian and US parachutes proved successful and the WFP carried out its first successful high-altitude air drop on April 10 to deliver 20 tonnes of food aid to Deir Ezzor.

At the WFP operations headquarters at Marka Airport there is a multinational staff of 35, plus local contractors. Overseeing the missions is the Canadian company MMIST, a solution provider of precision aerial delivery.

A single Russian parachute is used for bags of food weighing between 800kg and one tonne mounted on



The food and cooking oil bag loaded on to the WFP Il-76 aircraft (inset).

PICTURES: DAVID OLIVER

collapsible pallets. These are prepared in the WFP hangar at Marka, along with three US parachutes used for dropping cooking oil containers that require a slower descent rate.

The WFP has a small number of GPS-guided parachutes used for precision drops of vital medical supplies. They can be landed with an accuracy of 100 metres in the target drop zone.

Abakan Air has six aircrew and two ground crew assigned to the Il-76. They are rotated every three months. They supervise the loading of up to 26 pallets that are dropped in three runs of 10, 8 and 8.

There are two missions a day, one soon after dawn, when temperatures and wind speeds are low, and a second at around midday.

Weather forecasts

The planners use the UK Met Office weather forecasts, which have proved to be extremely accurate. Very few missions have had to be cancelled by bad weather.

The most important member of the crew is the navigator. Jordan is very supportive of WFP operations with its air traffic control (ATC) handling the flight until it reaches the border and the crew are in contact with the Damascus area control centre while it is in Syrian

airspace as far as VHF radio range covers. However, the flight keeps to the same route using a recognised corridor to the drop zone (DZ). The total flight time of missions to Deir Ezzor is typically 2 hours 45 minutes.

While the Ilyushin's crew has no direct communications with the NATO-led air operation against Daesh, Russian Su-30 fighter aircraft have been shown on YouTube videos providing unofficial escorts to the aircraft in Syrian airspace.

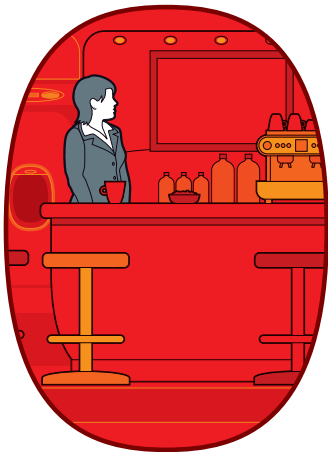
In June, the UN received written approvals for road deliveries to 15 locations in Syria but Deir Ezzor was not included. However, there is a big difference between receiving written approval to access a location by road and the access actually taking place. In response to the request of ISSG, WFP has developed a plan to provide humanitarian aid deliveries by air to other besieged areas inside Syria if road access is not possible. Airdrops are always a last resort as access by land is more efficient.

Meanwhile, the WFP operation at Marka continues and has successfully completed more than 50 high-level airdrops into Deir Ezzor.



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KADDB flew its electric-powered multirole Hexa-Rotor VTOL UAV at SOFEX 2016.



Orbital ATK showed a model of its AC208 Combat Caravan II armed with four Hellfire missiles.

BORDER TERROR GIVES SOFEX A SHARP EDGE

Jordan's Special Operations Forces Exhibition and Conference (SOFEX) took place at the King Abdullah I Airbase in Amman in May. David Oliver was there.

With the threat from Daesh (also known as IS and ISIL) on its Iraq and Syrian borders, SOFEX 2016 took on special significance.

The biennial four-day gathering had been preceded by two other key events – the annual Warrior combat-oriented competition at the King Abdullah II Special Operations Training Center (KASOTC) and the Middle East Special Operations Commanders Conference (MESOC).

SOFEX 2016 opened with flag-carrying Royal Jordanian Air Force (RJAF) AS332L Super Pumas followed by a spectacular tactical demonstration by the RJAF and Jordan's Joint Special Operations Command attended by King Abdullah II, the commander of the Jordan Armed Services.

The demonstration featured the casualty evacuation of a wounded soldier by Jordan's newly created quick reaction force (QRF) under attack from a mobile Daesh-type group. The display featured several UH-60L Black Hawks, recently delivered refurbished ex-US Army UH-60As, and Bell AH-1F Cobras. The QRF has been established to provide a rapid response to contain Daesh forces from infiltrating Jordan's borders.

One of the few aircraft in the static display was one of two medically-equipped AW139s belonging to the newly formed Jordan Air Ambulance Centre (JAAC). Located at Amman Civil Airport at Marka, the JAAC has 42 personnel, including six pilots and eight paramedics. The AW139s are fitted with a comprehensive range of medical equipment for air evacuation operations installed by the Austrian company, Air Ambulance Technology.

Also in the static park was a Bell 407MRH, one of 30 multirole-armed helicopters modified by NorthStar Aviation in Abu Dhabi, being delivered to the UAE Air Force. Fitted with a FLIR Systems Star SAFIRE 260-HLD in a nose turret, the 407MRH can be armed with a variety of weapons, including AGM-114 Hellfire missiles, laser-guided rockets, GAU-19 12.7mm or M134B 7.62mm mini-guns.

NorthStar has taken delivery of 48 Bell 407GX helicopters and anticipates additional orders from Middle East customers for its 407MRH. It is evaluating a similar conversion of the Bell 429.

SOFEX 2016 attracted 384 exhibitors from 37 countries, and 115 military delegations from 58 countries. The largest of the overseas exhibitors was

the United States. Raytheon announced the sale of its TOW 2 anti-armour missile for the RJAF's AH-1 Cobras, while Orbital ATK showcased its ShotFinder acoustic hostile fire detection sensor. Weighing less than two kilograms, the system's single circular antenna can be mounted on the underside of a helicopter to provide 360 degree detection of both muzzle blast and noise of a fired round. It filters out the helicopter's noise and is not affected by brown-outs or white-outs.

The Orbital ATK special mission aircraft division also announced an upgraded variant of its AC-208 Combat Caravan. Derived from the Cessna 208 Grand Caravan, the AC-208 counter insurgency (COIN) aircraft was developed under the US Combat Caravan programme for the Iraqi Air Force.

Strike capability

The AC-208B provides a strike capability using two Hellfire missiles on under-wing pods and is complimented with a suite of sensors, including an electro-optical (EO) targeting system with an integrated laser designator, air-to-ground data link and communications equipment for intelligence, surveillance, and reconnaissance (ISR) missions, and integrated self-protection equipment.

The aircraft has been delivered to the Lebanese Air Force and others are scheduled to be delivered to countries in the Middle East and Africa through the US foreign military sales (FMS) programme.



Royal Jordanian Air Force Black Hawks and Cobras took part in the opening ceremony display at SOFEX 2016.

PICTURE: DAVID OLIVER.

A new variant, launched at SOFEX, is the AC-208 Combat Caravan II, armed with four Hellfire missiles, which is about to undergo flight trials later this year followed by missile firing trials prior to first deliveries in 2017.

The South African Paramount Group is the largest privately-owned defence and aerospace business in Africa, providing fully integrated land, sea and air solutions. In its aerospace sector, Paramount announced the formal launch of the Mwari, an armed variant of its advanced high-performance reconnaissance light aircraft (AHLAC).

Powered by a single Pratt & Whitney PT6A-66 turboprop, driving a pusher propeller, the two-seat AHLAC is designed to fulfil a wide range of missions, including ISR, coastal and border patrol, and cargo transport.

Paramount's founder and chairman, Ivor Ichikowitz, said that the initial flight-test phase of the AHLAC had been completed and the first production demonstrator would be complete by September. "Our partnership with Boeing, which is installing the mission system, is working well and the aircraft will be in production within two years. The first Mwari – the Swahili name for an 'all-seeing supreme being' – will make its debut at Africa Aerospace & Defence (AAD) in September."

Other Paramount Group aerospace programmes include the Mi-24 Night Hawk helicopter upgrade that includes weight

reduction, a new mission control system, new western weapons systems and countermeasures suite, and composite rotor blades. Some of these innovations will be integrated in the Mwari, which will have an 800kg weapons payload.

Following its take-over of the South African company Advanced Technologies and Engineering (ATE), Paramount is also continuing to produce the Civit tactical mini unmanned air vehicle (UAV) and Vulture tactical UAV. It is also developing a new medium-range rhomboid unmanned aerial system based on the ATE Roadrunner.

