



# ARABIAN AEROSPACE

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

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## Riding the roller coaster

The news that the American ban on laptops and other personal electronic devices has been lifted comes as one ray of sunshine among otherwise stormy clouds that hang over the Middle East's aviation scene.

That the laptop ban was an ill-thought, knee-jerk reaction to a serious security threat in the first place is irrelevant now. The recognition that the major Middle Eastern hubs, which have invested heavily in sophisticated screening technology and systems, are far more likely to identify a weapon or an explosive device than in most parts of the world – and certainly the US – is a relief for the carriers affected.

Those airports and airlines that do not have such robust systems in place will need to invest the time and money to ensure screening does comply with the standards.

The ban hit the whole region hard. Outside of the region, very few people understand the geography and history of the Middle East. As the 'big three' Gulf carriers – Etihad, Emirates and Qatar – have risen up the charts of the world's most successful airlines, their individual brands are recognised worldwide but still seen as sub-brands to the 'Gulf carriers' tag.

Under attack from competitors in the US and in Europe for "unfair subsidies", the Gulf carriers mounted spirited individual defences against the claim; the laptop ban hinted at "high-risk routings".

The current diplomatic upheaval with the isolation of Qatar from its relations with Saudi Arabia, the UAE, Bahrain and Egypt, which led to the exclusion of Qatar aircraft from the airspace of those other countries, has hit the headlines and added to the confusion and the negative perception of the region as a whole.

These perception factors, along with a



combination of the competitive environment, market climate and impact of a strong US dollar, are threatening to take the momentum out of the growth of the Middle East market.

Factoring in the separate challenges in Istanbul faced by Turkish Airlines, that could mean the region's key emerging transit hubs face the prospect of slowing growth.

The airlines are deferring on deliveries of aircraft and making vital cost reductions. However, the reputation has been built on top-quality standards, whether that be safety, security or service. It is essential that those standards remain high to maintain the differentiation between the Middle East and most other parts of the world.

Safe landings.

Alan Peaford, Editor-in-chief

COVER: Kuwait Airways' Kamil Al-Awadhi

PICTURE: KUWAIT AIRWAYS

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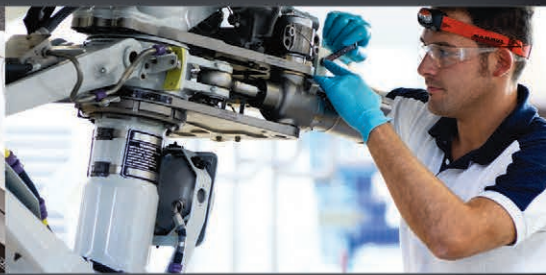
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## ETIHAD CARGO AIDS RWANDA BLACK RHINO RETURN

The critically endangered black rhino has returned to the wilds of Rwanda with the help of Etihad Cargo and animal transport specialist Intradco Global.

Intradco chartered two Etihad Boeing 777 freighters to transport the 19 black rhinos from Johannesburg to the Rwandan capital, Kigali, in May.

Ten rhinos travelled on the first flight, and nine on the second, along with the three vets and two attendants who

accompanied them for the duration of their entire journey from Johannesburg to Akagera National Park.

Jes Gruner, Akagera Park manager, said: "Together with the Rwanda Development Board and the Howard G Buffett Foundation, we have spent the last three years preparing for this historic event, ensuring that the park is safe for the arrival of the rhinos and for their long-term future so they can breed and thrive."

### Qatar signs for F-15 jets

Qatar and the US have signed an agreement for the purchase of F-15 fighter jets, with an initial cost of \$12 billion.

Minister of State for Defense Affairs, Dr Khalid bin Mohammed Al Attiyah, said: "We believe that this agreement will propel Qatar's ability to provide for its own security while also reducing the burden placed upon the US military in conducting operations against violent extremism."

### Falcon approval

Falcon Aviation has been approved by the UAE's General Civil Aviation Authority (GCAA) to perform third-party line maintenance at its new Dubai South facility at Al Maktoum International Airport (DWC).

Falcon Aviation director of maintenance, Nicolas Tejera, said: "We have merged our extensive

aircraft-on-ground teams at Al Bateen with Dubai South and have recruited and trained up more aircraft engineers so they can multi-task at either of these bases. This means we can offer our clients the flexibility they need."

### DAE lease deal

Dubai Aerospace Enterprise (DAE) has signed long-term lease agreements for 10 ATR 72-600 aircraft with Alliance Air, a wholly owned subsidiary of Air India and the first airline to start operations under the Indian Government's regional connectivity scheme.

### Mumtalakat stake

Bahrain Mumtalakat Holding Company (Mumtalakat) has acquired a significant minority stake in Axtmann Aviation Holding that operates FAI Aviation Group (FAI), a provider of mission-critical aviation services, offering

fixed-wing air ambulance, special missions, charter and aircraft management, as well as full MRO services.

### EAG ends JV talks

Etihad Aviation Group has confirmed that it has terminated negotiations with TUI in relation to a potential joint venture involving the leisure operations of Air Berlin Group and the German TUIfly company.

The airline said it has taken the decision following "many months of negotiations, in good faith during which time the parties have been unable to reach agreement on the final nature of such a joint venture".

### Super for Saudia

Saudi Arabian Airlines (Saudia) was presented with the award for 'most improved airline' at the Skytrax 2017 World Airline Awards held during the Paris International Airshow.

### Etihad renews Jettainer contract

Etihad Airways and Jettainer are extending their cooperation until 2021.

The leading international service partner for outsourced unit load device (ULD) management will continue to manage and maintain the UAE national airline's container fleet over the next five years.

### Dubai duo in partnership

Emirates and Flydubai have formalised a partnership which will see the two Dubai-based airlines join forces. Both airlines will continue to be managed independently, but will leverage each other's network to scale up their operations and accelerate growth.

The partnership goes beyond code-sharing and includes integrated network collaboration with coordinated scheduling.

The new model will give

Flydubai customers seamless connectivity to Emirates' worldwide destinations spanning six continents. For Emirates' customers, it opens up Flydubai's robust regional network.

### Saudi E-3A upgraded

Boeing has completed a series of upgrades to substantially enhance the technological capabilities of Saudi Arabia's E-3A airborne warning and control system (AWACS) aircraft.

Among enhancements to improve radar capabilities and reduce repair time for the airborne surveillance fleet are systems that increase the original equipment's radar sensitivity and expand the range for tracking targets.

### Dnata's US deal

Dnata has reached an agreement with Lynx Holdings to acquire its AirLogistix USA cargo-handling operations at George Bush Intercontinental Airport in Houston.

## Rolls-Royce supports Turkish

Rolls-Royce is providing TotalCare service support for Trent 700 engines that power seven Airbus A330 aircraft included in the extensive fleet of Turkish Airlines.

Dominic Horwood, Rolls-Royce, director, customers and services – civil aerospace, said: “Our customers regularly re-select TotalCare for fleet additions, a clear sign that they value the economic benefits it brings. We look forward to continuing to support Turkish Airlines as it grows its A330 fleet.”

## Qatar – simply the best

Qatar Airways has been named airline of the year by the prestigious 2017 Skytrax World Airline Awards, held at the Paris International Airshow.

It is the fourth time that Qatar Airways has been given this global recognition.

The Doha carrier also won a raft of other major awards at the ceremony, including best airline in the Middle East, world’s best business class and World’s best first class airline lounge.

Qatar Airways’ home and hub, Hamad International Airport, was also rated five-star by Skytrax, one of only five in the world to be given this recognition.



## Emirates awash with friendly cleaning

Emirates coincided the showcasing of an environmentally friendly aircraft cleaning technique that has enabled it to save millions of litres of water every year, with World Environment Day on June 4.

Emirates uses the ‘aircraft drywash’ technique to clean its aircraft.

Little or no water is involved, which is in contrast to conventional methods of aircraft cleaning that typically use thousands of litres of water per wash.

A liquid cleaning product is first applied manually to the entire external surface of the aircraft. Clean microfiber fabric is then used to remove the cleaning product, which has dried to a film, removing the dirt along with it and leaving the aircraft clean and polished. The aircraft is left with a fine protective film allowing the painted surface to retain a longer gloss and shine.

## BAA Training in Sharjah

BAA Training, in cooperation with strategic partner, the aviation training centre Pier 7 Aviation, is expanding its services to the Middle Eastern by establishing a base in Sharjah offering type rating, cabin crew and full flight simulator training, and wet lease services.

The new location for

Boeing 737 CL and Airbus A320 full-flight simulators complements 26 existing BAA Training locations.

## Libya nav systems

Libya Telecom (LT) will shortly roll out the installation of new navigation systems combining VHF omni-directional radio (VOR) and direction measuring

equipment (DME) to improve air traffic management at four major airports – Mitiga, Benina, Tobruk and Labraq.

VOR is a short-range radio navigation system that uses VHF band to enable receiver-equipped aircraft to determine position and maintain course using radio signals transmitted by a network of fixed ground radio beacons.

## Jeppesen delight at Turkish renewal

Jeppesen has inked a new 10-year service contract with Turkish Airlines.

The agreement includes both paper and digital Jeppesen charts, FliteDeck Pro, electronic flight bag (EFB) services, NavData digital navigation services, Airport Moving Map capabilities, e-Link digital chart library services and Receiver Autonomous Integrity Monitoring (RAIM) prediction technology.

## Cargo cooperation increases

Etihad Cargo and Royal Air Maroc Cargo signed a memorandum of understanding in June that will see the two airlines cooperate in a number of areas, including network development, freighter deployment and increasing traffic on several trade lanes.

David Kerr, senior vice president, Etihad Cargo said: “Together with Royal Air Maroc, we have been working for the past year to deliver improved services for shippers to the US, Canada, Brazil and west Africa.”

## Royal Wings boosts Aqaba

Royal Wings – the subsidiary of Royal Jordanian – has launched direct flights between King Hussein International Airport in Aqaba on the Jordanian coast and Al Maktoum International Airport at Dubai South.

Royal Wings is transferring its operations from Amman to Aqaba to boost air transportation and tourism in the port city.

With this new flight, investors and tourists will be able to visit Aqaba, Petra and Wadi Rum, and enjoy Jordanian tourist sites and its moderate weather.



## Saudia receives IATA boost

Saudia has received the highest level of certification for its digital merchandising of the airline’s on-board products available to travel retailers.

This now means that, when travel agents and retailers are making air travel bookings for Saudia guests, they will be able to see images of the seats and layout on board. In addition, passengers can purchase additional services when available.

Saudi Arabian Airlines director general, Saleh bin Nasser Al-Jasser, received the award from IATA director general and CEO, Alexandre de Juniac.

Al Jasser said: “The implementation of the new digital merchandising gives Saudia the ability to offer the 69,500 IATA-accredited travel agencies across the world a view of the latest Saudia on-board products.”



## Another high for Dubai.

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## Iran Air takes delivery of its first ATR 72-600s

Iran Air took delivery of its first four ATR 72-600s in May. Earlier this year ATR and Iran Air signed a firm contract for 20 ATR 72-600s and options for a further 20. Deliveries of the 20 firm aircraft will extend until the end of 2018. Iran Air CEO, Farhad Parvaresh, said: "Our new fleet of ATR 72-600s showcases our will to provide newest generation aircraft to our customers, therefore ensuring comfort, reliability and competitiveness. Strengthening the links between all our communities will encourage new business opportunities for everyone."

## Air Arabia looks at fleet expansion

Air Arabia may look at expanding its fleet, with a decision to be made by early next year.

The Sharjah-based carrier took delivery of its latest A320 in March after firming up a deal with Airbus for an additional five aircraft in November 2016.

CEO, Adel Abdullah Ali, said: "As we go into the summer I'm optimistic that things will be much brighter."

## NATS is 200th berth

NATS, the UK's leading provider of air traffic control services, has become the 200th business to receive a trade licence from the Abu Dhabi Airports Free Zone (ADAFZ).

## Female first

A Kurdish woman is the first female to receive a certificate allowing her to fly a Boeing 737-800 plane for Iraqi Airways.

Warte Abubair Ali, 26, earned her certification in civil aviation in 2015 in

Denmark. She has been hired as a pilot for Iraqi Airways' Boeing 737 flights.

The Minister of Transportation in Iraq, Kazem Finjan al-Hamami, said: "The ministry has noted she met all the requirements of success and excellence from the finest institutes, and wishes her further success."

## Etihad and China Southern codeshare

Etihad Airways and China Southern Airlines have entered a new codeshare partnership, increasing the number of agreements operated by the Abu Dhabi-based airline to 53.

Mohammad Al Bulooki, Etihad Airways' executive vice president commercial, said: "This is a significant

milestone in the airline's network development strategy and a key component of its footprint in the China market."

## Dubai Pods cast

Dubai International (DXB) terminal 3 has launched the sleep 'n fly lounge, offering a total of 27 pods and cabins allowing passengers easy rest.

## Al Musallam quits as Gulf Air CEO

Maher Salman Al Musallam has resigned as CEO of Gulf Air. Al Musallam joined Gulf Air as deputy CEO and has been at the helm of the airline, as acting CEO, since December 2012. He was given the permanent post as CEO in May 2016.

Gulf Air credited Al Musallam and the executive management team, with spearheading the national carrier's 2013 restructuring strategy to reduce the airline's annual losses.

## Space education

To strengthen cooperation between UAE educational institutions and specialised advanced technology, science and space centres, The Mohammed Bin Rashid Space Centre (MBRSC) has signed an MoU with the University of Dubai, which aims to develop and qualify Emiratis capable of working in space science technology and thereby contribute to the development of the sector.



## Boeing and ALAFCO commit to the MAX

Boeing and Kuwait-based ALAFCO committed to 20 737 MAX 8s at the 2017 Paris International Airshow, valued at \$2.2 billion at current list prices.

ALAFCO already has unfilled orders for 20 737 MAX aircraft and was also one of the first Middle East customers for the 787 Dreamliner. The new commitment, when finalised, will boost the lessor's order to 40 737 MAXs.

"As a lessor, we are committed to provide our global customer base with technologically advanced aircraft," said Ahmad Alzabin, chief executive officer and vice-chairman, ALAFCO.

"Fuel efficiency, operational reliability and efficiency are key factors for our airline customers and the 737 MAX will help us meet those demands in the single-aisle market."

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## Emirates IFE remains world best

Emirates has won the world's best in-flight entertainment award for a record 13th year at the prestigious Skytrax World Airline Awards. The airline also picked up the award for best first class comfort amenities.

## Hangar painting

STTS, the painting and sealing specialist for airline, military and VIP aircraft, has begun its painting and hangar work at Dubai South.

STTS, a subsidiary of French group Finaero, has appointed Aircraft Support Industries (ASI) to take on the building works at its wide-body painting bay at the new Al Maktoum International Airport. Completion is expected in 2019.

The facility will mainly target MRO painting needs for all types of commercial wide bodies.

## Stop that car

Ethihad Airways is to begin charging premium passengers for its former complementary chauffeur service at key hubs outside of Abu Dhabi. The move follows a review of the airline's services.

## Sabre/RJ tie-up

Royal Jordanian (RJ) and Sabre Corporation have signed a new agreement whereby Sabre provides RJ with a suite of technology to help plan its network of flights.

Royal Jordanian president and CEO, Captain Suleiman Obeidat, said: "In order to maintain our strong reputation and performance, we need to adapt ourselves to the needs of the regional market we serve and make sure we are using our resources efficiently. Sabre's technology will give us a new level of insight, enabling us to make better network planning decisions."



## Oman takes delivery of first Eurofighter Typhoon

The Royal Air Force of Oman has received its first Eurofighter Typhoon combat jet – part of a batch of 12.

Oman has also ordered eight Hawk lead-in fast jet trainers as well as the 12 Typhoons.

The delivery followed an official roll-out event on May 15 at

BAE Systems' site at Warton, UK, during which the first Typhoon and Hawk aircraft were formally presented to the customer in front of an invited audience including His Excellency Sayyid Badr bin Saud al Busaidi, the Sultanate of Oman's Minister Responsible For Defence Affairs.