Various guises

Unmanned aerial systems (UAS) in various guises were to the fore at the show. The Jordanian company, King Abdullah Design and Development Bureau (KADDB), has developed a multirotor Hexa-Rotor VTOL UAV.

Weighing 6kg, the Hexa-Rotor can carry a 1.5kg payload to an altitude of 1,000m over a maximum range of 3km. Its electric motor gives it a 30-minute endurance.

KADDB also showed the prototype of a short-range, fixed-wing UAV. The three-metre wingspan twin-boom UAV II has a take-off weight of 20kg and can be powered by either a petrol/diesel engine for long range and long endurance or an electric motor for a low acoustic signature and a 40-minute endurance and an operational radius of 3km.

China was a major exhibitor at the show and

has been taking advantage of US reluctance to give approval for the export sales of armed UAS, even to friendly Middle East nations.

One of its most capable medium-altitude long-endurance (MALE) UAVs is the China Aerospace Science and Technology Corporation (CASC) CH-4. At SOFEX, China Aerospace Long-March International promoted the armed variant, the MQ-9 Reaper-class CH-4B.

A fully armed CH-4B has a fuel capacity of 165kg and a payload that includes electro-optic and infrared sensors for TV in a semi-retractable turret, synthetic aperture radar and semi-active laser guidance.

It can carry up to six AR-1 laser-guided missiles or FT-9 60kg precision-guided bombs, or four FT-6A 250kg range-extended precision-guided weapons.

Designed for the suppression of enemy air defences (SEAD) role, the FT-6A utilises a fragmentation warhead to destroy radio frequency communication systems, jamming, and command posts.

The CH-4B has been in service with the People's Liberation Army Air Force (PLAAF) since 2014, and with the Iraqi Armed Forces based at Kut Air Base, since 2015.

An undisclosed number have also been delivered to Saudi Arabia, which have been used to attack rebel forces in Yemen, while Egypt and the UAE are also reported to have acquired the CH-4.

A weather-disrupted Farnborough Airshow still had plenty to cheer about. **Alan Peaford** reports.

BILLION DOLLAR RAIN

It was wet. Following a run of rain affected shows from Abu Dhabi to Berlin, the English summer produced a monsoon-like downpour that closed down the opening day of the Farnborough Airshow as halls flooded and waterfalls cascaded down the Hampshire site's famous hills.

But enthusiasm was not dampened. Organisers reported that the show had recorded orders and options to the value of US\$123.9 billion defying industry expectations, but as ever more important was the amount of other business that was done.

This show – just 40km outside of London – is the most global of all of the major aerospace trade events but day one was dominated by the arrival of outgoing British prime minister David Cameron who had resigned following the defeat in a referendum which took UK out of Europe. He was joined by Virgin Atlantic boss Richard Branson to welcome senior aerospace executives, military officials and international government representatives at the official opening ceremony which featured a fly past by the F-35 Joint Strike Fighter flanked by the Red Arrows. The F-35 was given its show debut enabling the UK industry to see the new fighter for the first time ahead of its entry to service with the RAF.

Biggest headlines

As far as the Middle East was concerned, the biggest headlines came – not surprisingly – from Qatar Airways and its CEO Akbar Al Baker.

Al Baker signed a deal with leading Latin American airline LATAM to purchase up to 10% of the airline's shares linked to a capital investment.

"LATAM represents an exciting opportunity to invest and support the development of our long-term relationship. As a leading airline in Latin America, and key member of Oneworld alliance, this investment provides potential opportunities for Qatar Airways' global network, alongside our successful investment in IAG," Al Baker said.

Meanwhile Al Baker revealed that talks with Boeing over a potential order for up to 30 737s are "quite advanced" as he seeks alternatives to his stalled Airbus A320neo deal.

Al Baker remains unimpressed with Airbus and



Qatar CEO Akbar Al Baker (right) and Enrique Cueto, CEO of LATAM Airlines Group sign the agreement.

Pratt & Whitney over teething problems with the re-engined narrowbody which prompted Qatar to trigger the walk-away clause in its contract for the first of its aircraft which was due for delivery earlier this year.

But Al Baker did have his chequebook out for the group's executive aviation division which is set to double its Gulfstream G650ER fleet, following an order for three more of the ultra long-range business jets. Deliveries are scheduled in 2017, 2018 and 2019.

Speaking at the event Al Baker said: "When all the aircraft are in service, we will be the largest G650 operator in the world."

He also confirmed that Qatar Executive will phase out its Bombardier business jet fleet of four Global 5000s and a single XRS.

Another airline to be spending was Gulf Air which tied up the loose ends of its restructuring programme by announcing the contracts for engines and seats. The airline confirmed it had selected Trent 1000 engines to power 10 Boeing 787-9 Dreamliners, as well

as taking the firm's long-term service support and later at the show inked a deal with B/E Aerospace to supply the business class seats for the Dreamliners.

EgyptAir was also among the orders with a deal for nine Boeing 737-800s. Eight of the airplanes will be financed by Dubai Aerospace Enterprise (DAE).

The announcement coincided with 50 years of partnership between Boeing and the airline that began with an order for a 707 in 1966. EGYPTAIR placed its first 737 order in 1975.

Among other agreements Abu Dhabi's Strata, the advanced composite aero-structures manufacturing company wholly owned by Mubadala, announced that it has been awarded two contracts to manufacture additional composite components and completed major assemblies for Airbus. The combined deals, valued at more than \$1 billion, will see Strata manufacture Airbus A320 Horizontal Tail Plane (HTP) and A350-900 Inboard Flaps (IBF) in Abu Dhabi.

Turkey's plans for a new regional aircraft industry are advancing, as major suppliers for the planned restarting of production of the former Dornier 328 are signed up.



DORNIER VARIANTS TO SPEARHEAD TURKEY'S INDUSTRIAL EVOLUTION

The UK's Farnborough Airshow was the scene for a significant step forward in Turkey's ambitions to create a civil airliner industry.

The first aircraft destined to roll off the production line from a new factory near Ankara – two sites are currently under consideration – will be turboprop- and jet-powered variants of the Dornier 328 (named the TRP328 and TRJ328 respectively) that will appear late this decade. Both types will be produced on a single production line.

This will be followed by a clean-sheet 60 to 70-seater design, formerly known as the 628 but now renamed the 723 as it is scheduled to roll out in 2023, the centenary of the founding of the modern state of Turkey.

An in-depth marketing survey is due to be carried out in the next few months to gauge the parameters for the new aircraft from potential operators.



The Turkish government last year announced it would acquire 50 of the 32-seat aircraft to kick-start the programme. Farnborough saw a new order for 10 of the jet variants of the 328 being placed by Istanbul Chamber of Commerce.

These will be used to demonstrate the aircraft's abilities around Turkey, where the government hopes to establish a network of domestic routes between secondary and tertiary cities. At present, much Turkish domestic traffic, even between city pairs that are relatively close together, goes via Istanbul, a time-consuming and inefficient process.

A further order for five of the turboprop versions was placed by Singapore's Sentinel Aerospace Group, which plans to use them in the special mission role. Details were not given as to their use.

The airshow was notable for Turkish manufacturer TRJet announcing major suppliers for the 328 programme.



Ibrahim Caglar, chairman of ITO, celebrates a TRJ order at Farnborough with Fatih Ozmen, owner and CEO of TRJ parent company, Sierra Nevada.

TRJet has selected a new version of the Pratt & Whitney Canada PW127 to power the turboprop version. This has a common turbine assembly with the PW119 that powers the original Dornier aircraft but a different gearbox that produces more shaft horsepower.

It will increase the maximum take-off weight of the turboprop to that of the jet version, from 13,990kg to 15,660kg, giving an extra 1.5 tonne of payload.

It was announced earlier this year that the turbofan version of the aircraft will use the Pratt & Whitney Canada P&WC PW306B.

Other major suppliers announced at Farnborough were Liebherr Aerospace, which will provide the air management and flight control systems; Rockwell Collins, which will supply Pro Line Fusion touch-

screen avionics; and Heggemann Aerospace, which will develop a common landing gear for both versions of the aircraft.

Given the primary aim of creating a Turkish aircraft industry TRJet is working with several Turkish vendors to supply components for the aircraft, to ensure that technology transfer and skills transfer into Turkey is achieved by the time the new aircraft start to roll off the assembly line.

The aircraft will be produced initially as a 32-seater regional aircraft, but the 50 ordered by the Turkish government will be capable of being manufactured in a variety of roles, such as medevac, airport calibration aircraft and VIP transports. They will be used by the Turkish air force and governmental users such as the ministry of health.



Three development aircraft will be built in Germany, where the original Dornier 328 was built and where 328 Support Services, the certificate holder for both the turboprop and jet versions of the aircraft, is based.

Those purchased by the Istanbul Chamber of Commerce will be demonstrated around the country, partly in an attempt to stimulate the creation of new airlines that will use the 328 for domestic services. They will also be used to demonstrate the type's ability to operate from austere airports and from a variety of surfaces, including gravel and grass.

328 Support Services reckons that there are around 2500 aircraft in the 328's size category flying worldwide, which makes for a potentially strong marketplace. It particularly believes that Russia could be a good market, once western sanctions against the country are lifted.

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Khalifa Al Zaffin:
"Growth of logistics and aviation is integral to Dubai's economic strength."

Airports are of growing importance across the Middle East region and it is no wonder that the annual Airport Show in Dubai is mirroring that growth.

Alan Peaford and Barbara Saunders report from the show.

Airport show rides the Dubai wave

When the Airport Show opened its doors for the first time in the UAE capital of Abu Dhabi, just after the turn of the millennium, airports in the Gulf were not big business.

Etihad had still not been created and Abu Dhabi was served by Gulf Air in the midst of its break up; Qatar Airways was an ambitious regional carrier and Emirates, by then the largest Gulf carrier, was carrying fewer than 10 million passengers on its 50 aircraft fleet.

Turn the calendar forward 16 years and Dubai is the busiest international airport in the world; Doha, Abu Dhabi, Amman, Jeddah, Riyadh and Muscat all have new or dramatically improved airports and others like Bahrain and Kuwait are going through transition.

And the show grows too.

Having moved from Abu Dhabi to Dubai the organiser – Reed Exhibitions – has ridden the wave alongside growth at Dubai's second airport, Al Maktoum at Dubai World Central, and reaped the benefits from the developing midfield

terminal at Abu Dhabi and the new concourses at Dubai International.

This year's show turned out to be the most successful by far, according to Reed, with exhibitors reporting a record number of potential business deals. The show recorded a double digit growth in exhibitor participation, space and number of attendees. There were more than 7,500 attendees from the aviation industry worldwide. The three-day event, witnessed participation by more than 300 exhibitors from 55 countries leading to some 3,500 meetings between buyers and exhibitors during the three-day event - another record breaking milestone for the show.

Sheikh Ahmed bin Saeed Al Maktoum, president of the Dubai Civil Aviation Authority, chairman of Dubai Airports and chairman and chief executive of Emirates Airline, formally opened the show and said its success is a reflection of the strength and importance of the Middle East aviation market for global players.

"The Airport Show has seen double-digit growth this year reflecting the strong interest and an unwavering global confidence in the Middle East, particularly in the UAE, which is making significant investments in the sector, actively embracing latest technological innovations, and opening doors of tremendous opportunities for global industry players," he said.

"It's a clear message that the MENA region is one of the most important markets and its growth can be a driving force for international aviation industry. Dubai continues to focus on becoming the world-leader in aviation and is investing billions of dollars toward infrastructure development to meet the needs of the future growth," said Sheikh Ahmed.

The whole issue of the role of

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aviation in economic prosperity was the subject of the keynote address at the Global Airport Leaders Forum (GALF) which ran alongside the Airport Show and given by Khalifa Al Zaffin, chairman of Dubai Aviation City Corporation, the development that includes Dubai South, the home of Maktoum International.

Al Zaffin said that the aviation sector is expected to contribute over 32 per cent to Dubai's GDP by 2020, and with the rapid growth taking place in the sector, the emirate is actively implementing its plans to effectively and efficiently handle the growth, while creating economic prosperity for all.

"Dubai is an aviation hub and the busiest airport in the world by international passengers. We are witnessing an unprecedented growth in passenger numbers. To cope with this Dubai has chalked out a strategy to continue with the growth in aviation and drive Dubai's economic prosperity. Growth of logistics and aviation is integral to Dubai's economic strength and in developing Dubai South, we are building an integrated airport city, which will have a significant contribution in the economic growth," he said.

Economic growth

The International Air Transport Association (IATA) expects the Middle East airports to enjoy that economic growth as they handle an additional 237 million passengers by year 2034. At this year's show the message was clear that, technology is the bedrock of managing this growth successfully.

Airports in the region are investing millions of dollars toward airport technology and system upgrades to ensure seamless passenger experience, along with security.

From smart gates, beacon technology, mobile devices to navigate the airports and face recognition systems, to air traffic management, baggage and check in management, IP-based security monitoring, communications, and ticketing, and information systems, airports are actively adopting new technologies.

According to a study by Technavio, the global market for smart airports is estimated to reach \$13 billion by 2019, at a combined annual growth rate of 6 per cent.

Exhibitors reported that they were encouraged by the response from visitors and expected positive business outcomes.

Daniyal Qureshi, group exhibition director at Reed Exhibitions Middle East, said: "More than 25 new products have been launched at the show this year and the show has witnessed keen interest from industry professionals, especially for the products that have been brought to the Middle East for the first ever time. The aviation industry is more active than ever in adopting new and smart technologies and the Airport Show is providing an ideal platform for them to explore these technologies and solutions that are set to transform the future of air travel.

"With global passenger numbers expected to rise to 7.3 billion by 2034, airports need to ensure they are able to cope with the rising



"Airports need to ensure they are able to cope with the rising numbers, and, at the same time, offer seamless travel experience."

DANIYAL QURESHI

numbers, and, at the same time, offer seamless travel experience. Smart technologies can greatly help in delivering a hassle-free passenger experience that can put an airport ahead of its competitors," added Qureshi.

The use of smart technology is not only contributing to enhancing passenger experience but also expected to help authorities in the region reduce 25 per cent of operational costs.

IATA said the increased use of devices, applications, networks and services will open up a whole new world for systems integration in the airports environment.

New products on display included a highly maneuverable cabin lifting for VIPs or limited mobility passengers; automated parking systems that enable vehicles to be stored without human intervention; inflatable aircraft hangers and a versatile vacuum lifter for baggage handling, to threat image recognition training.

Increased business opportunities

It wasn't just the technology companies that were optimistic. Ground handling and cargo handling companies could see increased business opportunities and are planning a foray into the other Gulf countries.

Most companies see increased potential for expanding businesses across the Middle East in view of the expected increase in investment in infrastructure projects, particularly airport expansions.

Germany-based TEC Huenert which specialises in the development and manufacture of airport ground support equipment, displayed its product range including passenger stairs, VIP mobile escalator stairs, a water and toilet service vehicle and its innovative Rescuestair systems.

"We have supplied the Rescuestair system to the Maktoum International Airport and are looking at associating with other airports in the region, particularly in Saudi Arabia, which is a big market," said Viktoriya Sarafova, international sales manager. "Our participation at the Airport Show enables us to gauge the business potential in view of the enquiries from trade visitors," she said.

The next show will be 15-17 May, 2017.

Romark bites at region's onboard catering sector

Southern Russia food producer Romark, whose parent company Urozhaynoye has 9,000 hectares under cultivation in the Stavropol eco-region, is opening an office in the Dubai Multi Commodities Centre to target the Middle East's onboard catering sector with its La Batata range of crisp veggie health snacks.

The company, which produces snacks using its patented and proprietary oil dispersal production system, says following strong interest from regional carriers in its GMO, gluten, preservative and colourant-free range, it will now invest in a dedicated packaging line to meet their needs. Romark's regional breakthrough enquiries came at the World Travel Catering & Onboard Services Expo

in Dubai which was collocated with the Airport Show.

"We have received a great deal of interest from Middle East airlines but they want our snacks in smaller packages and we will set up a separate line for this – it's worth the investment," said Ilya Stroyev, General Manager.

"We chose Dubai for our first operation outside of Russia because we want to service this region's carriers because of their high passenger levels, their commitment to serving the best and the growth potential," he said.

"Our timing is right because of the fall in the value of the rouble we are offering the highest quality product at a very competitive price."