Cargolux President & CEO Richard Forson and Nabil Sultan, Emirates Divisional Senior Vice President, Cargolux.

## Emirates SkyCargo and Cargolux team up

Emirates SkyCargo and Cargolux Airlines have signed an MoU for a strategic operational partnership in air cargo transportation.

The agreement is the first of its kind in the air cargo industry between a mainline airline and a specialised freighter operator.

"Emirates SkyCargo is committed to being the leading player in the global air cargo industry, providing our customers with the highest standards of products and services," said Nabil Sultan, Emirates divisional senior vice president, cargo.

"Cooperating with Cargolux, which is a leading, established and specialised air cargo operator with strengths that are complementary to our own, will allow us to present a broader enriched product offering and add value to our customers."

## New plans for Dubai Airshow

New features planned for the Dubai Airshow 2017, including new sector-specific pavilions, a space pavilion, a UAV summit, a cargo zone and the return of airport solutions, are set to bring focus to new market sectors when the show opens in November.

## The big bang theory

Honeywell and NASA have completed a two-year test to determine the most effective way to show pilots flying supersonic jets where people on the ground may hear sonic booms, potentially eliminating one of the primary barriers to the broad adoption of supersonic flight.

The testing programme successfully integrates predictive software and display technology into business jet cockpits, and demonstrates how pilots can see where, and how, sonic booms would affect the population on the ground.

## Jet booster

Jet Aviation, together with its joint venture partner the Al Mulla Business Group, is

outfitting a brand new facility in the shared terminal at Dubai South. The company plans its DWC FBO to go operational at the VIP Terminal in Q3 2017.

## Farsound teams up

MRO supply chain and logistics company, Farsound Aviation, has won a multi-million-dollar contract renewal with Turbine Services & Solutions Aerospace (TS&S Aerospace), an MRO provider for aircraft engines located in Abu Dhabi.

Abdul Khaliq Saeed, CEO of TS&S, said: "It's due to strengths in partnerships with leading aerospace players, such as Farsound Aviation, that robust global supply chains and ecosystems have been built to bolster the market."

## Helicopter deaths

Thirteen high-ranking Turkish military officials were killed when their helicopter crashed in the south east of the country in June. In a statement, the army said the AS 532 Cougar had crashed shortly after taking off.

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## Airbus wises up to Skywise

Airbus has launched a new aviation data platform in collaboration with Palantir Technologies – pioneer in big-data integration and advanced analytics.

Skywise aims to become the single platform of reference used by all major aviation players to improve their operational performance and business results and to support their own digital transformation.

## ATR sells short

ATR is finalising the evaluation for the launch of a version of the ATR 42-600 with enhanced short take-off and landing (STOL) capabilities. The regional turboprop aircraft manufacturer is ready to offer this new version, the ATR 42-600S, to its current and potential customers.

## Turkish giant LEAP

Turkish Airlines has concluded a 15-year rate per flight hour (RPFH) maintenance agreement with CFM International to support the LEAP-1B engines that will power the airline's new fleet of 75 Boeing 737 MAX aircraft scheduled for delivery between 2018 and 2023. The agreement covers a total of 150 engines.



## UAE signs space accord with Algeria

The UAE Space Agency has signed a memorandum of understanding with the Algerian Space Agency defining a framework for collaboration in the peaceful use of space.

Dr Mohamed Al Ahbabi, director general of the UAE Space Agency, and his Algerian counterpart, Dr Azzedine Oussedik, signed the

MoU at the Algerian Ministry of Foreign Affairs in April.

The signing was attended by Abdelkader Messahel, Algerian Minister for Maghreb, African Union and Arab League Affairs and Dr Khalifa Al Romaiti, chairman of the UAE Space Agency.

## SalamAir techs up

Radixx International, a provider of custom-tailored airline reservation, distribution and merchandising systems, has announced that it is now working with Oman's first budget airline, SalamAir.

SalamAir CEO, Francois Bouteiller, said: "We chose Radixx as our partner because of its unparalleled hybrid distribution capabilities, and for the industry-leading ancillary revenue solutions the

company provides. Carriers like ours are always looking for the most innovative ways to deliver top-quality service to passengers, while at the same time maximising revenue."

## Powerful Sener

TAV Group president and CEO, Sani Sener, ranked seventh in *Construction Week's* power 100 list. The magazine is one of the industry's most prestigious publications in the Gulf.

Sener has become the

only Turkish businessperson with a the top 10 ranking in the last three years.

## Clean, quiet Etihad

Etihad Airways has been given a top rating by London's Heathrow Airport for its emissions and night-time noise performance during the first three months of 2017.

The 'fly quiet and clean' league table, the first of its kind to be produced by the airport, placed the UAE's national airline among the top carriers.

## Egypt gives support for 99s

The Arabian section of the global women's pilot group, the Ninety Nines, has been granted the patronage of the Egyptian Civil Aviation Ministry for its fifth annual meeting, which will be held in October.

More than 100 female pilots from all over the world, along with the president of the international organisation of the Ninety Nines, Jan Mckenzie, will attend the meeting.

Governor Alia Twal said: "We are very happy to have this meeting under the patronage of the Ministry of Civil Aviation; this will add more value to the meeting in October."

## Kuwait training

Airbus Helicopters has selected Thales to provide flight and training solutions for the Kuwait Air Force and National Guard H225M Caracal transport helicopters.

Thales will supply one Reality H full-flight mission simulator (FFMS) and two flight procedures tactical training systems. The three systems can be networked to perform collective training exercises and prepare crews for complex missions, including combat search and rescue.

## LM-100J freighter makes first flight

The first Lockheed Martin LM-100J commercial freighter aircraft completed its inaugural flight in Georgia, USA in May.

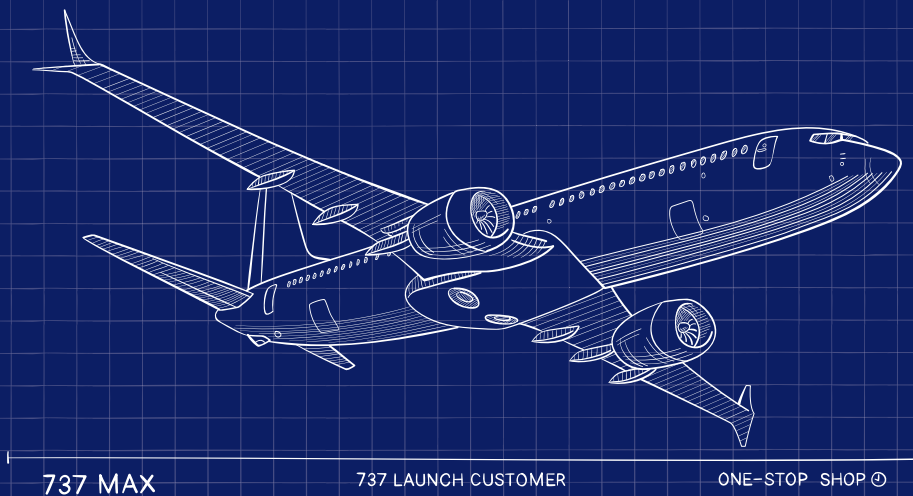
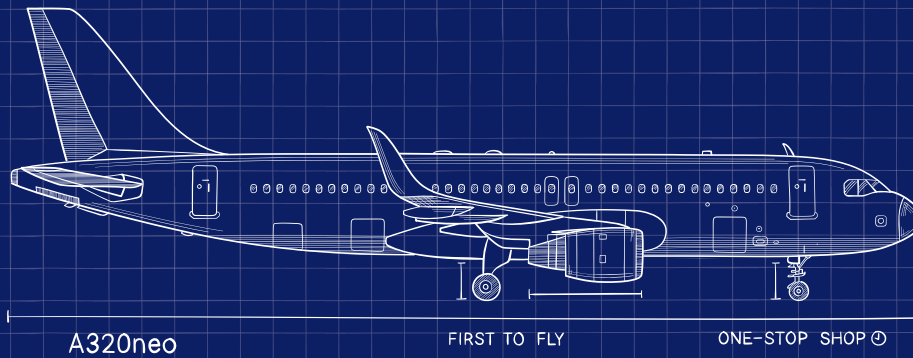
"I was proud to pilot the first flight. The aircraft performed flawlessly, as is typical of our military C-130J new production aircraft," said LM-100J programme chief test pilot Wayne Roberts.

"This new model will perform many commercial roles in the decades to come like humanitarian service following natural disasters, nuclear accident response, oil spill containment, and fire-fighting. It will also enable remote area development such as mining and oil and gas exploration.

"This day marks the beginning of a tremendous commercial capability that only the LM-100J can deliver."



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All 10 of Kuwait Airways' order for Boeing 777-300ERs should have been delivered by July this year.

# KUWAIT FEELING BRAND NEW...

*For years, Kuwait Airways languished in the doldrums with an obsolescent fleet and reputation for poor in-flight service. New aircraft, a better-trained workforce and improved ground facilities are now beginning to regenerate the Kuwaiti national carrier, reports Alan Dron.*

**A**s your Kuwait Airways Boeing 777-300ER taxis out from the gate at Kuwait International Airport to the holding area of runway 15L, you pass several anonymous, white-painted Airbus A300-600s and A310-300s parked on remote stands.

Those are the remnants of one of the oldest fleets owned by any national carrier in the Middle East.

By the time this article is read, all are likely to have been flown to the Far East for scrapping. And, as your 777 takes to the air and leaves its former companions dwindling in the distance, there is a sense that the national carrier is also rapidly leaving its past behind it.

A visible sign of this is the airline's new livery. For more than 30 years, Kuwait Airways' aircraft have sported a mid-blue cheatline and tail panel with a

Continued  
on Page 24



**"We're not competing against the 'Big 3', Turkish and Saudia. It's a completely different business model that emphasises steady growth."**

KAMIL AL-AWADHI

CONTINUED FROM PAGE 23

stylised bird emblem, which has appeared increasingly dated in recent years.

A rebranding exercise has seen the 777s painted all-white with oversize 'Kuwait' titles on the forward fuselage and an updated representation of the stylised bird sweeping down the fin and up over the rear fuselage.

After years of decline – made more noticeable in comparison with the explosive growth and elevated service levels of other Gulf carriers such as Emirates, Etihad and Qatar Airways – Kuwait Airways has embarked on a five-year turnaround plan that it hopes will restore it to the front rank of Middle Eastern airlines.

An urgent aim is to reclaim Kuwait-originating traffic from Gulf competitors. The airline's share of passengers at Kuwait International is around 25%, low for a home hub. It aims to boost that to 40-45% by 2021 as its fleet expands and standards improve.

This, believes deputy CEO, Kamil Al-Awadhi, will allow Kuwait Airways to win back customers who have been siphoned off by other carriers to their hubs further down the Gulf.

#### Point-to-point services

At present, around one-third of Kuwait Airways' passenger traffic transits through the emirate, with the remaining two-thirds split fairly equally between business passengers and leisure travellers. In future, there will be more emphasis on point-to-point services, rather than transit traffic.

"The problem is with the regional market: it's flooded," he said, standing in his office with shirtsleeves rolled up – an unusually relaxed look for an Arab airline executive on home turf. "The Kuwait-Dubai route has something like 25 daily flights on it, which is ridiculous. To compete against that sort of capacity is going to be tough."

Kuwait Airways has to decide whether it's worth getting involved in a dogfight, or whether to concentrate its efforts on routes that are not so well served, such as Kuwait-Doha.

One aspect of the company's route network that has been eliminated is its portfolio of fifth-freedom services, such as Kuwait-London-New York and Kuwait-Bangkok-Manila.

Al-Awadhi explained: "We've disposed of all fifth-freedom routes. It's not a profitable way to operate a flight."

"There was a time, when yield was a lot higher, when you could dilute the cost of landing and parking."

That 'cushion' has been eliminated with today's much lower yields.

As a state-owned company, Kuwait Airways has been supported through heavy losses in the past, although these have been dropping steadily, from KD98 million (\$320 million) a few years ago to KD26 million in 2015. "Right now, we're self-funded with no financial support from the government," said Al-Awadhi.

A new fleet will cut fuel and maintenance

## More than six decades of history

**Founded in 1954, Kuwait Airways is one of the Middle East's older airlines.**

**It began life with Douglas DC-3s, moved into De Havilland Comets and Hawker Siddeley Tridents, then acquired Boeing 707s and 747-200s.**

**A switch to Airbus products took place in 1983-84, with A300B4s and A310-300s ordered. However, Boeing kept a foothold in the fleet with two 767-200ERs in 1986.**

**Following the 1990 invasion by Iraq, most of the fleet was destroyed or appropriated by the Iraqis. This led to one of the longest-running cases in international legal history, a 20-year saga that eventually saw Iraq pay compensation of \$500 million in 2013.**

□□□□□

**In the intervening period, Kuwait Airways re-equipped in the 1990s with a mix of Airbus A300-600s, more A310-300s, long-range A340-300s and Boeing 777-200ERs. With the exception of a later batch of A320-200s, those constituted the fleet that maintained the airline's schedules until very recently.**

**A two-stage re-fleeting process began in 2014. Seven new A320s and five A330-200s were leased to act as a 'bridge' to a new fleet of 10 A350-900s that will start to arrive in 2020-21 and will replace the A330s by around 2025, while the existing A320s will be replaced by 15 A321neos from 2019.**

**A study is under way to decide whether to increase capacity by swapping five of the A320neos for larger A321neos.**

**Additionally, 10 Boeing 777-300ERs have been acquired, with the last due to be delivered this July.**

**The 777 has proved extremely popular with both airline cabin crew and passengers, said Al-Awadhi, who regularly receives phone calls from prospective passengers, wanting to know which routes and flights the aircraft will be operating before they book tickets.**



**Kuwait Airways' decades-old colour scheme, seen here on one of its Airbus A330-200s, is being replaced with a more modern interpretation, as on the Boeing 777-300ER.**

costs, improving the carrier's operating figures. The new aircraft will largely be used to increase frequencies to existing destinations, rather than add new ones.

"We're not competing against the 'Big 3', Turkish and Saudia," said Al-Awadhi. "We're not going to be a mega-connector. It's a completely different business model that emphasises steady growth."

Although the arrival of low-cost carriers (LCCs) in the Gulf has been felt by Kuwait Airways, Al-Awadhi firmly believes that they and hybrid carriers actually expand the market.

"I was in a management meeting 10 years ago, before [Kuwaiti hybrid carrier] Jazeera Airways started. There was panic that it was going to start chewing our market. I find that an LCC generally opens up a new market." He feels that LCCs encourage more people to fly.

Arguably, a more significant problem for Kuwait Airways over the past decade has been the stuttering attempts by the Kuwaiti Government to privatise the nationalised airline. Privatisation would allow the company to be more operationally nimble, but the on-off-on-again process has hindered the company's progress.

#### Attempt at privatisation

The latest attempt at privatisation in 2015 quickly stalled, with the government apparently changing its mind as to whether the national carrier should be cut free.

It then apparently decided that just 20% of Kuwait Airways' shares would be sold, but the situation keeps changing, said Al-Awadhi, who admits he has no idea what will happen. He does, however, make the point that the situation is entirely in the government's hands, not the airline's.

A further obstacle to Kuwait Airways' future is the condition of its home base, Kuwait International Airport, which is operating at almost double its annual design capacity of six million passengers. Although Al-Awadhi has no wish for Kuwait Airways to become another Middle East mega-carrier he said: "Even if I did want to, it would be impossible, purely because of the infrastructure."

"My airport is falling to pieces at 11.5 million passengers. The infrastructure is stretched beyond its limits."

Relief is on the way, in the shape of a new \$4.3 billion terminal that will have a capacity of 25 million passengers.

However, that is not due to be completed until around 2022.

As an interim measure, Kuwait Airways is building its own, dedicated 'support terminal' for its passengers that will have an annual capacity of 4.7 million and which should be operational in the first quarter of 2018.