Among the few highlights in the static display was one of three RMAF CH-47Ds delivered last August. From ex-US Army National Guard stocks, they were overhauled by Oregon-based Columbia Helicopters, while the aircrews and technicians were trained at Fort Indiantown Gap, Pennsylvania. The three CH-47Ds have been inducted into Escadron Chinook at Rabat-Sale.

Defence writer **Alan Warnes** has attended the International Marrakech Air Show (IMAS) over the past decade and gives his personal verdict on this year's event.

MISSING RMAF MEANS NO TOUR DE FORCE THIS YEAR

Of the five Marrakech air shows to have taken place since the inaugural event in 2008, this was undoubtedly the most disappointing.

That was largely due to the lack of presence from the Royal Moroccan Air Force (RMAF). The static display usually comprises 15 or so RMAF exhibits from right across the inventory. However, this year it was just seven aircraft – an F-16C Block 52, Alpha Jet, C-27J, Bombardier 415, T-6C, CH-47D and an AB205.

These were all relative newcomers except for the Alpha Jet, which had been modified for the 'Al Ghait' rainmaking role, and the AB205, with spray bars attached each side of the cabin, for its 'lutte antiacridienne' anti-locust role.

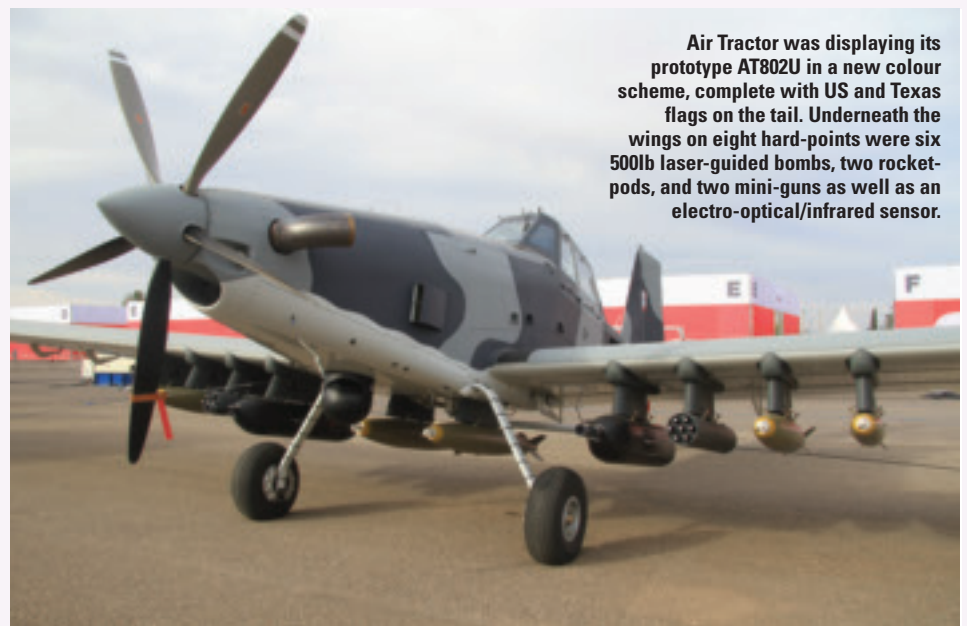
But what was probably more of a let down was the disappointing turn out of RMAF aircraft in the air display.

It amounted to a couple of Pumas flying with flags unfurled underneath, while four F-16Cs made a fly-by, a low formation pass and then a bomb burst before disappearing back to their Ben Guerir base.

The rest of the display comprised aerobatic teams – the RMAF's Marche Verte (Cap 232s), the Italian Air Force's Frece Tricolori (MB339PANs), the Spanish Air Force's Patrulla Aguila (Casa 101s) and the United Arab Emirates Air Force & Air Defence (UAEAF&AD) Al Fursan (MB339NATs).

The flying display cried out for something a bit more imaginative – some guts and thunder. On previous occasions there were formation flypasts, illustrating much of what made up the RMAF. According to one senior RMAF officer: "The event wants to rely more on industry playing their part and so the usual large RMAF presence was withdrawn."

On the positive side, the event is viewed by industry as the 'gateway to the African markets'. If it continues to attract delegations from countries such as Benin, Burkina Faso, Cameroon, Jordan, Mali, Mauritania, Nigeria, Pakistan and Tunisia, as this year, the aerospace industry will continue to attend.



Air Tractor was displaying its prototype AT802U in a new colour scheme, complete with US and Texas flags on the tail. Underneath the wings on eight hard-points were six 500lb laser-guided bombs, two rocket-pods, and two mini-guns as well as an electro-optical/infrared sensor.

RMAF seeks Gazelle replacement

The Royal Moroccan Air Force has launched a programme to replace its ageing fleet of around 24 SA342L Gazelles, which have been operational since 1982.

The aircraft have provided a light support and limited attack capability, playing an active role in operations in the south-west of the country – the region where the Polisario militant group is bidding to claim a homeland for the Salawari people, ousted from the annexed Western Sahara.

Bell Helicopter's Stephen Suttles, vice president Middle East and Africa, believes his company is well positioned to provide a Gazelle replacement: "We are listening and understand what they need. We think we have the right mix and it wouldn't be necessary to replace one aircraft with another.

"Working with NorthStar Aviation, we can offer the armed Bell 407MRH, which the UAE Air Force is operating. It can be armed with several offensive options – including the AGM-114 Hellfire, M134 mini-gun, GAU-19 machine gun and Hydra 70 rockets – to meet their needs."

NorthStar takes the 'green' Bell 407 aircraft to its facilities in Melbourne, Florida and integrates systems the customer requires on to the platform before shipping it to the country. The company has an office in Abu Dhabi, too, which is supporting the UAE deal for 30 modified helicopters.

Interestingly, the UAEAF&AD Bell 407MRH in the Marrakech static was seen for the first time publicly, fitted with an infrared suppressor over the engine exhaust.

Light strike aircraft fight for prominence

With Morocco's on-going operational requirements in the south-west of the country, three companies used IMAS 2016 to market their light strike aircraft.

Embraer was showing off the A-29 Super Tucano, Air Tractor featured the AT 802, while Hawker Beechcraft displayed its AT-6 Wolverine.

Working in partnership with Sierra Nevada Corporation, Embraer has so far sold 26 Super Tucanos – 20 to Afghanistan and six to Lebanon. The Afghan Air Force pilots are being trained at Moody Air Force Base in Georgia and the aircraft are already being delivered, while the six Lebanese examples should be at the same base by the end of 2016.

Discussing the Super Tucano, Geraldo Gomes, Embraer vice president business development, was clearly having a verbal swipe at Air Tractor when he said: "Our aircraft is a clean sheet design and did not evolve from an agricultural aircraft. The aircraft has five NATO hard points and two internal machine guns, which can be engaged as necessary."

Embraer has now sold the Super Tucano to 13 air forces. It announced the sale of four A-29s to Mali earlier this year and has already delivered four to neighbours Mauritania – two in 2012 and a second pair in 2015, to add to the four ex French Air Force EMB 312 Tucanos delivered in 2010/11.

Meanwhile, Air Tractor was keen to tell of its 30 AT 802s operating in Africa, although they are in the fire-fighting and agricultural arenas, rather than the attack role.



According to its pilots, it is a new modification, presumably a lesson from infrared surface air missile threats in Yemen, where the helicopter has been playing its part in the Saudi-led coalition fighting rebels there.

Bell's other two options are the AH-1Z Viper and UH-1Y Venom, both boasting an impressive ISTAR capability too. "If they want interoperability with the US and NATO, these two platforms will give Bell an edge in any competition," said Aaron Camele, the company's international military campaign manager.

Bell is also working with NorthStar on an armed Bell 429, which, with two engines and increased maximum take-off weight, could be an even better, if a more expensive, solution.

Neither Airbus Helicopters nor Finmeccanica Helicopters were at the show to provide their insight into what their options could be but,

undoubtedly, the EC 725 or AW159 Wildcat would be among them.

France's Aerotech Group exhibited an upgraded SA341F Gazelle at the International Marrakech Air Show in April 2014, which would have catapulted the RMAF's Gazelle fleet into a new era.

The 'Naja' programme, as it is known, could equip the Gazelle with new generation weapons and was witnessed at the event with two Raytheon Griffin laser-guided missiles on one side, while the starboard side saw another option – the TDA 68mm laser guided rocket. A FN Herstal .50 gun, was also exhibited.

While Tunisia and Niger are known to have taken up an upgrade on their Gazelle fleets, and the Iraqi ones were also worked on before delivery, Morocco never bothered. Aerotech did, however, fit a pair of night vision lights under the cabin of some of the RMAF's Gazelles.

"The AT 802 would be ideal for those African countries that don't have a precision type aircraft and it comes at a fraction of the price of its competitors," said Tom Menker, Air Tractor's business development representative based in Olney, Texas.

There were 24 AT 802 Border Patrol Aircraft delivered to the UAEAF&AD between December 2010 and June 2013. However, they are now being passed

on to other countries in the Middle East – Egypt, Jordan and Lebanon.

L3 Wescam recently delivered four intelligence, surveillance, targeting and reconnaissance (ISTAR)-configured AT 802s to the Royal Jordanian Air Force, initially destined for Yemen. However, given the current situation in that country, they were never delivered.



An RMAF F-16C 08-8012 fitted with conformal fuel tanks can operate the Sniper targeting pod and DB-110 reconnaissance system. The aircraft are useful assets in the Saudi-led coalition in Yemen.

Pilots pay tribute to F-16C comrade

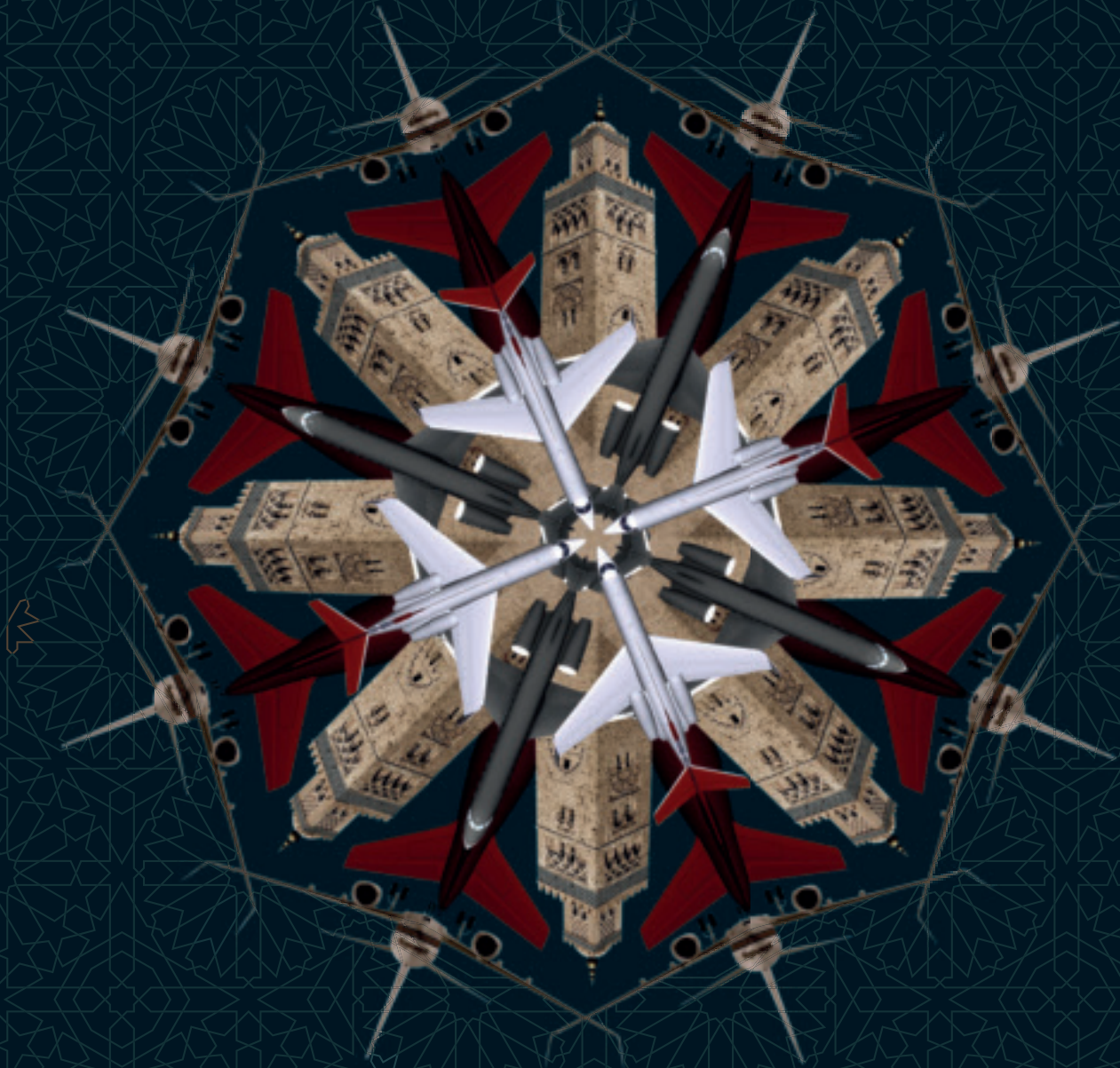
Personnel around the F-16C would not talk about their on-going operations in the Saudi-led coalition, but they did say they were based at the same facility as other foreign aircraft (Khamis Mushayt). They also confirmed the name of the pilot killed when F-16C 08-8008 crashed in Saudi Arabia in May last year, as Lt Bahti 'Sonic' Yassine.

Every Friday, all the F-16 pilots wear a 'Sonic' name badge on their flying suits in tribute to their fallen comrade.

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Lorraine Martin: "It is of global importance to educate young women and provide everyone with equal opportunities to work, to lead and to succeed."

Be confident, women told

Lockheed Martin's Lorraine Martin, deputy executive vice president of its mission systems and training business, spoke on the 'Women in Leadership and in Business' panel with Fatima Al Jaber, board member, Al Jaber Group and other industry leaders, at the Women in Industry Forum in Abu Dhabi.

The day-long series of panel and round-table discussions were designed to 'discuss, define and drive the timetable for cultivating and advancing the role women play within the global corporate and cultural landscapes within industries'.

"When we expand the overall number of qualified women in the workforce, we will see an even greater, exponential impact on the global economy," said Martin. "Therefore, it is of global importance to educate young women and provide everyone with equal opportunities to work, to lead and to succeed. The more intelligent, problem-solving human capital we have in the marketplace, the more innovation and growth we will see, particularly in emerging markets."

In offering advice to the next generation of female leaders, Martin said: "It all starts with education and that learning should never stop. Science, technology, engineering and maths (STEM) education provides a distinct advantage in our field. It is critical to innovation, and I would encourage any young woman to consider STEM subjects – or career development opportunities in these fields."

In closing, she added: "Have confidence in yourself, look for opportunities outside of your comfort zone and above all – focus on performance. The philosophy I developed over the years is 'every commitment, every day', which underscores the importance of consistently delivering and ensuring you are contributing to projects that make a difference in your business."

Air Arabia first officer, Ghada Mohamed Al Rousi, issues a rallying cry to young women around the world, as concern mounts within the commercial aviation industry over a looming global pilot shortage.

WOMEN HOLD THE KEY TO THE AVIATION DOOR

There has never been a better time to build a career in the aviation industry. Airlines are growing, with more aircraft, more flights, more routes and more passengers than ever before. Nowhere is this truer than in the Middle East and Asia, where the growth of the middle-class is generating considerable industry growth.

But if this progress is to be maintained, the sector must address the one area where growth is stalling: pilot numbers.

Currently, there are approximately 130,000 commercial pilots flying worldwide. Boeing has estimated that, by 2034, 558,000 more commercial pilots will be needed to meet the growth of the industry. Yet currently just 3% of commercial pilots are female. If the demand for more pilots is to be met, this statistic has to change.

The reasons for a lack of female pilots are varied. In some markets, certain cultural and attitudinal barriers still exist, with piloting still very much seen as a 'male' profession. Similarly, there exists a misconception that all pilots are forced on to long-haul trans-continental flights,

pulling you away from home for weeks on end – and, therefore, making it impractical to both fly and raise a family.