However, the company will outgrow that by 2019-20, which makes the arrival of the new main terminal on schedule vitally important.

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*Steadily climbing profits at the Kuwaiti carrier, Jazeera Airways, have gone into reverse recently, with two consecutive quarters of losses. New CEO Robit Ramachandran tells Alan Dron he is focusing on restoring the airline's winning ways.*

# REVERSE THRUST...

**L**ow oil prices for the past couple of years have generally led to surging profits at airlines worldwide, as the amount they spend on fuel has dropped sharply.

For Gulf airlines, however, those low prices have been something of a double-edged sword.

Lower fuel costs have encouraged some airlines to drop their ticket prices in an attempt to attract more passengers and win greater market share. That has led to a race to the bottom in the industry, with yields plummeting.

That situation has been made worse for Jazeera Airways, Kuwait's second airline, by a combination of over-capacity in the marketplace and a slowing Kuwaiti economy.

Reduced income from oil has led to cutbacks in Kuwaiti Government budgets, including travel budgets and new industrial projects. And, as an astonishing 93% of the Kuwaiti working population is employed either directly or indirectly by the government, the effects on Jazeera have been significant.

The company still made a net profit of KD10.8 million (\$35.4 million) in 2016, but that figure was almost 30% lower than in 2015 and the last quarter of the year it actually made an after-tax loss of KD1.2 million.

Losses continued into the first quarter of the current financial year, with a net loss of KD0.9 million, on a turnover down 15.3% compared to the same period in 2016.

## Healthier figures

The busy summer period is likely to produce healthier figures, but Jazeera is taking several steps to ensure the company's recovery, said CEO Rohit Ramachandran.

"The first is to focus on gaining a greater share of corporate traffic. We're also putting quite a lot of focus on ancillary revenues, making sure they supplement the core yield."

"Traditionally, Jazeera has been quite liberal in offering facilities. Now we're looking at right-sizing each of those additional features, such as bag allowance, park-and-fly, and the business lounge we're promoting even for economy passengers on a paid basis at the moment."

Traditionally, Jazeera, like several other Gulf airlines, has offered the sort of baggage allowance that would seem incredibly generous in most other regions of the world. This is recognition that, in the Gulf, Arab nationals as



The carrier is building its own terminal at Kuwait International Airport to give its passengers a 'game-changing', more restful experience from the crowded main building.

well as expatriate workers from the Indian sub-continent often travel with several suitcases.

Seeking to 'right-size' that particular facility might seem like a negative move but, according to Ramachandran: "The key is to do it in a smart and opportunistic manner"

"There are some routes where a generous baggage allowance is an important part of selecting a carrier and we would make sure that our loyal customers aren't affected."

"However, on some routes it's not a problem, for example, on short-intra-Gulf routes, not those like India and Egypt where commuting expatriates need their baggage allowance."

Jazeera has for several years faced strong competition from other Gulf carriers, particularly those intent on feeding long-haul passengers into their hubs further down the waterway. Now, however, it is facing increased competition in its home market, both from a reinvigorated Kuwait Airways and a newcomer in the shape of Wataniya, which should have taken to the air by the time this article is read.

"We welcome Kuwait Airways' resurgence. It's in Kuwait's interest to have a couple of strong national carriers. We're customers of Kuwait Airways on the catering and maintenance side and we're happy for them to

continue growing in the niche long-haul markets," said Ramachandran.

"As a principle, we are proponents of a free and open market and welcome the entry of new players as a testament to the strength and maturity of Kuwait's aviation framework."

All Jazeera asks, continued Ramachandran, is that competitors apply traditional values to the way in which they do business, rather than not worrying about the bottom line just so long as they can grab market share.

Among Jazeera's targets is a drive to win earlier bookings, to allow for better revenue management as the flight date approaches. "Additionally, I would say we've been quite entrepreneurial in putting in more capacity, but only on high-demand routes. For example, we've put quite a lot of tactical capacity into Egypt, where we see continued sustained strong demand because of the demographics of Kuwait and the large number of Egyptian expats." Jazeera operates into six points in Egypt and the routes give a higher yield than many others.

An important strand in Jazeera's efforts to restore profitability will be a new e-commerce platform that should be rolled out in phases from mid-July. This will be easier to navigate than the current site, have stronger underlying



**“We’re looking at right-sizing additional features, such as bag allowance, park-and-fly, and the business lounge we’re promoting even for economy passengers on a paid basis at the moment.”**

ROHIT RAMACHANDRAN

Jazeera operates seven Airbus A320s and Ramachandran admits that discussions are under way with the European manufacturer over the future shape of the fleet. However, it is not a certainty that Airbus will provide any new metal for the carrier.

What is important to the airline is that fleet growth is justified: “We want to make sure we have a sound network plan that translates into a fleet plan.” The airline is finalising route business cases for around 25 sectors that will be rolled out in the seasons ahead. The Indian sub-continent is of interest, as are the CIS states. If those come to fruition, then fleet expansion is certainly on the cards.

**Keen to explore a partnership**

Jazeera is fundamentally a regional carrier, with its furthest destination being Istanbul. For some time now, it has been looking around for a long-haul partner.

“The reason we’re keen to explore a partnership is because we have a reasonably strong position within the Kuwaiti and regional market and want to leverage that. There’s a natural propensity for people to travel to key destinations in western Europe, southeast Asia, even North America. We know we’re not in that game yet... if we get a like-minded partner sharing similar DNA, we feel there’s great potential for a route to western Europe and southeast Asia.

“It could start with something as simple as an interline agreement. That could move on to a codeshare and end up as a joint venture. We’re in discussion with two or three carriers we consider very similar to ourselves.”

Would Jazeera ever consider operating long-haul services itself?

“We have no immediate plans to do so... but who knows. I’ve learned in this business to never say never.”

technology that will give users a more seamless experience, and have a much greater ability to sell targeted offers to individual site users. It will also place greater importance on selling features that bring in ancillary revenue.

Another major strand in improving its performance will be the opening, by the first quarter of 2018, of Jazeera’s own dedicated terminal. This will take its customers away from the overcrowded terminal building at Kuwait International Airport. “It will be a game-changer in our opinion,” said Ramachandran.

“We want this terminal to be ‘best in breed’. It will be highly automated and have several technical ‘firsts’ in Kuwait. We want passengers to get from the terminal entrance to the aircraft in 15 minutes.”

“We want to make the arrival and departure formalities much simpler by using biometrics and so on.”

The terminal is due to cost Jazeera around KD14 million (\$46 million).

While that building moves towards completion, Jazeera has been squeezing more value out of its existing business lounge. In the past few months it has started promoting it to economy-class passengers, who can pay for entry. Ramachandran describes the interior as having clean lines, with a lot of white surfaces promoting a calm atmosphere, with refreshments to one side of the room and a piano in the corner. “It’s not opulent by any means, but it’s a simple and effective haven for people to relax in.”



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# Bahrain all set to unlock the Combi

*Visitors to next year's Bahrain International Airshow could well get their first view of the new PEMCO B737-700FC FlexCombi.*

**Barbara Saunders**  
*reports.*

The launch customer for the new 700-series conversion programme, Bahrain-based Chisholm Enterprises, is hoping to debut the aircraft – its first fully owned airliner – subject to certification approvals.

Chisholm, a regional provider of tailored aviation and business solutions, is hoping to put the new B737-700FC into service with its Bahrain-based Texel Air non-scheduled cargo airline subsidiary in the third quarter of 2018.

Seven-figure investment in the B737-700FC was made, according to Chisholm CEO George Chisholm, to “future proof” the three-year-old Texel Air to meet varied customer needs. It followed “many months of research”.

Market and technical research centred around finding a cost-effective solution that would take Texel Air into the next decade “by creating a new platform with increased payload and configuration flexibility”, according to Chisholm.

“Texel Air currently operates as an ad-hoc charter cargo airline, serving niche gaps in the market, or when schedule flexibility is required,” explained Chisholm. “Over the years, the company has received charter requests for capacity that required cargo uplift supported by small numbers of passengers, such as hunting parties and rock bands. For instance, it was involved in the Boni Jovi and Yanni Middle East tours.

“Traditional combi configurations or quick-change aircraft do not satisfy this demand.

## Match market needs

“We looked at splitting the business, but that wasn’t viable and we, therefore, decided to further develop the ability to be able to change an aircraft’s configuration to match market needs, as opposed, for example, to chartering in passenger aircraft to complement cargo shipments.”

With the requirement identified, Chisholm studied many different types of aircraft and combi concepts from traditional, off-the-shelf combi supplementary types, to developing removable modular pod-based compartments for existing cargo aircraft, similar to ones used on C-130 VIP aircraft.

“We concluded that the pod-based modular system was not economically viable and other aircraft options were not suitable, with existing combi interior configurations geared more to passenger numbers rather than cargo space, with limited ability to increase flexibility,” explained Chisholm.

Discussions were held with a number of potential partners to help develop the concept of a three layout of passenger accommodations (LOPA) FlexCombi aircraft. The company turned to PEMCO, which it had worked with on four previous B737-300 conversions, to develop its sought-after freight-cum-combi-cum-quick change hybrid. “We were very confident of their ability to provide a one-stop-shop for all supplemental type certifications (STCs) required from cargo door, cargo conversion to FlexCombi.

“We chose the B737-700 based on availability, capital cost, STC design, conversion cost, operating performance into smaller regional airports with shorter runways, increased range, payload requirements and our own experience of operating the aircraft for the past 10 years.”

The first of its kind, the FlexCombi, will allow Chisholm to

switch between three different LOPAs with minimal man-hours for conversion process once aircraft in the field. “We can move between carrying six pallets and 24 economy seats; seven pallets and 12 economy seats to eight pallets,” explained Chisholm. “The removable bulkhead gives us increased flexibility to meet cargo-passenger separation requirements.”

Over the next three months, Chisholm will also work with PEMCO and suppliers to evaluate additional features, such as head-up display and enhanced vision system, rear full galley, rear toilets and air stairs and iPad-compatible in-flight entertainment systems. “We will not be able to opt for them all but will be looking at where we can enhance capabilities and passenger comfort. The head-up display, for instance, is now really a standard expectation these days and will also enhance safety when flying into lesser-known, secondary airfields,” explained Chisholm.

Texel Air will provide maintenance support for the FlexCombi under its Bahrain-145 approval. The airline, which is increasingly moving into the maintenance, repair and overhaul sector, also holds European Aviation Safety Agency (EASA)-145 and Cayman-145 certification for the entire B737 and A320 families.

PEMCO will induct the first aircraft for B737-700 passenger-to-FlexCombi modification at its facilities in Tampa, Florida, during the second quarter of this year. It expects to receive a US Federal Aviation Administration STC by mid-2018.

Shortly after the initial issuance, PEMCO plans to certify both B737-700 conversion programmes with EASA and the Civil Aviation Administration of China.

**George Chisholm:**  
“The removable bulkhead gives us increased flexibility.”



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# AIRBUS LOOKS FOR ROOM

*The Airbus A380neo version will not be produced. But the European manufacturer has proposed ways to make the double-deck airliner more cost-effective for airlines.*

**Alan Dron reports.**

**F**or several years now, Emirates Airline president, Sir Tim Clark, has been asking Airbus to launch a re-engined version of the A380, of which his airline is the world's largest user.

The Dubai-based carrier operates 95 of the type, with 47 more still to be delivered, and has played a major part in keeping the A380 final assembly line moving. Fellow-Gulf airlines Qatar Airways and Etihad Airways have also been significant users of the A380, with 10 each in service or on order.

Airbus has made it clear that the costs involved in developing an A380neo are too great for an aircraft whose original version has sold slowly and the market for which would likely be even more limited.

However, Airbus believes it can make the existing aircraft more cost-efficient by rearranging its internal layout to allow up to an additional 85 passengers – all without impinging on passenger comfort, it claims.

At a media day in Toulouse, France, in June, it showed a model that could substantially cut seat costs for airlines, either on new-build aircraft or, potentially, as retrofits to in-service examples.

Some of the ideas had been suggested previously but the Toulouse event was the first time at which the full collection of proposals had been presented as a package.

John Leahy, Airbus' chief operating officer, customers, listed the proposed measures, together with the number of additional seats each would generate:

- Going to an 11-abreast economy-class cabin from the current 10-abreast – 23 seats;
- Premium economy cabin at nine-abreast – 11 seats;
- New forward stairs – 20 seats;
- New rear stairs – 14 seats;
- Upper deck 'door three' deactivation – 8 seats;
- Removal of upper deck sidewall – 6 seats;
- Combined crew rest compartment – 3 seats.

Some of these measures are controversial. Although Airbus says it can get 11-abreast seating into the fuselage, this would mean returning to a central bank of five seats. Sir Tim has already expressed concerns about being able to sell the highly unpopular middle seat.



**Chief operating officer, customers, John Leahy, outlines the ways in which Airbus could increase the capacity of the A380. Right: Emirates has long wanted a re-engined A380 to reduce operating costs.**

Nevertheless, employing at least some of these measures would improve the aircraft's operating economics. Both the manufacturer and airlines have admitted that, when the A380 was initially introduced, they were so seduced by the vast amounts of space available to play with that they opted for unusually generous internal configurations.

#### Cruise liner

The front stairs to the A380's upper deck, for example, "doesn't have to look like something off a cruise liner", said Leahy. It could be made narrower and steeper, generating space upstairs. The rear spiral staircase could also be replaced by a straight version, reducing the volume it currently occupies.

Asked what further efficiencies could be applied to the A380 apart from the cabin, Airbus' executive vice-president, head of programmes, Didier Evrard, said the overall weight of the aircraft had been steadily reduced over time. But he returned to the aircraft's internal arrangements, saying: "There will be a big focus on the cabin. An extra 80 seats immediately gives you a big efficiency jump on the aircraft."

A large model of the A380 on show at the event contained removable sections illustrating where increases in capacity could be introduced.

There are considerable variations in the number of passengers carried by the A380 in different internal layouts. Emirates, for example, has three versions, offering 489 or 517 seats in three-class layouts and a two-class option with 615 seats. Etihad's aircraft can carry up to 489 and Qatar Airways' 517.

Theoretically, the aircraft can carry around 800 passengers in an all-economy configuration. This has been suggested by several Far East airlines for Haj flights to Saudi Arabia.

Among other proposed modifications to Airbus' flagship were engine efficiency improvements, while new winglets to aid fuel economy were mentioned as a strong possibility.

Among other Middle East-related topics discussed at the event was Pratt & Whitney's PW1100G geared turbofan, one of two powerplant options for the A320neo. Early problems over engine start-up time and associated software glitches led Qatar Airways' CEO, Akbar Al Baker, to walk away from at least four of the aircraft last year, saying he was not prepared to accept the aircraft with such problems.

Pratt & Whitney executives insist they have fixed the problems and the engine is now returning high reliability rates.

Evrard agreed that the engine start-up problem



# TO MANOEUVRE THE A380



had been fixed, but added: “Now the issue we’ve been facing is a design maturity issue.” These, too, were being solved, but when a rapid ramp-up of production rates was under way he pointed out: “You can have some quality escapes. We’re working very closely with Pratt & Whitney. We have a big team deployed and connected to their supply chain and their factory.”

Over the past couple of years, problems with suppliers have led to aircraft being parked at

Toulouse awaiting components, particularly from cabin equipment suppliers such as French seat manufacturer Zodiac.

Airbus chief operating officer and president of Airbus Commercial Aircraft, Fabrice Brégier, warned that cabin quality still did not always reach the required standard. Allied to this, customers were becoming more demanding, but this was hardly surprising considering the cost of the products.

“We have to find ways of improving quality and doing it faster,” he commented, warning that higher standards were being expected from suppliers that provided parts across the spectrum of Airbus products: “A supplier that is delinquent in Airbus Helicopters has no right to continue to work for Airbus Commercial,” he cautioned.

#### Predictive maintenance

More positively, Brégier noted that predictive maintenance – undertaking repairs or replacements of components before they failed – meant that Airbus was getting closer to the goal of “zero aircraft on ground (AOG) incidents”.

Nor did he see the market for the A350 softening, despite the problems arising from the diplomatic breach between Qatar and several of its neighbours, which led to a closure of much of the airspace around the Gulf state. Qatar Airways has ordered 80 A350s. Production ramp-up of the advanced twin-aisle was continuing and was still planned to reach 10 a month by the end of 2018, he said.

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*Traditionally, regional jets have not sold well in the Middle East. Now, as Alan Dron finds out, Brazilian manufacturer Embraer believes that the new E2 version of its E-Jet range may change that situation.*

# EMBRAER EYES THE MIDDLE EAST WITH E2 REVAMP

It has become an airline industry axiom that small airliners struggle to win orders in the Middle East – particularly in the Gulf.

Turboprops, popular in virtually every other geographic region, are largely notable by their absence in the Middle East (Nesma Airlines in Saudi Arabia is one of the few exceptions that proves the rule) while even the ‘sexier’ regional jets have found the going tough.

Certainly, some Middle East operators do use them – Embraer’s first generation of E-Jets can be found in service with Egyptair Express, Royal Jordanian and Oman Air, for example – but they are present in far lower numbers than in Europe, North America or Asia-Pacific.

For years, the minimum ‘entry price’ to the region’s market has generally been an Airbus A320 or Boeing 737.

John Slattery, president & CEO Embraer Commercial Aviation, believes that the company’s new E2 version of the popular jet (almost 1,500 of the first-generation variants have so far been sold with 284 firm orders and 445 options for the new family members) has a better chance of cracking the Middle East.

## Hot and harsh

“The challenge in the Middle East is that it’s a hot and harsh environment. While your [Boeing] 777s and [Airbus] A380s have the opportunity to ‘breathe fresh air’ and fly long distances outside the region, an aircraft like ours tends to stay in that environment for a long time.”

That environment, he says, has led to the existing General Electric CF34 powerplant on the E-Jets being more expensive to operate than engines on other aircraft.

Slattery said: “With the Pratt & Whitney GTF on the E2, with its higher bypass ratio, our expectation, and P&W’s expectation, is that the cost of operation will be better because of its fundamentally different architecture.



“I think with the GTF-powered E2, we will have a resurgence of momentum in the marketplace.”

As well as the new engine, the aircraft’s performance has been improved, even over and above the previously announced benchmarks. The E190 E2’s maximum range in normal circumstances is 2,850nm (5,275km); the aircraft’s hot and high performance has now been tweaked, due to a combination of factors such as flaps and slats optimisation and greater reduction in drag from the airframe than originally envisaged.

## Temperature and altitude

The benefits will vary slightly depending on the temperature and altitude of any given airport, but typically could amount to an extra 200nm (370km). Short field performance has also been marginally improved, giving an extra 100nm (185km) range.

More generally, the E2’s performance has been further revised upwards following aerodynamic changes. The E195 E2’s range was originally due to be 2,000nm. “Last year, we increased the wingspan by 1.5 metres: that took it to 2,450nm,” said Slattery. “With empirical

John Slattery (left) believes the company’s new E2 version of the popular jet has a better chance of cracking the Middle East.



evidence from the flight-test programme, we’ve now taken that to 2,600nm. We’ve been able to increase maximum take-off weight from 60,700kg to 61,500kg.”

Other recent milestones in the test programme have included the successful completion of wing-bending tests, which saw the E2’s wing bent 3.2 metres higher than it should be, or 150% higher than the load test criteria.

The first of the new range of aircraft, the E190 E2, is due to enter service with Norwegian airline Wideroe in the first half of 2018, with the larger E195 E2 following a year later with Brazilian carrier Azul.

The smallest of the three versions, the E175 E2, has had its service entry date delayed by a year to 2021, due to the strength of the larger two aircraft in the marketplace and because there is currently little sign of the long-running problem of scope clauses at US regional carriers being resolved. These set limits on the size of aircraft that the regionals can fly under agreements with the pilots’ trade union.

That marketplace is substantial. Embraer’s latest 20-year forecast for the regional jet segment, issued



at the Paris Air Show, predicts 6,400 aircraft will be required worldwide by 2036.

However, despite the Brazilian company's confidence that its re-engined variant will reinvigorate its presence in the Middle East, it still foresees just 220 aircraft – 3% of the total – finding their way to the Middle East. Africa, another region whose potential has been talked about for many years, but which stubbornly remains on the horizon, will account for the same percentage.

By far the largest numbers of aircraft will be destined for North America (32%) and Asia Pacific (27%).

Slattery believes there will be a continuing movement from turboprops to jets. He points, for example, to major Bombardier Q400 user Horizon Air that is moving to E175E2s and believes that airlines will increasingly turn to turboprops for sectors of more than 300nm (555km).

Embraer calculates that there will be 5,500 aircraft in the 70-150-seat category that will require replacement in that timescale, notably ageing A319s and Boeing 737s.

Slattery stresses that Embraer has no intention

of intruding into the territory occupied by the two major OEMs, but likewise believes that the accepted wisdom of the benefits of having a single-type fleet is on the way out.

Airlines that have made their money out of serving major city pairs will increasingly find themselves operating to secondary and tertiary cities, for which a typical narrow-body carrying upwards of 150 passengers will be too large.

Slattery believes that, increasingly, they will look for a smaller aircraft, such as the E-Jet, to complement the larger aircraft: "I believe we're at the front end of a wave augmenting their mainline fleets with a larger regional jet."

#### Operating costs

The largest member of the E2 family will give superior operating costs, believes Embraer, to the smallest members of the Airbus A320neo and Boeing 737 MAX ranges, but although its performance overlaps to some extent with that of the A319neo and MAX 7, the company is at some pains to stress that it does not intend to compete directly with the larger aircraft.

Bombardier's CSeries regional jet strayed into that territory and found itself facing ferocious

competition from Airbus in particular, which was determined not to have the Canadian aircraft poach its customers.

Having said that, Slattery does believe that the E195 E2's improved capabilities will allow it to access a larger number of airlines than the E-Jet range could in the past. He also believes that regional jets can be effective at ranges as short as 300nm (555km), generally thought to be the preserve of turboprops, with their lower costs.

The E2 range, like other members of the new generation of regional airliners such as the CSeries and the Sukhoi Superjet, will also provide improved 'living conditions' for passengers compared to their predecessors.

This will be particularly noticeable in the luggage capacity of the cabin. Whereas many regional airliners until now have had limited space in the overhead bins, the E2's bins will be 40% larger than those of the earlier E-Jets and will be able to accommodate a roller bag for every passenger.

Middle East airlines will be keen to run the rule over the new aircraft to see if the improved performance makes them more attractive for their purposes.



# BAN ON THE RUN

*America's ill-conceived laptop ban has been replaced by new, more robust mechanisms for protecting passengers.*

**Martin Rivers** talked to *Abdul Wahab Teffaha*, secretary general of the Arab Air Carriers' Organisation, about the need for a standardised global approach to security.

**A**fter months of threatening to roll out its laptop ban globally, the US Department of Homeland Security in June unveiled a raft of new security measures aimed at fighting terrorism without further inconveniencing passengers.

America's new approach obliges foreign airports to adopt more stringent measures in relation to explosive-trace detection, canine security and vetting of airport personnel.

Any gateways that fail to comply will be prohibited from allowing large electronic devices in the passenger cabins of flights to the US – echoing the measures placed on seven Arab countries plus Turkey in March.

At the time of writing, six of those affected countries – the UAE, Qatar, Turkey, Kuwait, Egypt and Jordan – have been lifted from the ban, which was hastily rolled out after intelligence agencies uncovered a possible Daesh plot to smuggle bombs in the battery compartments of laptops.

Saudi Arabia and Morocco were also expecting an imminent reprieve.

The newly standardised policy should dampen the cries of protectionism and anti-Arab bias that abounded in the aftermath of the ban.

Critics were quick to note that the eight affected countries provided the only nonstop links to America from the Arab world and Turkey, and that none of them featured in the route maps of US carriers. This skewed approach led many to question whether the ban was genuinely motivated by security concerns.

Even the International Air Transport Association (IATA), the impartial trade group representing global airlines, poured scorn on the measure, describing it as “not acceptable” and warning of clear “commercial distortions” against the affected airlines.

Another trade group, the Arab Air Carriers' Organisation (AACO), which represents airlines from the MENA region, saw its members disproportionately affected by the ban. But secretary general, Abdul Wahab Teffaha, chose his words carefully when weighing in on the matter. Speaking in Bangkok, shortly before the new measures were announced, he called for constructive dialogue – not combative accusations – in pursuit of a workable solution.

“I have to take it for granted as a matter of factuality that these two governments have identified certain [security] threats, and

Continued  
on Page 36



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CONTINUED FROM PAGE 34

that those threats prompted the ban,” the AACO chief said, referring to parallel but different restrictions imposed by the UK Government.

“This I have to take at face value, because we have no other information to prove otherwise. However, I believe there are alternative ways of dealing properly with the ban. We know, for example, there is a difference between what [airports] the UK and the US identified [as posing a security risk]. Why? When you have differences identifying the same threat and doing the same thing [to mitigate it] but [applying] to different countries, that makes me think, ‘What kind of criteria were used in order to justify the ban in the first place?’”

Close intelligence sharing has, historically, seen the US and the UK act in unison over air security measures; for example, by limiting the carriage of liquids in 2006 after the disruption of an Al Qaeda plot targeting transatlantic flights.

Different circumstances partly explained the divergent policies adopted in March: the UK applied its ban to Lebanon and Tunisia because it had existing nonstop flights to those countries, whereas the US did not. However, London’s decision to exempt the UAE, Qatar, Morocco and Kuwait was harder to understand.

#### Refused to speculate

Teffaha refused to speculate as to why the US and the UK made contradictory threat assessments – particularly in relation to America’s inclusion of Dubai, Abu Dhabi and Doha, the Gulf’s three largest hubs. Pre-empting the eventual resolution of the crisis, his focus was instead on unifying policy between all nations to protect all global passengers – not just those travelling on certain flights from the MENA region.

“Since there is no agreement between the two countries which actually invoked the ban, then they have to sit together at least to see what is the threat and where is it coming from. That’s step number one,” he explained.

“Step number two” was closing the gaping holes in the policy at a global level; holes that – if the intelligence is accurate – self-evidently left the majority of travellers exposed to airborne terror attacks.

“The ban now is from certain countries, but nothing would prevent a terrorist from going through a third country that is not on the list,” Teffaha noted, echoing widespread criticism by security experts. “Our concern is to have maximum security, maximum safety. Leaving third countries without any safeguards puts a question mark on how the ban is sufficient [in its original form].”

He insisted that passengers would remain at risk – both on flights outside of the US and on connecting flights to the US via a third country – until America issued recommendations for corrective measures to the affected nations. (Emirates Airline boss, Tim Clark, reiterated the call for guidance when he met the heads of the US Transportation Security Administration and the Department of Homeland Security in May – one month before the new measures were announced.)

**“The ban now is from certain countries, but nothing would prevent a terrorist from going through a third country that is not on the list.”**

**ABDUL WAHAB TEFFAHA**

Teffaha said: “There are 180 other countries which were not identified [by either government]. What are these 180 countries doing that the 10 [banned] countries are not doing?”

“The right thing to do is to provide guidance to the governments of the world to mitigate this threat. It may not happen to the US, not to the UK because of their bans – but it may happen to France, it may happen to other countries. They don’t have to tell us anything about the [specific nature of the] threat. Just tell the world what it needs to do to mitigate this threat, rather than stepping back and letting the threat, God forbid, proliferate to other places.”

AACO’s frustration at the lack of actionable information is, unfortunately, not a new theme for the organisation.

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

#### Hamstrung by sanctions

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

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

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

Just as AACO regards the International Civil Aviation Organisation (ICAO) – not the US – as the highest authority on security matters, so it sees the UN body – not the EU – as the standard-bearer for safety regulation. “The right way to do it is [embodied by] ICAO’s slogan: Leave no country behind,” Teffaha concluded.

“I can understand that some countries may have higher levels in order to assert the safety of operations at certain airports or certain airlines. That’s fine. But those levels need to be transmitted. And if you find somebody that is not meeting your standards, you should go and tell them what they need to do.”

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*Leasing accounts for 40% of today's airliner purchases and is expected to reach the 50% mark soon. Two Middle East lessors give Alan Dron their views on the current market and future prospects.*

# A NEW LIFE OF LEASE...

**D**ubai Aerospace Enterprise (DAE) created shockwaves in the airliner leasing market in April when it bought fellow-lessor AWAS.

Ireland-based AWAS was twice DAE's size and the acquisition instantly catapulted the latter into the 'top 10' of the world's leasing companies.

The deal saw DAE, with a fleet of slightly more than 100 aircraft, acquire AWAS, which had 263 owned, managed and committed airliners. The latter figure included 23 new aircraft scheduled to be delivered by the end of 2018.

The combined company has an owned, managed and committed aircraft fleet of 394 aircraft with a total value of more than \$14 billion, serving more than 110 airline customers in 55 countries from offices in Dubai, Ireland, Singapore and the US.

## Buy-out was necessary

DAE CEO, Firoz Tarapore, said the buy-out was necessary to keep up with developments in the sector.

"We're a company that has grown very nicely in the past few years. As we looked at the competition, we noticed that, in the last five to six years, the definition of 'scale' had been revised upwards with consolidation [in the sector] and new entrants and their very large order books."

DAE realised, he said, that getting to that size through organic growth would take too long. "We realised that getting to scale in an 'inorganic' way was really our preferred answer."

The company looked at a couple of potential acquisitions but came to the conclusion that AWAS offered the best opportunity, not only because of its size but also because its cultural 'fit' complemented DAE's own.

A combination of people, processes and systems at AWAS had been perfected in its three decades of existence, said Tarapore; it had, for example, a highly digitised and robust process for doing business that had benefited from heavy investment in systems.

At the time of writing, DAE was awaiting regulatory approval for its acquisition and it was



ALAFCO has a substantial order book.



**Firoz Tarapore: DAE was not in the turboprop market generally, but purely in the ATR 72-600 market. This was because the 70-seat aircraft "is pretty much the only one that's purpose-built for the market".**

too early to say if the AWAS name would be retained: "We will do what is right from a brand and marketing perspective," said Tarapore.

AWAS' largest area of interest is the Asia-Pacific region, followed by Europe, the Middle East and Africa, then the Americas. "We're kind of similarly spread out, with one exception – that our presence in the Middle East, our portfolio on a percentage basis, is higher than theirs. But the mix is very complementary because of their size of order book and broader reach. Together it allows us to put together a client base that now reaches 110 customers in 55 countries."

While DAE decided that acquisitions were the way to go, fellow Gulf lessor, ALAFCO, has decided against such a course. Or has it?

## Adapts its strategy

"ALAFCO constantly adapts its strategy to meet future challenges," said a spokesman for the Kuwait-based company. "Though there are no current plans to acquire other leasing companies, we may consider such acquisitions if good opportunities arise."

ALAFCO is smaller than DAE, but has a substantial order book that will considerably bolster its size over the next few years. It invests primarily in narrow-body aircraft, and selectively in wide-bodies.

"ALAFCO has also invested strongly in new-technology aircraft, with its current order book comprising 115 new technology Airbus and Boeing aircraft – of which 10% are wide-bodies," noted the spokesman.



The ATR 72-600: It has a unique combination of trip costs and seat costs for the operator, said Tarapore.



Breaking down the order book, it consists of 73 Airbus A320neo, 10 A321neo, 20 B737 MAX 8 and 12 A350-900, with the ordered aircraft scheduled for delivery between this year and 2021.

“Noteworthy is that ALAFCO’s order book is amongst the largest in the aircraft leasing industry,” said the spokesman.

Underpinning that order book is a continuing appetite for new aircraft, despite worries in certain areas of the airline industry that, as the huge orders placed with manufacturers over the past few years start to materialise on airport aprons, over-capacity will further drive down yields.