But piloting a plane shouldn't be about gender. It is about hard work, ability and desire. In my case, I knew being a pilot was right for me. I told myself I was able enough to do the job and now, as a first officer for Air Arabia, I've never looked back.

I have been lucky in that, in the UAE, the country is supportive of women like me who are looking to break down barriers and balance family life with a career. The importance of this encouragement for young women looking to become pilots cannot be emphasised enough – whether it be from family, government or wider society.

Overall, mind-sets are starting to shift. Many people are surprised that, coming from a conservative background in the Middle East, I have been able to fulfil my career aspirations in the aviation sector. But more and more young women are realising that it is possible; recently a Royal Brunei Airlines plane piloted by an all-female crew landed in Saudi Arabia, a landmark moment in the history of aviation.



Ghada Mohamed Al Rousi:
 "Piloting a plane shouldn't be about gender. It is about hard work, ability and desire."

That's not to say that becoming a pilot is easy. I undertook the multi-crew pilots licence (MPL), which develops the abilities needed to fly in a multi-crew airline environment and takes more advantage of flight simulators than a traditional commercial pilot licence. The MPL seemed the right choice, as it is increasingly becoming the preferred training method for many global airlines.

Again, I was grateful for and encouraged by the support of the academy where I learnt to fly. Alpha Aviation UAE, based in Sharjah, is aware of both the growing shortage of pilots and the lack of female pilots. As a result, some of the Alpha Aviation Group courses have been up to 20% female intake.

The first three months were gruelling and the instructors were firm. They will identify your weak points as a cadet and specifically improve you in those areas. I graduated as the first Emirati holder of the MPL, and I hope I can serve as an example and inspiration to many other budding aviatrixes.

The barriers that might once have prevented women from flying a plane are disappearing and,

most importantly, the aviation sector now needs female pilots. Pilot supply is falling short of demand and will continue to do so unless a solution is found.

Of course, some women will never start pilot training: they might not be able to afford the course and, sadly, some families might still not accept that it is a job for women. But governments and airlines now have a duty to educate people on the possibilities of women becoming commercial airline pilots, and women have a duty to pursue their dreams. If you want this job enough, then you simply have to go for it. Don't listen to anyone who tells you that you can't.

This is a crossroads for the aviation sector. We can either be pro-active in bringing a whole new demographic into the cockpit to solve the impending pilot shortage crisis, or we can watch some of the most talented women of our generation move into other fields.

I am proud to serve my country in this job every day and my country shows its pride by supporting me. It is time for more countries and more women to follow suit.



Alia Twal.

Twal honoured as a 'liveryman'

Alia Twal, the governor of the Arabian chapter of the Ninety-nines, the women pilots' association, has been made a 'liveryman' in the Honourable Air Pilot Company.

Twal, whose full-time job is as a pilot with Royal Jordanian, is only the fourth Jordanian in history to have achieved this position. The others were the late King Hussein, HRH Prince Faisal Al Hussein, and HRH Prince Hamza Al Hussein.

The Honourable Air Pilot Company was established as a guild in 1929 in order to ensure that pilots and navigators of the then fledgling aviation industry were accepted and regarded as professionals.

□□□□□

It was modelled on the lines of the livery companies of the City of London and, in 1956, the guild was formally recognised as a livery company. In 2014, it was granted a royal charter by the UK's Queen Elizabeth II.

The Honourable Air Pilot Company focuses on sponsoring and encouraging action and activities designed to ensure that aircraft are piloted and navigated safely by individuals who are highly competent, self-reliant, dependable and respected. It fosters the sound education and training of air pilots, from the initial training of the young pilot to the specialist training of the more mature.

Its work includes charitable activities, education and training, technical committee work, aircrew aptitude testing, scholarships and sponsorship, plus advice and recognition of the achievements of fellow aviators worldwide.

*LGO is a brand new
women-only airline.*

*Liz Moscrop meets the man
with the plan and looks at
where it fits with other
initiatives in the region.*

Go for it! Dubuisson takes women into the jet set

In an industry where men outnumber women and in a region where women are only recently entering the workplace in greater numbers, one man has taken the initiative to create an environment where women can participate in aviation at many different levels.

In 2015, Emmanuel Dubuisson founded Go International in Abu Dhabi, a privately-owned consulting company aimed solely at women. He believes it is a world first and explained: "Our main objective is to advise our female clients or customers on how to manage, lease or acquire an aircraft adapted to their specific needs and requirements."

He's also launching a private jet service at the Middle East Business Aviation (MEBA) show this November, purely for female customers, crewed only by women and female support staff. He explained: "It will be with Bombardier Global 6000 and Challenger 650 types. I'm doing this because, for me, it is a big gap in the market, in every market, not just aviation."

"There are not enough women involved. I would like to change this mind-set and create something important and different in the business sense."

The concept could come into its own during the extremely busy Hajj and Umrah season, where long-range flights are booked out months ahead. It also caters to families who would feel more comfortable knowing there is the possibility to book a female-only flight when they are making their travel arrangements.

Dubuisson continued: "We will hire all female crew for female clients. We will see who we can find, but ideally all female operational staff. We will base ourselves at Al Bateen."

He is working in conjunction with an, as yet, unnamed partner, but the whole project will go

live at the MEBA show in November, possibly alongside a fashion show.

Another part of the initiative tailored more towards business women is a programme dubbed "LGO for Ladies", to help women who are interested in buying or chartering an aircraft make effective decisions that are in their best interests.

There is also a completions expert to help provide guidance on interior design features, select flight crew, or even install an extra closet. With an eye on the market, LGO will also take into account the potential resale value of the aircraft.

According to the company's press information, LGO offers a choice of aircraft comprising: Cessna Citation Jets (CJ1, CJ2, CJ3, and CJ4), Dassault Falcon 7X, 900 (B, C, EX, EASY) and the Bombardier Global Express. All the aircraft are available for charter or leasing.

Strong initiatives

Dubuisson's project comes hard on the heels of many strong initiatives in the region. Confounding perceptions, the Middle East is actually one of the world's most forward-thinking regions in terms of attracting women into aviation. The first female pilot in the Gulf was Egyptian Loftia Al Nadi in 1933. Today Major Mariam Al Mansouri is much feted. She led a squadron of UAE F-16s through a bombing raid against the Daesh (also known as ISIL) terror group in northern Syria.

There are several innovative organisations whose aim is to bring more women into the sector. Take Women in Aviation International (WAI), for example. The non-profit organisation has a mission to increase diversity throughout aviation.

WAI accepts both women and men as members. Mervat Sultan heads up the Middle East chapter. No stranger to innovation herself, the Syrian-born finance manager of Ras al-Khaimah-based Ramjet Aviation Support, was one of the first Emirati women to earn a flight dispatcher's license. She also holds a private pilot's certificate.

Last year, WAI teamed with the local chapter of the International Association of Women in Aviation (IAWA) and ran a joint conference together at the Dubai Air Show. IAWA members encompass most of the women holding executive positions in aviation worldwide.

Another strong local group is the Arabian section of the Ninety-Nines, an international women pilot organisation founded in 1929. Section governor Alia Twal is a first officer with Royal Jordanian Airlines. All the groups collaborate to support each other and many boast members in common.

Indeed, earlier this year, women from the UAE, Qatar, Lebanon, Saudi Arabia, Germany, Romania and other countries joined the region's first General Assembly of Women in Aviation Middle East, which took place at the Airport Show 2016. Other high-profile women included: Suaad Al Shamsi, the first UAE female aircraft engineer; Captain Kristina Tervo, a Boeing 777 Instructor at Emirates Airlines; Talar Faiq, director general of Erbil International Airport in Kurdistan; Dina Beljafallah, vice president CEO Office, Aerospace & Engineering Services, a Mubadala Company; Captain Hanadi Zakaria Al Hindi, the only female pilot in Saudi Arabia; and Roula Droubi, regional director – government, industry & community engagement, Boeing International, among many others.

Emmanuel Dubuisson
with members of the
all-women team.



There are plenty of opportunities to enter the aviation industry locally. Mideast Aviation Academy in Amman, Jordan, for example, has graduated women from Saudi Arabia, Egypt, Sudan, Bahrain and Algeria.

Another proactive local employer is Strata, the Mubadala Aerospace-owned aerostructures facility based in Al Ain. Mubadala is encouraging female employees to establish a mentoring programme.