“ALAFCO has successfully placed 20% of its order book to date – covering slots in 2017, 2018 and partially in 2019 – and is now working on securing customers for its 2019-2021 deliveries,” said its spokesman.

“We see demand for aircraft remaining buoyant and future demand will be supported by strong global traffic growth.”

Until recently, one sector of the airliner market – turboprops – was largely ignored by leasing companies. This is changing, with DAE having orders and commitments for 57 ATR 72-600s – a substantial chunk of the 126-aircraft portfolio of aircraft it owned before it pounced for AWAS.

However, said Tarapore, it should be noted that DAE was not in the turboprop market generally, but purely in the ATR 72-600 market. This was because the 70-seat aircraft “is pretty much the only one that’s purpose-built for the market. It has a unique combination of trip costs [and] seat costs for operators that have to fly short flights and has this incredibly broad

operator base, all the way from flag-carriers like Air New Zealand and Garuda to stand-alone airlines that don’t need the expense of a narrow-body to service their part of the world.”

For its part, ALAFCO said it “currently has no plans to enter the turboprop market, but could consider future investments in this niche sector if good opportunities arise”.

One noteworthy aspect of ALAFCO’s business is that it is Sharia-compliant. Does this affect the way in which it does business, or provide an advantage when dealing with airlines from Islamic nations?

#### Invisible to clients

The process is, in fact, invisible to clients, said the spokesman: “ALAFCO obtains financing through Islamic structures from international banks as well as Islamic banks. However, this has no effect whatsoever on the way it conducts business with its airline customers (lessees) – lease transactions are conducted in a similar manner to any other aircraft leasing company.”

The Kuwaiti company intends to steadily expand its portfolio that, in June, consisted of 61 aircraft: 35 A320ceo family aircraft, two A320neo, 22 Boeing 737 family and two 777-300ERs.

“ALAFCO aims to reach a portfolio of at least 100 leased aircraft by 2020 and aims to achieve this through sale and leaseback transactions, acquiring aircraft with lease attached, and by taking delivery of its ordered aircraft,” said the spokesman.

“It also aims to increase its global reach. ALAFCO recently established an operating

subsidiary in Ireland, which has allowed penetration into new markets such as the United States.

“ALAFCO believes that leasing companies will continue to play an increasingly important role in the aviation market. But, with a larger number of players entering the aircraft leasing industry, competition between leasing companies is expected to increase.”

Tarapore sees macroeconomic factors giving the leasing business “an upward bias for the next 20-30 years. Leasing provides a very flexible option for our customers.”

The company has several Middle East customers, but Tarapore pointed out that competitors also have a share of that market and can be based in locations as far-flung as the US, Ireland and Singapore.

He believed that one of the challenges the industry will face is, ironically, the amount of investment capital that has poured into the sector in recent years – some with great understanding of the market, some less so.

“Whether that capital will continue to price itself rationally in the next few years and contribute to the stability of the business is uncertain.”

He pointed out that airlines had opted to order some 7,500 to 8,000 re-engined A320s and Boeing 737s at a time when fuel was at \$100-plus a barrel. Whether those aircraft would remain on order books with fuel at \$50 was uncertain. “We think there will be a significant amount of discussion about what happens to those numbers.”

# IT'S THAT SIMPLE



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*IATA director general, Alexandre de Juniac made a clear statement at the International Air Transport Association (IATA) annual general assembly. Kaleyesus Bekele reports.*

# Cry freedom!

Alexandre de Juniac: "We need borders that are open to people and trade."

**T**he global airline industry's performance on safety, sustainability and profitability is solid, but the industry faces the threat of protectionist measures being implemented by governments.

These were the key messages from the International Air Transport Association (IATA) annual general meeting held in Cancun, Mexico in front of an audience of 1,000 industry leaders and stakeholders.

IATA director general, Alexandre de Juniac, called for governments to enhance their collaboration with the industry to meet rising security challenges, avert a looming infrastructure crisis and to build smarter regulation.

Highlights from de Juniac's address included:

■ **Industry financial performance:** Although regional differences remain stark, overall the air transport industry is generating profits above its cost of capital. In 2017, the global airline industry is expected to generate a \$31.4 billion profit on \$743 billion in revenues. That's a \$7.69 average profit per passenger.

■ **Defending against protectionist measures:** "Nothing should stand in the way of aviation – the business of freedom. Aviation is globalisation at its very best. But to deliver aviation's many benefits we need borders that are open to people and trade. Today we face headwinds from

those who would deny the benefits of globalisation and point us in the direction of protectionism. This is a threat to our industry. We must bear witness to the achievements of our connected world. And we must ensure the benefits of aviation for future generations."

■ **Safety performance:** Flying remains the safest form of long-distance travel by a wide margin. In 2016 the industry performed 40.4 million flight sectors and there were 10 fatal accidents.

■ **Infrastructure:** "An infrastructure crisis is looming. Infrastructure in many parts of the world can barely cope with demand today. And development plans are not ambitious enough to accommodate the 7.2 billion passengers we expect in 20 years' time." Bottlenecks and deficiencies in airport and air navigation services exist in all corners of the Earth.

IATA also urged governments to be cautious when privatising aviation infrastructure assets. "Privatization has failed to deliver promised benefits in many countries – India, Brazil, France, and Australia to name just a few. The concessionaire makes money. The government gets its cut. The airlines pay the bill – usually a big one. And passengers and the local economy suffer the results of higher costs," said de Juniac.

## CORSIA CRUCIAL FOR WORLD FUTURE, SAYS ALIU



ICAO President Dr Aliu urges airlines to focus on the emissions mission.

ICAO Council President Dr. Olumuyiwa Benard Aliu brought a clear and determined message to global airline CEOs at the IATA AGM concerning aviation's Carbon Offsetting and Reduction Scheme for International Aviation, or 'CORSIA'.

"We should dispel any concerns that any recent developments on the Paris Agreement will negatively impact our shared planning for effective and globally aligned aviation emissions mitigation," President Aliu said, "and I would urge you all to enthusiastically and promptly promote the CORSIA's full implementation. This global agreement demonstrates not only concrete leadership and social

responsibility on climate change, but also simple and sound economic sense for airlines all over the world."

Last October, world governments endorsed the CORSIA at ICAO's 39th Assembly, with countries representing over 80% of international flight operations volunteering to participate as early as its pilot phase in 2021.

"Since that time, Saudi Arabia, Gabon, El Salvador and most recently Nigeria have also signalled their intention to join, meaning that some 90% of international operations will be covered by the CORSIA when it launches," President Aliu said.

Since the agreement forged at its Assembly last October, ICAO has been

working to ensure the timely implementation of CORSIA, including the definition of its Emissions Unit Criteria, Monitoring Reporting and Verification (MRV), and the Registry framework which will be needed.

Once it launches, the CORSIA offsetting results will complement the other main emissions reduction measures being pursued by governments and the air transport sector through ICAO.

These are presently focused on accelerated tech innovations, streamlined operations to decrease fuel burn and noise, and the development and deployment of sustainable alternative jet fuels.



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# A tale of fact and fiction

*Iran paraded many new defence products and capabilities during a major show in April but what was actual achievement and what was merely propaganda? Babak Taghvaei reports.*

**P**resident Hasan Rouhani's government, The Iranian Ministry of Defense, The Iranian Aviation Industries Organization (IAIO), and the Iranian Defense Industries Organization (IDIO) pulled out all the stops as they unveiled their latest defence equipment for public consumption on April 15.

The trouble was that, along with some genuine major achievements, there were a number of items that were there merely for propaganda purposes. And it is some of these that stole the headlines.

Take the Qaher F-313 fifth generation combat aircraft for example. Reported to be a sub-sonic close air support aircraft with limited air-to-air combat capability, it drew the attention of the media more than all the other unveiled products.

The original mock-up of the aircraft was first unveiled during a propaganda ceremony in February 2013 in front of former president Mahmoud Ahmadi-Nejad.

Unfortunately, the aircraft was suffering from a number of obvious design flaws, which caused derision in the international press. The project was suspended and then quickly stopped after the Iranian presidential election in May 2013. The former IACI CEO, Hossein Parvaneh, who supervised the project, was dismissed amid allegations of corruption.

## Under pressure

In 2016, after Russia turned down Iran's request to procure at least 48 Su-30SMs and 24 Yak-130s, the Iranian MoD was put under pressure to speed up the development of the Kowsar-88 future advanced jet trainer and also reactivated the unfortunate Qaher F-313 project.

Subsequently, in September 2016, work started on design and construction of a new Qaher F-313 mock-up. It was completed in March and unveiled (again) as Qaher 313 on April 15. It was equipped with a larger two-piece canopy, dual wheel nose landing gear, and a pair of General Electric J85-GE-13 Turbojet engines, which provided power for it to taxi – but that's about all.

The other 'hoax' achievement demonstrated to the president was the Saba-248 utility helicopter, which was claimed to be completely designed and manufactured by the Iran Helicopter Support and Renewal Company (IHSRC) domestically while, in fact, it was a recycled Tara Helicopter Services Agusta A109E, which had been damaged due to a hard landing a couple of years before.

These 'fakes' overshadowed the real and genuine defence achievements in the media.

The Iranian Aircraft Manufacturing Industries (IAMI) Kowsar-88 Advanced Jet Trainer, for example, and the Babaie Missile Industries Fakkur-90 semi-active radar homing air-to-air missile, are two genuinely good defence products.

The Kowsar-88 is equipped with a pair of General



Electric J85-GE-13 Turbojet engines, Zvezda/ IAMI K-36DMIR ejection seats, a glass cockpit with three multi-function displays (MFDs) in aft and front cabin instrument panels, a head-up display (HUD), and four under-wing hardpoints for carriage of air-to-ground weapons.

It will form the future fleet of the IRIAF's advanced jet trainers for use in the Specialized Undergraduate Pilot Training (SUPT) and Combat Commands Training (CCT) squadrons.

Design and development of the Kowsar 88 began in December 2007 after the failure of project "Ya-Hossein".

Lessons learnt from development of the IRIAF's Dorna, Tondar and Tazavr advanced jet trainers were considered during design of the Kowsar-88, which is planned to replace 12 50-year-old F-5A/Bs from the IRIAF's 43rd CCTS within the next 10 years.

The Fakkur-90 air-to-air missile (AAM) is another genuine achievement. The new medium-range AAM is planned for the IRIAF fleet of 62 F-14A/AMs in the near future. It consists of Shahin components but in a domestically manufactured AIM-54 shell (manufactured by Babaie Missile Industries company).

**Top an impressive looking Qahar 313 is just a vision, while the Kowsar-88 trainer is more reality.**

*The UAE is developing closer defence ties with India, as Jon Lake discovers.*

# INDIAN SIGNS LOOKING GOOD

**S**heikh Mohammed Zayed Al Nahyan, the Crown Prince of Abu Dhabi, was the chief guest for India's annual Republic Day celebrations in January.

He was joined by a contingent from the UAE armed forces, who participated in the Republic Day parade, the event that showcases India's military power, as well as its cultural diversity.

The crown prince was the first chief guest in more than 50 years who was not a head of state or government (though he is the UAE's president-in-waiting).

The status of chief guest is an honour that India has traditionally given to countries that are pivotal to its diplomacy and security. Last year's chief guest was French President Francois Hollande, while the previous one was then US President Barack Obama.

The crown prince's visit to India followed Indian Prime Minister, Narendra Modi's, state visit to the UAE in August 2015 – his first to a GCC country and the first by an Indian prime minister for 34 years.

## Growing stronger

Ties between India and the UAE have been growing stronger on the back of ever-closer economic cooperation.

As Asia's fastest-growing economy, India has a huge and growing appetite for energy, and is a major importer of oil. Consequently, it is the UAE's largest trading partner (with bilateral trade totalling \$58 billion in 2016), and is the second-largest destination for the UAE's oil exports.

The UAE is India's third-largest trading partner after China and the United States, and its fifth-largest supplier of crude oil. It hosts India's second largest expatriate population (after Saudi Arabia), consisting of 2.6 million people, who work and send money back to their families. They form the UAE's largest expatriate group.

The two nations aim to increase bilateral trade by 60% over the next five years, with India hoping that the UAE will act as a gateway for exports to the wider MENA region, while the UAE has launched a \$75 billion investment programme into India's infrastructure, including



**Crown Prince of Abu Dhabi Shaikh Mohammad Bin Zayed Al Nahyan with Indian Prime Minister Narendra Modi.**

airports, ports, and highways, as well as construction and petrochemical projects.

India and the UAE are particularly keen to expand cooperation in the energy sector, and the two heads of state signed an agreement to allow for the storage of crude oil by Abu Dhabi National Oil Company in Mangalore and to further strengthen the strategic relationship between the countries in the field of energy.

The two state visits mark a new stage in a strengthening relationship between the two nations, which is increasingly underpinned by an emphasis on investment, security and defence.

Zikrur Rahman, a former Indian ambassador to Palestine, explained the attraction of closer links between India and the UAE: "Gulf countries like the UAE feel threatened by the changing scenario in the west with the rise of right-wing parties. They feel it is time to look east, where they know India is a dominant economy with indigenous defence capabilities."

The increasingly close relationship between India and the UAE may come at Pakistan's expense. Muslim Pakistan has long enjoyed a privileged position with the Arab world and the Gulf States, and especially with Saudi Arabia,

providing military assistance and manpower as well as diplomatic support.

But the UAE and its neighbours have concerns about growing extremism and political Islamism, and relations with Pakistan have been cooling since the inauguration of Prime Minister Nawaz Sharif in June 2013.

Sharif is seen in some circles as having been too accommodating to Islamist movements, and relations were further soured by Pakistan's refusal to deploy troops for service in the Yemen conflict, and by the killing of five UAE diplomats in a bomb attack in Afghanistan in January 2017 – an attack attributed by some (including Abdul Raziq, Kandahar's police chief) to Pakistan's inter-services intelligence organisation.

The UAE has found its disquiet about Pakistan and political Islamism increasingly converging with India's own security concerns.

Certainly, expanded cooperation on counter-terrorism and counter-extremism lies at the heart of the new UAE-Indian strategic agenda, and the two nations have set in place agreements to share intelligence and ensure greater cooperation between their security and intelligence agencies. They are already working to combat radicalisation

Omani and Indian forces fly together at Exercise Eastern Bridge.



and to thwart the financing of extremist groups.

India and the UAE are also to enhance defence and maritime security cooperation, and will work together to produce a range of military weapons.

Following talks between the crown prince and the Indian prime minister, supported by Indian defence minister, Manohar Parrikar, and UAE armed forces deputy supreme commander, General Sheikh Mohammed Bin Zayed Al Nahyan, a comprehensive strategic partnership that included wide-ranging defence and energy provisions was signed.

Under the agreement, public and private sector institutions in India and the UAE will cooperatively undertake studies, research, development, manufacturing and technology transfer, with the aim of jointly producing and selling defence equipment.

#### Explore opportunities

Such cooperation has, in fact, already started. On September 28 2015, Emirates Defence Industries Co (EDIC) signed a memorandum of understanding (MoU) with India's Reliance Defence Limited. The two companies will jointly explore opportunities for building capabilities in the areas of aviation, defence equipment and vehicles, armament manufacturing, defence electronics, commercial and naval ships, and especially in the maintenance, repair and overhaul (MRO) of military equipment and platforms. The partners hope to find synergies that will allow them to leverage one-another's capabilities, while also reducing costs.

One of EDIC's subsidiaries is the Advanced Military Maintenance, Repair and Overhaul Centre (AMMROC). A joint venture between Lockheed Martin, Sikorsky and Mubadala (now EDIC), AMMROC provides MRO services for a wide range of fixed and rotary wing aircraft – including many types that are in service in India, whose annual military aircraft maintenance bill is currently estimated at a hefty \$12.25 billion.

With the Boeing C-17, BAE Hawk, Dassault Mirage 2000, Pilatus PC-7, and Lockheed Martin C-130J in service in both countries, there is certainly scope for cooperation and rationalisation.

*The Royal Air Force of Oman (RAFO) has completed the latest in a reciprocal series of joint exercises with the Indian Air Force (IAF).*

**Jon Lake** reports.

## OMAN CONTINUES TO BUILD BRIDGES WITH INDIA

For Exercise Eastern Bridge IV, the RAFO deployed five Block 50 F-16C/D Air Defence Fighters from No 18 Squadron at Thumrait to Air Force Station Jamnagar in Gujarat, India.

The Omani F-16s exercised with IAF Sukhoi Su-30MKI and MiG-29 fighters, MiG-27 fighter-bombers and SEPECAT Jaguar maritime strike aircraft.

The Eastern Bridge series of exercises began in October 2009, when India and Oman were the last operators of the SEPECAT Jaguar, and when six Indian Jaguars, crewed by pilots from 'Flaming Arrows' and 'Cobras', at Gorakhpur, deployed to Thumrait.

For Eastern Bridge II, six RAFO Jaguars deployed to Jamnagar in October 2011, where they worked with IAF Jaguars and MiG-29s.

Eastern Bridge III, in October 2013, saw a return to Oman, and six IAF Jaguars from No 6 Squadron deployed to Masirah, where they exercised with RAFO Jaguar, Hawk and F-16 aircraft.

Eastern Bridge survived the retirement of the Middle East Jaguars in August 2014, with the RAFO F-16 force picking up the mantle.

The RAFO views Eastern Bridge as an important tool in maintaining its operational effectiveness and readiness.

Eastern Bridge IV marked the second exercise in India, and the RAFO F-16 contingent arrived in Jamnagar on January 14 prior to the start of the exercise two days later. This was the first time that RAFO F-16s

had participated in an exercise outside the Gulf Cooperation Council countries.

The Omani contingent was led by RAFO commander, Air Vice Marshall Mattar Bin Ali Al Ubaidani, a former Jaguar pilot, who met his opposite number, Air Chief Marshal Birender Singh Dhanoa, Chief of Air Staff of the Indian Air Force, who was himself a former frontline Jaguar pilot.

Though Oman was the first Gulf Cooperation Council country to establish a regular series of bilateral exercises with the Indian Air Force, the success of Eastern Bridge has led to a similar series of exercises between the Indian Air Force and the United Arab Emirates Air Force and Air Defence.



Jaguars in common between the chiefs of the Oman and India forces.



The Beechcraft T-6 fleet in Iraq is to grow in numbers.

## IRAQ TRAINS ITS FOCUS INWARDS

The Iraq Air Force is aiming to decrease its overseas training requirements.

It aims to improve its ability to train its pilots and maintenance technicians while significantly reducing costs and also enhancing its ability to take over the sustainment of its aircraft and reducing its reliance on foreign partners.

The air force began to stand up its own training operation in 2007, assisted and advised by a coalition air forces training team within the US Air Forces Second Air Force, part of Air Education and Training Command.

Britain's Royal Air Force also provided some assistance and a number of Iraqi officers completed their flying training at RAF Cranwell during 2009. Iraq's pilot training fleet currently consists of 12 Cessna 172 primary/elementary trainers (of 18 delivered), about 20 LASTA 95 tandem-seat piston-engined basic trainers, and 15 T-6A Texans used for advanced flying training. Three Cessna 208 Caravans are used for training transport and reconnaissance (ISR) pilots.

The Flying Training Wing is run by the Iraqi Air Force College and is split between two bases, with the Cessna 172s at Al Sahra/Tikrit (also known as

Combat Operating Base Speicher) and the LASTA 95Ns and Beechcraft T-6As at Talil.

The Cessnas are assigned to the 201st Training Squadron (designated as the 52nd Expeditionary Flight Training Squadron until late 2009, and then as 1 Squadron until March 2011), the LASTA 95Ns to the 202nd Training Squadron and the T-6As to the 203rd (previously known as 2 and 3 Squadrons).



The 204th Squadron is expected to stand up at Tikrit with KAI T-50IQs, or perhaps with the recently ordered T-6Cs.

The US Defense Security Cooperation Agency (DSCA) has notified Congress of a potential \$1.6 billion foreign military sale of pilot training, maintenance training and contractor logistical services support to the Iraq Air Force, to be delivered in-country for up to five years.

The sale will cover aircraft modifications, repairs and spare parts, publications, ferrying, and training base support, security, and construction.

Spartan College of Oklahoma will serve as the principal contractor.

## KUWAIT TO BUILD NEW MILITARY ENCLAVE

The Kuwait Air Force (KAF) is embarking on a major upgrade of one of its three air bases, in conjunction with the US Army Corps of Engineers, writes Jon Lake.

Abdullah Al-Mubarak Air Base is the military enclave at Kuwait International Airport and is the location of the KAF headquarters, the KAF Museum and is home to the KAF's transport arm. This consists of two units, the 41st Transport Squadron, equipped with the L-100-30 Hercules, the 42nd Transport Squadron with Lockheed Martin KC-130Js and Boeing C-17 Globemaster IIIs.

The base has recently been used by Italian Air Force Boeing KC-767A tankers, which have been supporting coalition operations against Daesh since October 2014.

On April 6 the US Defense Security Cooperation Agency (DSCA) announced that Kuwait had requested a foreign military sale of support services for the construction of facilities and infrastructure connected to the planned upgrade of the base. The US State Department has now approved the deal, worth an estimated \$319 million.

The upgrade will see the replacement of the existing operations centre, hangars, training facilities, and barracks, as well as the construction of new warehousing.

The revamped Al-Mubarak will be a fully autonomous air base which, it is hoped, will ensure continued operational readiness, with improved facilities for key airfield operations, command-and-control, readiness, sustainment, and life support.

The new base is also intended to facilitate the education of current and future KAF personnel.

The project will be managed by the US Army Corps of Engineers (USACE), which has previously constructed similar facilities and infrastructure in other Middle Eastern countries.

The USACE, together with its contractors, will provide project management, engineering services, technical support, facility and infrastructure assessments, surveys, planning, programming, design, acquisition, contract administration, construction management and other technical services.

The KAF's other bases are Ali Al Salem, 60km north east of Al Mubarak, which is home to the KAF's training aircraft and helicopters (eight squadrons in total), and Ahmed Al Jaber, 55km south west of Mubarak, currently home to two frontline and one training squadron of F/A-18C/Ds.



**Jon Lake** looks at the latest moves in the UAE's long-running search for a next-generation fighter.

**T**he UAE has evaluated a number of fighter aircraft including the Dassault Rafale, Boeing's Advanced Super Hornet and Advanced F-15 and the Eurofighter Typhoon.

Emirati attention now seems to have switched back to the Advanced F-15, already entering service with the Royal Saudi Air Force as the F-15SA and now ordered by Qatar as the F-15QA. These orders promise to keep the F-15 production line out to 2022.

### Two-phase deal

Following a meeting between US Defence Secretary, James Mattis, and Sheikh Mohammad Bin Zayed Al Nahyan, deputy supreme commander of the UAE Armed Forces and Crown Prince of Abu Dhabi, reports emerged of renewed Emirati interest in the F-15, possibly as part of a two-phase deal that would also see the UAE Air Force eventually acquiring the Lockheed Martin F-35 Joint Strike Fighter.

In March, it was reported that the crown prince had received reassurances from US President, Donald Trump, about the possibility of the UAE acquiring fifth generation fighter jets.

A host of new capabilities have been added to the F-15 through the development of advanced





The UAE Air Force could eventually acquire the Lockheed Martin F-35 Joint Strike Fighter.

# JSF in the mix for UAE

derivatives of the F-15E Strike Eagle for South Korea (F-15K Slam Eagle), Singapore (F-15SG) and Saudi Arabia, as well as via upgrade and modernisation programmes for USAF F-15C/D Eagle fighters and F-15E Strike Eagle fighter-bombers.

Any new Advanced F-15 customer can now opt for active electronically scanned array (AESA) radar, new cockpit displays (including F-35 type large area displays), helmet-mounted sighting and display systems, advanced new electronic warfare and self protection systems, conformal fuel tanks and even a new wing with a longer fatigue life and two additional underwing hardpoints, while the aircraft is compatible with a wide variety of advanced weapons.

A number of low-observable (stealth) features were developed under the F-15SE Silent Eagle programme, including conformal weapons bays for internal weapons carriage and a number of radar cross-section (RCS) reduction features, most obviously including canted tailfins. Though none of these features have been incorporated in the Saudi F-15SAs, and are not thought to be featured on the Qatari aircraft, they remain notionally available to other customers, including the UAE.

The aircraft's raw performance remains

impressive, even by modern standards, and it has a very useful payload range capability. Especially when coupled with advanced stand-off weapons, the Advanced F-15 gives its operators semi-strategic reach.

This may not be enough for the UAE, however, whose MBDA Black Shaheen cruise missile is an export variant of Storm Shadow and has a range of approximately 300 nautical miles (560 km) – roughly twice the range of the AGM-84H/K SLAM-ER, which is the main stand-off weapon offered with Advanced F-15 export versions.

## Upgrading and modernising

The USAF is currently upgrading and modernising its Eagles, preparing them for further service, and including the integration of BAE Systems' Eagle passive active warning survivability system (EPAWSS) on 400 F-15Es and F-15Cs.

The F-15C is now expected to remain in service until replaced by the next generation penetrating counter-air (PCA) platform, which is scheduled to reach initial operational capability in the mid- to late 2020s.

Steve Parker, Boeing's vice-president of F-15 programmes, reportedly said that though PCA

would be a new platform, any Boeing PCA candidate aircraft would feature technology developed on the F-15 and hinted that the aircraft's outer mould line could be changed very easily, and that PCA would be "different from a wrapper perspective".

But for the UAE, any F-15 purchase could prove to be an interim step, since the UAE Air Force and Air Defence wants to acquire the fully fifth generation F-35 Joint Strike Fighter.

But the F-35 may not be the only fifth generation option for the UAE.

At the IDEX 2017 show in Abu Dhabi, Russian media reported the signing of a military and industrial cooperation agreement between the UAE and Russia, including the "creation, development and supply of a fifth-generation fighter jet" to fly some time after 2025.

This could see the UAE supporting and part-funding the Russian lightweight multi-role fighter (LMFS) programme, which aims to produce a replacement for the MiG-29.

Russian sources also reported Emirati interest in the Sukhoi Su-35, though many western analysts believe that any talks between the UAE and Russia are principally intended as a means of applying leverage on the US to ensure access to the F-35.

# KUWAIT'S ITALIAN JOB LOT

**Alan Warnes** joined a Kuwait delegation to witness the start of the Kuwaiti Eurofighter adventure.

**A**mong the many guests at the unveiling of the 500th Eurofighter at Leonardo's Turin-Caselle facility on April 11 was a small Kuwait delegation headed by the country's ambassador to Italy, His Excellency Sheikh Ali Khalid Al Sabah, who was presented with the first component to be built for the inaugural Kuwait Air Force (KAF) Eurofighter.

On April 5 last year, Finmeccanica (now Leonardo) signed a deal, believed to be worth nearly \$9 billion, with the KAF for 28 Eurofighters.

The contract includes 22 single-seater and six twin-seat tranche 3 aircraft.

Drawn from the Italian production line, deliveries are expected to begin in 2019 and run until 2023.

The KAF Eurofighters will be the first to be fitted with the new Leonardo Air and Space Systems (formerly Selex ES) E-Scan radar, known as Captor-E. It comes after an agreement was penned in November 2014 to develop the new electronic radar.

With 87 of the 96 aircraft designated for the Italian Air Force built at Leonardo's production facilities, an aircraft division official said: "Production will be slowed down next year to bridge the gap before the 28 new-build Kuwaiti jets."

He added: "As well as the aircraft, the contract includes three years of support, from delivery of the first aircraft; training for operations with the Italian Air Force and building up the infrastructure at Ali Al Salem Air Base, where they will be housed. A complete training package will be created."

The Kuwaiti aircraft will be built to P3EB standard which, along with the Captor-E, includes integration of the Storm Shadow cruise missile, Brimstone 2 ground-attack weapon, and Meteor beyond-visual-range air-to-air

(BVRAAM), although it has never been confirmed that Kuwait has ordered any of the weapons. It will be a tight deadline getting everything into service by the end of 2018.

Radar development and integration is the responsibility of Leonardo, although both Eurofighters already fitted with the Captor-E, are not based in Italy.

Instrumented production aircraft 5 (IPA-5) is at BAE Warton, and had commenced flight trials by mid-July 2016. A second Eurofighter, IPA-8, based at Manching in southern Germany, has now joined the active electronically scanned array (AESA) integration programme after making its first flight on September 14 last year.

Eurofighter CEO, Volker Paltzo, would not confirm how the programme had progressed or how many hours of airborne Captor-E testing the aircraft had flown.

## New jet trainer

With the KAF acquiring a highly modern fighter, it is no surprise it has also been looking at a new jet trainer. According to one source: "Kuwait is going to make a big announcement soon on the purchase of a new jet trainer."

With the BAE Hawks and Tucanos grounded, Kuwait has been sending its pilots for flying training to France, Italy and the UK.

In Italy, Kuwaiti pilots have been flying on Italian Air Force FT-339A/Cs (MB339s) at Lecce-Galatina, the home of 61 Wing, since 2014. They fly around 150 hours on phases 2-3 (basic and advanced flying training).

With the FT-339A/Cs being phased out in 2018/19 as the Eurofighter is introduced into service in 2019, the KAF needs to start looking at new flying training options. So it was not surprising to see Leonardo fly the M-345 high-efficiency trainer (HET) to Turin from its home at Venegono for the 500th Eurofighter roll-out.

The first batch of five basic-advanced lightweight M-345s will start to replace the FT-339s in Italian Air Force service in 2019. A Leonardo spokesman said: "The M-345 brings a new concept in military flying training and, with the Williams FJ44 engine, the operational cost is comparable to a turboprop."

According to another Leonardo source, KAF pilots are now training on the 12 T-346As (Italian Air force designation for M346) in phase 4 (lead-in fighter training) at Lecce too. Obviously the KAF will need a lead-in fighter trainer and the M-346 could fit the bill. It might even consider a split buy. The live, virtual and constructive (LVC) simulation offered on M-346 and M-345 is seen by many air forces as the way to cut training costs.

I also understand that eight KAF instructor pilots will join the Italian Air Force's Typhoon operational conversion unit with 4 Stormo at Grosseto to learn to fly the Typhoon, then instruct back in Kuwait.

**The Kuwaiti delegation at Turin-Caselle during the roll-out of the 500th Eurofighter. From left, General Adnan Al Fadhli, deputy commander, Joint International Programme Office based at Leonardo; His Excellency Sheikh Ali Khalid Al Sabah; Dr Bashar Al Bida, Kuwait defence attaché, Rome, and Lt Col Mujan Al Sabah.**





## Super Tucano to boost Lebanon terror fight

*Lebanon has never had a lot of money to spend on defence. As Alan Dron reports, its latest purchase, although modest, has an important role to play in maintaining the small nation's territorial integrity from Daesh terrorists.*

**A**n initial batch of Lebanese military pilots is currently at Moody Air Force Base in the US state of Georgia undertaking training on six Embraer A-29 Super Tucano light combat aircraft that will shortly be ferried to the Levant.

They will be warmly received by the Lebanese armed forces as welcome reinforcements to fend off Daesh and other Islamist terrorists just over the border in western Syria.

Lebanon has ordered six of the turboprop aircraft, with options on a further six. Their low operating costs, short runway requirements and five weapons pylons, plus two built-in 0.5-inch machine guns, equip them well for the counter-insurgency (COIN) role.

“Lebanon has limited resources, so an affordable aircraft with low costs is suitable,” said Brigadier-General Nazem El Khoury, editor-in-chief of *Arab Defence Journal*. “Also, we do not need a fighter for air-to-air combat, so the Super Tucano satisfies the Lebanese needs for close air support against the Islamic fanatics on our border.”

El Khoury added that two of the aircraft could be delivered in October or November this year, with the rest in 2018. They could be based either at Kleyate Air Base in the north of the country or at Riyak Air Base in the Bekaa Valley in the east of the tiny nation. Beirut International Airport is a third possible location.