Green shoots of change

Issues such as government-supported childcare and day care centres will increasingly take centre stage, but there are green shoots of change. Mubadala has pledged to offer day care to its employees and allow women to go home for up to an hour per day to breastfeed their babies.

Maternity leave is still an issue, however. In the UAE, women get 45 days maternity leave after the birth of a child, unlike other countries, which allow up to a year.

However, WAI's Sultan is hopeful that initiatives like Dubuisson's airline project will

“There are not enough women involved. I would like to change this mind-set and create something important and different in the business sense.”

EMMANUEL DUBUISSON

encourage further change. She said: “This kind of project is exactly what we look for. It gives women the opportunity to be inside the cockpit and outside in ground operations as well.”

Pilot, Capt. Corinne, added: “When I heard that idea I liked it very much. This is what we are searching for, to promote women in all aspects of aviation and to see them in the cockpit.

Sex discrimination

“As a pilot, I have been suffering all my career from sex discrimination. It is about time we came up with a fair working environment, which is equal for men and women as long as they are good at what they do. I want to share this fantastic project with everyone.”

With such a talent pool to draw from, Dubuisson should be well served to grow his business.

Indeed, he has plans beyond his initial private jet charter project. “We are not yet an airline, but yes, we are looking to see eventually how we can extend the project to airliners.”

Captain Carol Rabadi: "The fact that you are female means there is more attention on you, though the guys do treat us very well."

RJ leading ladies into the pilot seat

Royal Jordanian is actively backing its female pilots, who still make up a tiny minority of its crew.

Liz Moscrop
reports

The latest Boeing report indicates a need for 60,000 new pilots in the Middle East over the next 20 years. That could mean 1,200 new female captains in the region, but only if all airlines are as forward thinking as Royal Jordanian (RJ).

RJ is supportive of recruiting women to its ranks. Presently it employs 335 pilots, seven of whom are female, so that's around about the 2% mark.

The airline has several long-serving female flight crew among its employees. It tends to attract very high fliers. Samar Oran, for example, the second rated female pilot in Jordan, joined the carrier in 1978, and was the first Muslim Arab pilot to cross the Atlantic.

Rana Saman, the airline's corporate communications manager, said: "RJ always welcomes female pilots to join, as is the case with all other posts in the airline. We offer the chance to both females and males equally to be a pilot, like any other career. It all depends on the interest of the applicants. I would like to note that RJ employs female pilots, female flight engineers and female marshals."

To be fair, a 2% ratio female to male is low. The global average (skewed to the US) is just over 5%, according to big data analyser gendersgapgrader.com (GGG). It derives its data from the airman database and 2% is in line with a younger regional airline industry in the Middle East. The reasons for this are beyond the scope of this article, but one of the suggestions GGG makes is for women to see positive impressions of other women performing traditionally male roles.

Careers day

One such woman is Captain Alia Twal, who has just earned her Airbus A330 ticket. She started flying for RJ at 24, after flying with Mideast Aviation Academy as a flight instructor. She said: "We had a careers day at school and I knew then that I wanted to be a pilot. I finished my training in Jordan to become a chief flying instructor and became the youngest female pilot in the Middle East. I had students my age and older than me."

Twal is now governor of the Middle East branch of female pilots' networking group, the 99s. She said: "Living in the

Middle East, we are engulfed in a fast-moving culture that is yearning for change. There is an environment that is full of people who are open to change and are seeking to experience life; more so now, than ever before."

One of her unofficial mentors is Captain Carol Rabadi, who has been a strong role model for young pilots of both genders in RJ for many years. She started her career there in 1999 and is now a training captain.

She said: "The fact that you are female means there is more attention on you, though the guys do treat us very well." Instances of non-acceptance have been few and far between, she explained, and her experience, demeanour and skill mean that even if a man has ever been a little anxious about flying with her, he is soon comfortable.

One of her students, Captain Hadeel Khamash, recently earned her fourth stripe with RJ, and foresees a long career ahead with the airline. She said: "It's been a hard year of study, but it has been worth it."

Historical practices

However, there are issues where gender can cause a division, simply through historical practices. It is only relatively recently that RJ has recruited women, and Rabadi pointed to a few outmoded practices that could help support females flying in the ranks. "We are trying to get the airline to change the cut of our uniforms. At present the shirts are cut for men, and don't really fit us so well."

This underpins the fact that there is such a disparity in numbers. It is essential to be comfortable in the cockpit, as well as to present a professional image to both crew and the public.

A bigger issue, as it is in many airlines, is pregnancy. The women would like the airline to follow the same guidelines as it does for female flight attendants. Captain Rabadi said that they had had "a good response" from the airline in initial discussions.

The women are pilots first and foremost and all are concerned to contribute to RJ, and enjoy long and interesting careers. Captain Rabadi is enjoying the challenges of the new tools available for her at work. "Technology is so much better now. You can plan ahead for real situations in the air," she said.



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Al Musallam steps up at Gulf Air

Gulf Air's board has announced the instatement of Maher Salman Jabber Al Musallam as chief executive officer.

Al Musallam joined the airline as deputy chief executive officer and has been at the helm, as acting CEO, since December 2012.

He said: "This is a responsibility that I do not take lightly. I am honoured to continue serving the Kingdom of Bahrain's national carrier and, with the airline's executive management team's on-going support and efforts, realising its positive transformation."

Lewis lands AJW Aviation role

AJW Aviation has appointed David Lewis as chief technical officer.

Lewis will be responsible for technical standards and best practices across all divisions of the business, specifically maintenance, repair and overhaul (MRO), reliability, warranty and inventory management for customers' technical spares support programmes, aircraft maintenance, engine management and asset health monitoring.

He will also guide aircraft teardown and end-

DARWAZEH IS RJ'S NEW CHAIRMAN

Royal Jordanian's board of directors has elected Said Darwazeh as chairman. Darwazeh was appointed a representative of the government shareholdings' management company in RJ's board of directors two days earlier. He replaces Suleiman Hafez, who had chaired the board since November 2014.

RJ's president and CEO, Captain Suleiman Obeidat, was appointed the government representative.

Darwazeh is currently the CEO and chairman of Hikma Pharmaceuticals. Between 2003 and 2006, he was Jordan's Minister of Health.

He is also the chairman of the board of the Queen Rania Foundation, which focuses primarily on providing youth with learning opportunities and equipping young people with the necessary tools for success, such as ICT in education and online learning opportunities.



of-lease management reconciliations, as well as service level agreements with AJW's approved repair vendors.

Ureña Raso joins Comlux board

Comlux - The Aviation Group has announced Domingo Ureña Raso as a new member of its Group board.

Raso said: "The company is expanding quickly worldwide and I am very pleased to bring my experience at the most strategic level of the

Group. As I am residing in Spain, I will also work with Comlux España to develop our presence in the Iberian market and to acquire new VIP clients in the region."

Embraer's Slattery moves up

Embraer appointed John Slattery as president and CEO for its commercial aviation business unit in July.

Since November 2012, Slattery has been the business unit's chief commercial officer.

He joined Embraer in

March 2011 as vice president of customer finance and asset management. Prior to that, he spent 15 years in executive and leadership roles at various aircraft leasing businesses and financial institutions.

Sales post for Armstrong

Avtrade has appointed Patrick Armstrong as regional sales manager based in Dubai.

With a focus on the Middle East & Africa, Armstrong will be

responsible for developing further business and customer relationships, increasing sales and revenue, as well as promoting Avtrade's full range of services available to the aviation industry.

Three Emirati airport managers

Etiihad Airways has appointed three UAE nationals as airport managers in South Korea, Seychelles, and Saudi Arabia.

Fatima Al Hashemi is now airport manager for Incheon, South Korea; Yousuf Mohammed has been appointed as airport manager for Medina, Saudi Arabia; and Mansour Hamad is airport manager for Seychelles.

Al Hashemi, the carrier's second female Emirati airport manager, joined Etihad in 2012. Mohammed joined in 2011 and has worked in Jeddah, Kuala Lumpur, Colombo, and Muscat. Hamad was in the UAE Air Force for 13 years before joining the carrier in 2011.

"These new appointments embody the success of our UAE national development programme and also demonstrate our ability to attract top Emirati talent from elsewhere," said Ray Gammell, Etihad Aviation Group's chief people and performance officer.