He said senior US and Canadian officers had visited Lebanon recently to assist in its defence: “Everybody is helping, because they trust the Lebanese army. The new army commander, General Joseph Aoun, is tough and believes in pre-emptive strikes.”

Another former officer, Staff Colonel (Ret’d) Kamal Awar, now editor of the Lebanon-based publication *Defence 21*, agreed that the Super Tucanos “are what we need”.

“The aircraft is super for COIN operations; you don’t need fast jets in Lebanon. The whole length of the country is almost 200km and its width 50km.”

That makes the high speed of a jet unnecessary – the

Super Tucanos will be able to reach any location on the borders of a country that has shouldered the burden of hundreds of thousands of Syrian refugees within 30 minutes or so of being scrambled from their bases.

The Super Tucanos are being bought under a US foreign military sales purchase as part of a \$462 million package of equipment announced in 2015 and, according to Gulf defence sources, being paid for as part of a \$1 billion grant from Saudi Arabia.

That package will include eight AN/AAR-60(V)2 missile launch detection systems to alert the pilots of hostile surface-to-air missiles, eight ALE-47 countermeasure dispensing systems and 2,000 advanced precision kill weapon systems, which are unguided 2.75in (70mm) rockets that are given a laser-guidance system to convert them into a low-cost, guided-weapon system.

The Super Tucanos will be the first new fixed-wing combat aircraft to reach the Lebanese Air Force for some years. The country has been operating two Cessna Caravans armed with AGM-114 Hellfire II air-to-ground missiles for sorties against Daesh and Al Nusra Front forces that have attempted incursions into Lebanese territory.

In summer 2015, the US Department of Defense informed Congress of the proposed sale of a further 1,000 Hellfires. These could be fired by both the Caravans and the Super Tucanos.

Until recently, the Lebanese Air Force operated a small number of 1950s-vintage Hawker Hunter FGA70s. Although some sources show the air force as still having three aircraft on strength, they are thought to have been withdrawn from operational use in 2014.

Ironically, with their simple systems, tough structure and internal gun pack mounting four 30mm cannon plus SNEB 68mm multiple rocket pods on under-wing pylons, the Hunters would have made adequate COIN platforms.

More recently, the Lebanese armed forces have had to resort to improvised methods of attacking Daesh terrorists, such as attaching 250kg and 400kg ‘dumb’ bombs under the fuselage of helicopters.

## QATAR AND UAE REDOUBLE EFFORTS TO SELL SURPLUS FIGHTERS

On-going air force modernisation programmes will see both Qatar and the UAE replacing their fleets of Mirage 2000 tactical fighters, reports Jon Lake.

In recent months, both countries have redoubled their efforts to find buyers for these still very capable and operationally viable aircraft.

Qatar has already signed a deal for the acquisition of 24 Dassault Rafale fighter-bombers equipped with Lockheed Martin Sniper targeting pods, short-range MBDA MICA IR and MICA ER missiles, long-range Meteor beyond visual range air-to-air missiles, Sagem Hammer ASSM dual-mode precision guided munitions, and SCALP-EG air-launched cruise missiles.

The Emirate followed this contract by signing up for up to 36 Boeing F-15QA Advanced Eagles, accompanied by an as-yet undecided weapons package, with options taking the total to as many as 72 Eagles!

This armada of advanced fighters will replace Qatar's nine single-seat Mirage 2000-5EDAs and three two-seat Mirage 2000-5DDAs, which were delivered from 1997. The Qatari Mirages were offered to India in 2009, and subsequently to Libya (February 2012), Tunisia (July 2012), Egypt (August 2012), Algeria

(January 2013), Pakistan (September 2013 and again in early 2016), Libya (April 2016), Iraq (May 2016), and, most recently, Sudan.

In May 2017, it was reported that the Qatari Minister of Defence, Khaled Al-Atiyyah, and the chief of staff of the Qatari Armed Forces, Lieutenant-General Ghanim Bin Shaheen Al-Ghanim, had met the Sudanese Defence Minister, Lieutenant-General Awadh Bin Auf, and discussed a possible sale.



Though the UAE has yet to select a new fighter it, too, is looking to sell its somewhat larger Mirage 2000 fleet, consisting of about 55 survivors of 68 Mirage 2000EAD, RAD, DAD, 2000-9 and 2000D-9 aircraft, all of which are now in the later 2000-9 configuration (2000D-9 in the case of the two-seaters).

The UAE is known to have held talks with Egypt (in February and October 2013, and between June and October 2014), Algeria (March 2013), Libya (February 2014), and Iraq (December 2014 to May 2015 and then again in January 2016, with Saudi funding).

Most recently the newly appointed Pakistani chief of the general staff, General Qamar Javed Bajwa, reactivated discussions.

## QATARI RAFALES FLYING IN FRANCE

The first Dassault Rafale omni-role strike fighters intended for the Qatar Emiri Air Force are now flying in France, reports Jon Lake.

The aircraft are beginning a development and evaluation effort, which differs in detail from Rafales delivered to the French Armée de l'Air and to the Egyptian Air Force. The aircraft will also be used to support the training of 36 Qatari pilots and 100 engineers and technicians.

Qatar's Defence Minister, Sheikh Khalid Al-Attiyah, and his French opposite number, Jean-Yves Le Drian, signed a memorandum of understanding covering the supply of 24 Rafales in May 2015 on the opening day of the Doha International Maritime Defence Exhibition and Conference (DIMDEX).



The Qatari deal includes 18 single-seat Rafale EQs and six two-seat Rafale DQ variants, with 12 further options.

Qatar paid a deposit for the Rafales on December 16 2015, apparently using funds loaned by Japanese banks. The total value of the deal has been reported as \$6.8-7.5 billion. It is a higher price than Egypt paid for its 24

Rafales in 2014, but this is due to the provision of MBDA Scalp EG long-range cruise missiles and MBDA Meteor beyond visual range air-to-air missiles (BVRAAM).

The first Qatari Rafale, a two-seat DQ01, made its inaugural flight from Bordeaux-Merignac on June 28 2016, with the first single-seaters following on March 27 and April 20 this year.

DQ01 was quickly transferred to the French Air Force flight-test centre at Istres Airbase, where it has been seen flying with an Israeli Elbit Targos II helmet-mounted display system (HMDS), which features colour symbology and a full night vision capability.

French and Egyptian Rafales do not yet have an HMDS, which is a technology integrated on Rafale's major rivals, including the Eurofighter Typhoon, the Boeing F/A-18 Super Hornet and the Advanced F-15 Eagle.

Qatari Rafales will use a Lockheed Martin Sniper targeting pod instead of the French Thales Damocles or the new Thales Talios pod (now under development). Sniper is already flying on an Armée de l'Air Rafale test aircraft.

Deliveries are scheduled to begin in mid-2018, continuing at the rate of one aircraft per month.



**W**ith their long land borders, much of which lie in remote and featureless desert terrain, both Jordan and the UAE's border surveillance tasks conform with the 'dirty, dull, difficult and dangerous' roles that many believe represent the UAV's particular 'niche'.

Originally known as the Predator-B, the MQ-9 Reaper is an armed high-altitude long endurance remotely piloted UCAS used by the US Air Force, UK Royal Air Force and Italian Air Force for intelligence, surveillance, and reconnaissance and light attack/close air support duties – giving a persistent over-watch capability unmatched by manned fast jet platforms.

### Controversial strikes

Reapers have also been used for controversial targeted strikes against individuals – sometimes across borders.

The Reaper has a range of more than 1,000nm and an endurance of up to 14 hours. It can carry an external payload of 3,000kg, including up to four AGM-114 Hellfire II air-to-ground missiles, or the GBU-12 Paveway II laser-guided bomb, or the GBU-38 joint direct attack munition (JDAM).

Congressman Hunter's San Diego congressional district includes the headquarters of MQ-9 manufacturer General Atomics.

These proposed Reaper sales had previously been blocked by the Obama administration under the terms of the missile technology control regime (MTCR), a voluntary agreement



The MQ-9 Reaper: ideal for long featureless desert terrain border patrols.

# Trump pressured to export Reaper to the Middle East

*A group of 20 Republican and two Democrat members of the US House of Representatives, led by Congressman Duncan Hunter, has written to President Donald Trump asking him to approve export sales of the General Atomics MQ-9 Reaper armed unmanned combat air system (UCAS) to Jordan and the United Arab Emirates. Jon Lake reports.*

between 35 nations aimed at preventing the proliferation of cruise missile and armed UCAS technology. The Obama administration limited armed unmanned system sales to only its closest allies, principally the UK and Italy, producing unarmed versions for other customers.

Though a UAE request for the maritime Guardian variant was apparently turned down, the Emiratis were allowed to order the Predator XP, an export variant of the Predator that was specifically designed to be unable to carry weapons.

A request was made by the UAE in February 2013, and the deal was finally approved by congress in 2015.

The UAE thereby became the first non-NATO country to fly the Predator XP in 2016, when the first system (comprising four aircraft)

was delivered. The total size of the order is unknown, but is likely to have consisted of two or three systems with 10-12 air vehicles.

US MQ-9s have operated from a number of bases in the region, including Muwaffaq Air Base in Jordan, where Reapers were first seen in satellite imagery during 2015.

The US's unwillingness to export what the press delight in calling 'killer drones' has left a gap in the market that China has been quick to exploit, and both Jordan and the UAE have bought unarmed UAVs from China. Both are also reportedly looking at armed Chinese UAVs, while the UAE has developed, but not yet deployed, an armed UAV in the shape of the Adcom Yabhon United 40.

The Trump administration has taken a different approach to defence exports,

prioritising sales that will protect American jobs and industry, and that will allow American allies to take a greater share in the burden of their own defence, while imposing fewer restrictions on human rights grounds.

Thus, the US will now remove the human rights conditions that the Obama administration had attached to the sale of F-16s to Bahrain, or on military sales to Nigeria.

## Pro-Western nations will also help

The UAE and Jordan are recognised as being key allies in the fight against Daesh and other extremist groups, and the US hopes that these stable, pro-Western nations will also help to counter growing Iranian influence in the Gulf region. Selling armed MQ-9 Reapers promises to directly help these US allies in protecting their borders, in prosecuting attacks against fleeing insurgent targets, and in monitoring military and insurgent activity in the region, while simultaneously reducing the burden on US forces and assets.

The supply of MQ-9s will also enhance interoperability between the US and its regional allies, and will help those allies to contribute to a common operating picture in the region.

# Maltese mystery after Metroliner crash

*Malta has long had a strategic role in North African operations.*

**Jon Lake** reports that the tradition continues to the conflict of today.

The island of Malta's strategic location gave it a key importance during the Second World War – not least in supporting allied reconnaissance operations in Libya and the rest of North Africa.

The island is strategically important once again, having played a crucial, if quiet, role in Operations Odyssey Dawn and Unified Protector in 2011.

Today it remains important for allied forces acting as a base for intelligence, surveillance, targeting and reconnaissance (ISTAR) aircraft supporting coalition operations in Libya and other parts of North Africa.

This was highlighted on October 24 2016, when a Fairchild Metroliner MkIII (SA227-AT Expediter) – registration number N577MX – crashed in Safi, shortly after taking off from Malta International Airport.

The aircraft reportedly developed engine trouble as it took off, and control seems to have been lost. It was registered to Luxembourg-based CAE Aviation, a contractor offering maritime and terrestrial surveillance to various civilian, military and parapublic security agencies and non-governmental organisations (NGOs).

## Anonymous grey

It was painted in an anonymous grey colour scheme and appears to have been modified for the ISR role, carrying two aft-mounted electro optical/infrared (EO/IR) turrets, and perhaps a new active electronically scanned array (AESA) radar.

CAE Aviation operates another similarly anonymous-looking Metroliner, N919CK, that appears to carry a slightly different surveillance suite, as well as a pair of shorter-fuselage Swearingen SA227-TT aircraft (N75X and N123LH), and examples of the Beechcraft B300 King Air 350 (N51XX) and CASA C-212-300 Aviocar (F-HBMP).

All have been seen operating from Malta, along with a host of similarly modified aircraft operated by other

contractors, air forces and agencies.

Some of these disparate reconnaissance and surveillance types are understood to be monitoring the on-going civil war in Libya, and some may be directly providing support for forces (coalition special forces and their allies on the ground), though others are engaged in monitoring the flow of refugees and migrants attempting to cross the Mediterranean to Europe from North Africa and the Middle East.

The accident aircraft had previously been linked to the EU Naval Force (EUNAVFOR) Mediterranean mission.

In the immediate aftermath of the Metroliner crash, an accident that left five French nationals dead, the Maltese Government announced that the flight had been part of a French Customs surveillance operation, taking part in an anti-human trafficking mission.

## Illicit trafficking

This operation had reportedly been taking place over the preceding five months and had been tasked with tracing the routes of all manner of illicit trafficking, including human trafficking and drug trafficking.

The waters were then immediately muddied when the French Customs Service 'tweeted' that none of its employees had been on board, while the EU Frontex border agency confirmed that the aircraft had not been part of an EU mission, and EU Foreign Affairs High Commissioner, Federica Mogherini, tweeted that the flight was "not related" to any EU activities.

It soon emerged that the aircraft had been departing for Misrata in north-western Libya (a key battleground in the Libyan civil war), and the French MoD confirmed it had been involved in a surveillance operation and added that three defense ministry officials and two private contractors (presumably the pilots) had been killed in the accident.

French newspaper, *Le Monde*, reported that three of the five dead had been members of the General Directorate for External Security (DGSE), France's external intelligence agency, adding an air of mystery and intrigue to the accident.

In February 2016, French Minister of Defence and Veterans Affairs, Jean-Yves Le Drian, launched a criminal investigation into *Le Monde's* reporting, accusing the paper of compromising a military secret when it revealed that France had been using DGSE officials to carry out covert operations in Libya. The paper quoted an unnamed senior defence official as saying "We must avoid open military engagement [in Libya], we must act discreetly."

French President, Francois Hollande, was less discreet in July 2016, when he said that three French soldiers who died after their helicopter was shot down in Libya had been carrying out "dangerous intelligence operations", thereby indirectly confirming the existence of the covert French operation in Libya.

**The Metroliner reportedly developed engine trouble as it took off, and control seems to have been lost.**

PICTURE: JAPAN TIMES





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## Self-flying electric air taxis set for Dubai trials

*Electric multi-rotor helicopters as self-flying air taxis are to start trials in Dubai with the Road and Transport Authority (RTA). Dave Calderwood reports.*

The first air taxi tests will start in late 2017 using the German-designed and made Volocopter. “The tests will start in the fourth quarter and the project has been scheduled to run for five years,” said Alexander Zosel, co-founder of Volocopter. “We are very grateful and proud that the RTA has selected us as their partner after rigorous testing.”

Dubai plans to handle a quarter of all of its passenger travel using autonomous transportation by 2030, and has already forged a link with another electric air taxi pioneer, Chinese drone maker Ehang. Dubai’s RTA and Ehang announced a partnership at February’s World Government Summit.

His Excellency Mattar Al Tayer, general manager and chairman of the Dubai Roads and Transport Authority board, spoke highly of Ehang’s four-rotor 184 and said that the RTA had already experimented with the vehicle in a flight at the Dubai Civil Aviation Authority (DCAA) test site.

During the trials, DCAA had made a supportive contribution in defining the safety criteria required, issuing the permits for trial and inspecting the vehicle.

### Smartest city in the world

Al Tayer said: “The trial of the first AAV implements the directives of HH Sheikh Mohammed bin Rashid Al Maktoum, vice-president and prime minister of the UAE and ruler of Dubai, to transform Dubai into the smartest city in the world.

“It is also part of RTA’s endeavours to provide self-driving transport by engaging in the technological tests of self-driving vehicles in the Dubai environment. It replicates Dubai’s self-driving transport strategy aimed at transforming 25% of total individual trips into self-driving trips using various modes of transport by 2030.

“The step would also enhance the integration between public transport modes and people happiness through the

provision of smooth, quick and innovative mobility.”