ETIHAD APPOINTS TWO NEW GMS IN NIGERIA AND CHINA

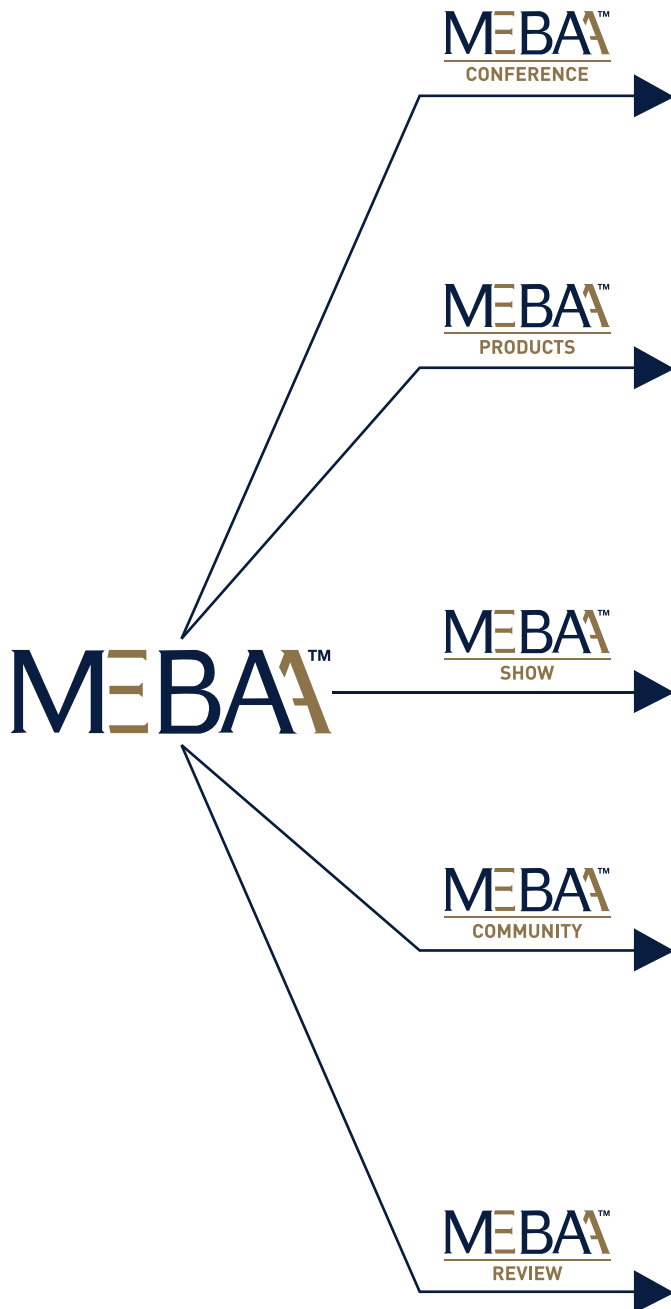


Etiihad Airways has announced George Mawadri is its new general manager in Nigeria. Mawadri (left) served with British Airways for 19 years in Uganda, Kenya and Zambia in the east and central Africa region, as well as the surrounding feeder markets of Zimbabwe, Malawi, Ethiopia, Rwanda, Sudan and South Sudan.

The airline has also appointed Peter Li (right) as its new general manager for China. Li will lead the development of Etihad's commercial strategy and represent the Abu Dhabi-based airline in China. He will be responsible for further strengthening Etihad's partnerships with the travel trade and corporate customers.

Etiihad senior vice president global sales, Danny Barranger, said: "We are delighted to welcome Peter to the China leadership team. China is, and will continue to be, one of the most important markets for Etihad Airways globally. The airline's unique geographic position serves as a significant hub in the global aviation network, and allows Abu Dhabi to closely link China with the GCC region, the Middle East, Europe, Africa and South America."





REGIONAL FOOTPRINT

MEBAA hosted conferences in several cities such as Dubai, Jeddah, Riyadh, and Amman. These conferences, with complimentary access for MEBAA members, provide a platform for discussion among members with a particular focus on the host country.



SAFETY, INSURANCE AND REGULATION

Emergency response planning workshop, free sample ERP manual and discounted customized ERP manual, discounted IS-BAO and IS-BAH certifications as well as new competitive insurance products through MAIS, exclusively for all MEBAA members.

The Middle East and North Africa's premier business aviation show will be held at DWC in Dubai, 6-8 December 2016. MEBAA Show 2014 showcased 44 aircrafts, 8,314 attendees, and 422 exhibitors. The show also had educational sessions, panel discussions and IS-BAO/IS-BAH certification workshops. MEBAA has also launched MEBAA Show Morocco, the first business aviation show in North Africa.



FLY AND FEED

GIVING BACK

With the support of its members, MEBAA has raised USD 25,000 within the first year of launching its donation program, Fly and Feed, in partnership with the United Nation's World Food Program (WFP.)

The annual business aviation review for the Middle East and North Africa addresses major issues and updates in the region for the year. In addition, the magazine showcases the profile and accomplishments of the association's 240 members.

Wen Feng

Marcella Nethersole *speaks to Shell Aviation's general manager Asia Pacific Middle East (APME).*

1

■ Tell us about your job and the company's presence in APME?

When I joined the aviation business in 2013, I was the general manager for Asia. More recently, I was given the opportunity to expand my portfolio to include the Middle East region. This is very exciting, as the combined region of Asia and Middle East represents around 60% of the world's total population and 30% of the world's land area, which means there is a huge potential for continued growth.

With Shell Aviation being present in key hubs such as Dubai, Hong Kong and Singapore, as well as growing ones such as Islamabad and Muscat, we are able to be a part of this growth story.

Shell Aviation is a global supplier of aviation fuels, lubricants and technical services, and in the Middle East, particularly, we have a strong heritage of more than 50 years. In 2017 we will be celebrating the milestones of 55 years in Oman and 50 years in Dubai.

2

■ What are the biggest challenges you face in your position?

My top priority and challenge will always be to drive continuous improvement in safety.

At Dubai International Airport, we have maintained a record more than 10 years of 'goal zero' and my role is to ensure both our operations and office staff continue to have a relentless focus on safety.

With double-digit growth rates in Middle East passenger traffic, my challenge is to ensure Shell Aviation is able to support industry safety, operational and commercial challenges of managing this increasing traffic, and continue to be a trusted global partner with a focus on world-class safety, operations and supply security.

3

■ Shell is a key supporter of Women in Aviation. Why do you think this is important?

Shell was recently named in *The Times* top 50 employers for women for the third year running and once again, was the only oil and gas company on the list.

Since 2013, female graduate recruitment has increased from 34% to 43%; the representation of senior women has gone from 16.2% to 19%.

Hundreds of our staff have benefited from Shell's women's career development programme and senior women's connect programme, as well as more than 20 women's networks globally.

In March 2016, the Shell in Dubai women's network hosted an event to recognise successful women from the UAE in celebration of Women's Day.

Today, half of our leadership team is female.

4

■ What advice would you give to women considering a career in aviation?

Have a clear career goal and never underestimate your potential. It is also important to have a strong network that supports you both in your business and personal life.

The global nature of this industry also means that we tend to travel for work, and it's important to strike a balance between work and family life.

5

■ Where do you see progress in environmental change being made by the aviation industry?

Shell is one of the largest investors in R&D among international oil and gas companies. In 2015, we spent \$1.1 billion on technology research and development. In Shell Aviation we have a dedicated team of aviation scientists at a specialist aviation research facility within the Shell Technology Centre at Houston in Texas, USA. They can work closely with and draw on the expertise of other Shell scientists around the world who develop fuels and lubricants for other sectors. We work closely with aircraft equipment manufacturers and airlines to develop and test quality fuels and performance-enhancing lubricants.

In 2009, the world's first commercial passenger flight powered by fuel made from Shell natural gas was flown by Qatar Airways from London Gatwick to Doha, and in December 2013, we became the first major international energy company to develop a lead-free replacement for two main grades for aviation gasoline.

We also aim to support our partners and customers in reducing environmental impact with a suite of e-services to reduce paper transactions.

“ Have a clear career goal and never underestimate your potential. ”



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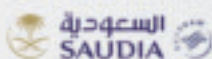
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