While the Ehang 184 uses proven drone technology for its ground-managed flight, it has yet to fly a human. It also has its exposed rotors at ankle-level, a design flaw that would have to be changed for public transport.

The Volocopter has flown a human and is now on its second generation, the 2X. It has 18 rotors spread out around a protective ring above head height. Like the Ehang, the Volocopter has fully redundant power trains and an intelligent autonomous control system to offer maximum reliability.

### Extreme climatic conditions

Zosel is looking forward to the Dubai tests for the technology under extreme climatic conditions.

“We now have a fantastic opportunity to work with the RTA on the development and testing of the entire future ecosystem for safe autonomous air transport using Dubai as a first showcase project,” he said.

The Volocopter’s maximum flight time is nearly 30 minutes at a cruise speed of 50km/h, and a maximum airspeed of 100km/h.

It measures about two metres in height, and the diameter of the rotor rim, including propellers, is about seven metres.

“The German Volocopter Company was selected thanks to its compliance with the international safety and security standards, and passing the rigorous standards of the German Aviation Authority, which applies the highest safety and security in designing and operating aircraft,” explained Al Tayer.

“The RTA is working with the DCAA to develop the legislative and operational guidelines, and define specifications and standards applicable to operators in the emirate, so that the legislation will be ready before the date set for the commercial and official operation of the autonomous air vehicles.”

*Gama Aviation's brave move of its FBO from Dubai International Airport to Sharjah International Airport back in 2010 is paying off with a 45% increase in movements for the first four months of 2017. Dave Calderwood reports.*

## GAMA RAISES THE BAR AFTER SHARJAH SWITCH



**G**ama has been so encouraged by the steadily rising traffic to its spectacular FBO at Sharjah that, working with the airport authority, it is embarking on a major \$25 million-plus investment in developing the business aviation facilities.

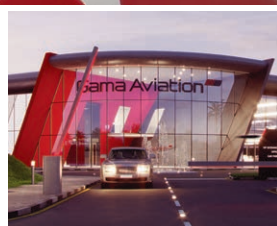
Operators have seen the benefits of being at an international airport that's close to Dubai city centre but has no restrictions over slots.

"It's about time, to be honest," said Richard Lineveldt, new managing director of Gama Aviation UAE. "That's tremendous. As ever, we qualify that by saying we're heading into the summer now so it will probably even out over the next few months but we're very pleased with progress so far.

"We started at Sharjah in 2012 as the exclusive provider of business aviation services and opened our FBO terminal in 2014. Since then, we've seen a really good and healthy increase, which has accelerated from the beginning of 2017. We believe that is the result of a very clear and focused awareness campaign, rather than for any operational reason in the region.

"The reason for the move [from Dubai International] was that it was running out of space. The group made a decision to move to Sharjah, north of Dubai International, for the future as the airport is relatively close to the centre of Dubai but also doesn't suffer from the capacity problems at Dubai International.

"We've been successful from the start in attracting people from the region as they compare Sharjah to the busier airports in Dubai. They've seen the benefits of a more relaxed airport, with no slot restrictions at all, and ample parking."



**Operators have seen the benefits of being at an international airport that's close to Dubai city centre but has no restrictions over slots.**

It's not just local operators who are taking advantage of Sharjah's welcome. Others further afield, encouraged by the Gama FBO's international standard for business aircraft handlers (IS-BAH) approval as well as the facilities, are coming.

"When you talk to European or North American operators, who are looking for a fuel or tech stop in the region, Dubai would be the natural choice. But they haven't been able to get in for whatever reason," continued Lineveldt. "They look wider and Sharjah comes up. We've made a really concentrated marketing effort in getting the word out and it seems to have worked."

Of course, having all that space and no restriction is all very well, but clients then have to get into Dubai, and that's taken a special effort working with the national government. Road access, in particular, has been a sore point.

"In the past, it's been difficult because there was only one major road between Dubai and Sharjah. Historically it's been very busy and congested with traffic.

"The government has now invested in two additional highways between the two emirates and one of them links up to Sharjah International Airport.

"We also offer a helicopter shuttle but there isn't enough demand and understanding of the benefits from the clients at the moment. However, this is definitely something we're working on. When we build the new business aviation centre, it will have both a landside and an airside helicopter landing pad and, obviously, we would like that facility to be used by our clients."

The new Gama Sharjah Business Aviation Centre will be a secure, gated facility that will have 10,000sqm of hangarage space and 20,000sqm of external apron parking.

The hangarage will be used for heavy maintenance, parking and storage, as well as housing Gama's engineering company, Gama FZE Services.

The FBO will be expanded and the new building will also have Gama's offices as well.

"So we will have one central facility, which will run the entire Gama Middle East operation at Sharjah International Airport," said Lineveldt.

"We are aiming to open in the last quarter of 2018. The facility will have direct road access from the airport road, it will basically be a Gama signature design and follow the aesthetics of our existing facilities in Glasgow.

"It will have enough space to accommodate the growing desire or need for covered parking. Aircraft owners in the region are becoming more aware of the value of parking inside an air-conditioned hangar, especially during the summer months, and there is really a lack of facilities (in the region) to handle these aircraft."

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Piper's flagship M600 makes its debut.

## TURBOPROPS SHINE IN THE BRIGHT LIGHTS

The 'lights' were certainly turned on at the EBACE show.

Recent changes in European regulations mean that single-engine turboprop (SETP) aircraft can now fly in instrument meteorological conditions and at night carrying fee-paying passengers.

"Customers have always looked askance at the idea of single engines," said Marwan Khalek, group CEO of Gama Aviation, "but the situation may be changing."

And, judging by the aircraft on the static, it is changing fast.

American manufacturer, Piper, was there with its new M600 Turboprop, which received its European Aviation Safety Agency (EASA) certification at the show. Jacqueline Carlon, Piper's marketing director, said the company was pitching the six-seater to corporate flight departments and charter/air taxi operators.

"The cost base comes right down," she said. "It makes it sensible to have an M600 alongside larger jets for the shorter flights with just three or four passengers.

Daher was showing not one, but two, new variants of its TBM 900 model. These were the TBM 910 and the TBM 930; the pair really pack a punch with speed comparable to that of a jet.

Pilatus boss, Oscar Schenk, was adamant that his market-leading PC-12 would not be standing idly by as the new entrants snap at his heels; particularly as Cessna's SETP, the Denali, is now seeing parts manufactured for the first test article. "You will have to wait and see. We will be ready," he said.



## SPLASHING OUT ON A LINEAGE

Embraer has a world first in cabin interiors – the first ever two-person shower. Fitted on a Lineage 1000E, it is a short step from the aircraft's queen size bed. The company's vice-president of interior design, Jay Beever, said: "The idea is not to be racy, but more to understand it is more spacious than other on-board showers."

# ON THE SWISS WATCH

*EBACE held each year in Geneva is as popular as ever with Middle East and North African owners and operators. Alan Peaford was at the show and reports on the highlights. Pictures by Billypix.*

## LONG GOOD FLY DAY

Textron Aviation's Cessna Citation Longitude successfully crossed the Atlantic in order to show the fourth test aircraft, fully fitted with production interior, to the market.

It was no mean feat. Because of rules regarding experimental aircraft, the Longitude had to plan a longer route that it will when certified later this year as its 3,500nm range will deliver non-stop transatlantic crossings.

The new super-midsize Cessna flagship will carry 12 passengers in a cabin with a stand-up flat floor and a cabin altitude of less than 6,000ft.



## Lufthansa Technik is a high frier

Lufthansa Technik was impressing operators with its latest innovation.

A newly certified induction cooking platform was on show, demonstrating how business jet crew can cook fried eggs, fresh steak and stir fry, safely in the galley area.

The units are now in serial production and will be ready for early 2018.

## Supersonic solutions

The supersonic business jet, the Aerion AS, came another step closer to reality at EBACE. For many years, the company has said the engine would be key to the programme's viability.

At the show, Aerion announced that it would be working with GE to study engine development for the three turbfans that will power the Mach 1.5 jet.

Thrust requirements, noise limitations, technical support, fuel consumption and cost are the key issues to be resolved.

## A neo look for Airbus

Airbus launched a corporate jet version of its A330neo at the show. Capable of flying 20 hours with a 9,400nm range – able to link Lagos with Sydney – this VIP aircraft includes a conference/dining room, bedroom, and private office and still has room for seats for staff. It can fly 25 passengers.

## The biggest deal on offer

It's been a long time coming but the world could soon have its first Airbus A380 corporate jet. Swiss-based Sparfell Associates has been given a mandate to offer a number of A380s for conversion to VIP aircraft.

Working with designer, Andrew Winch, the superjumbos will feature an upper floor "head of state" configuration complete with bedrooms, showers and private offices and lounges, while the lower deck will have an airline configuration for the entourage.

## VISION IS REALISED

The world's first personal jet achieved its European approvals at EBACE. The Cirrus Vision SF50 made its debut at the show.

The five-passenger jet – complete with parachute – already has 600 customers awaiting delivery.

The company took a model to Africa Aerospace and Defence (AAD) last September and, hopefully, the real one will fly into the Middle East soon.





## Falcon 8X developments are a real eye-opener

*It may be nine months since Dassault's Falcon 8X entered into service with the first aircraft being delivered to Greek operator Amjet but, as Dave Calderwood reports, the French aerospace company has been busy further expanding the abilities of its flagship private jet.*

**T**he UAE's civil aviation authority has now approved Dassault's Falcon 8X. On the operational side, the aircraft has also gained approval for flight in severe crosswind conditions. It can now land and take off in winds of up to 30 knots steady and 40 knots gusting.

And, overcoming a further hurdle, it has been cleared for operations at London City Airport, with its steep approach, short runway and strict noise limits. If it can get in and out of London City, the Falcon 8X can operate almost anywhere.

But, perhaps the most exciting addition is the certification of Dassault's FalconEye combined vision system. It's not exaggerating to say this could revolutionise operations in limited visibility conditions.

Simply explained, FalconEye is a head-up display that combines inputs from both a synthetic vision system (SVS) and an enhanced vision system (EVS). The SVS provides a realistic 3D view of the terrain ahead, and the EVS has special infra-red heat-sensing and low-light cameras located in the nose of the aircraft, which can see through hazards creating low visibility, such as dust, fog and darkness.

There are no fewer than six sensors in the EVS to pick up as much detail as possible.

### Head-up display

It's the combination of these two vision systems on the head-up display – proven to help pilots fly aircraft more safely in crucial stages of flight – that's new. It means the pilot knows precisely what's ahead of the aircraft and that's particularly important during the approach to land, when close to the ground.

After an exhaustive two-year test campaign covering all types of operating service, including fog, mist, snow and other severe weather conditions, the aviation authorities

have accepted and approved FalconEye. It's not just a 'nice to have' option. The combined vision system is expected to yield a vital operational gain by allowing a reduced minimum decision height of 100 feet, meaning the aircraft can make the decision to land in worse visibility than before. Operators of the Falcon 8X obviously appreciate this gain because almost all customers have chosen to fit FalconEye.

"Not only will FalconEye provide an unprecedented level of pilot situational awareness and flight safety," said Philippe Rebourg, Dassault Aviation's project test pilot, "it will greatly enhance the efficiency and cost-effectiveness of customers' fleets."

### Real success

The Falcon 8X is turning out to be a real success for Dassault. By May this year, aircraft number 40 was on the production line at the factory in Merignac, south-west France. The 28th aircraft was at Dassault's completion centre in Little Rock, USA, being fitted out to the customer's spec.

Increasingly, customers are opting for a package of extras: FalconEye, the latest Falcon Sphere II electronic flight bag, which is making the cockpit almost truly paperless, electric window shades and high-speed broadband.

The new generation of JetWave broadband using Inmarsat's Global Xpress Ka-band satellite network, is enabling passengers to browse the internet, stream videos or have a videoconference anywhere in the world, over land or water.

Finally, well, for now, Dassault sought to prove the Falcon 8X's long-range capability and recently flew non-stop from Singapore to London, two important business hubs. That's a distance of 6,300nm – well within the Falcon 8X's maximum range of 6,450nm – and a 14-hour flight.

*Brazilian aircraft manufacturer Embraer sees a continuing strong market for top-of-the-range executive jets in the Middle East. Alan Dron reports.*

## TOP-OF-THE-RANGE JET MARKET STILL STRONG IN THE MIDDLE EAST

**T**he Middle East makes up a small percentage of global executive jet sales, but accounts for a disproportionately large number of large-cabin types.

Embraer's latest 20-year prediction of sales says that the Middle East and Asia-Pacific will account for just 9%.

Removing the substantial chunk of aircraft destined for the Far East and in terms of numbers, Middle East executive jet sales are a very small proportion indeed of worldwide purchases. But those that are sold tend to be top-of-the-line models.

Most people will be familiar with images of the extreme end of the market – Boeing 747s kitted out as the ultimate luxury mode of travel. But just below that level are less ostentatious but still distinctly up-market business jets costing from \$20 million to more than \$50 million.

### Paris Air Show briefing

This was shown up in a pre-Paris Air Show briefing at Embraer Executive Jets' Melbourne, Florida, location. Luciano Froes, senior vice-president, marketing, of Embraer Executive Jets noted that of 25 Lineage 1000 jets in operation globally "almost half" were based in the Middle East.

The Lineage 1000 is Embraer's largest executive jet and is derived from the Embraer 190 regional jet, when it typically carries 98 passengers. The Lineage 1000 version has a \$53 million price tag and can carry a maximum of 19 passengers.

That, said Froes, made it ideally suited to a certain class

of ultra-wealthy Middle Eastern client that typically travelled with an extensive entourage and the large amounts of luggage that accompanied them.

A critical sector for Gulf-based executive jets is Dubai-London, given the popularity of the UK capital for both business and leisure trips, with both the Lineage 1000 and the smaller Legacy 650 model easily meeting the range requirement.

Globally, the business jet market continues to be essentially stagnant. The industry sold around 650 aircraft last year and this year's total is expected to be almost exactly the same.

"According to brokers and others, sentiment seems to be improving, but that is not yet materialising in the form of transactions," said Froes.

At present, a series of headwinds and tailwinds are exerting opposite forces on the business jet market. Factors holding back new sales include unfavourable exchange rates (the strengthening US dollar is having a negative effect on many emerging markets); there continues to be a large inventory of pre-owned aircraft awaiting new buyers; and political factors such as the UK's exit from the European Union are making some potential buyers wary of committing to a purchase.

### High-net-worth individuals

On the plus side, stock markets are up, the global population of high-net-worth individuals continues to grow and new products in manufacturers' executive jet line-ups are stimulating the market.

Given that in the Middle East 'size matters', Embraer's smaller executive jets, the Phenom 100 and 300, which seat four and six passengers respectively, are rarely seen on the region's airport aprons. There are two exceptions, however. Both Emirates Airlines and Etihad Airways have purchased Phenom 100Es (five for Emirates and four for Etihad) for their next generation of aspiring airline pilots.

At Emirates, after starting their training on piston-engined Cirrus SR22s to learn basic commercial piloting skills, cadets then advance to the Phenoms to obtain their twin-engine jet rating and their commercial pilot license on a multi-engine aircraft with instrument rating, and frozen airline transport pilot's licence (ATPL).

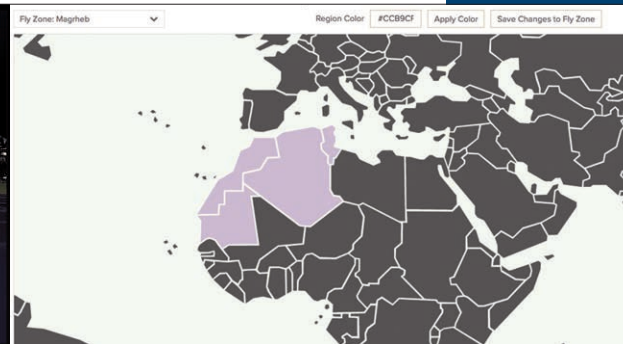
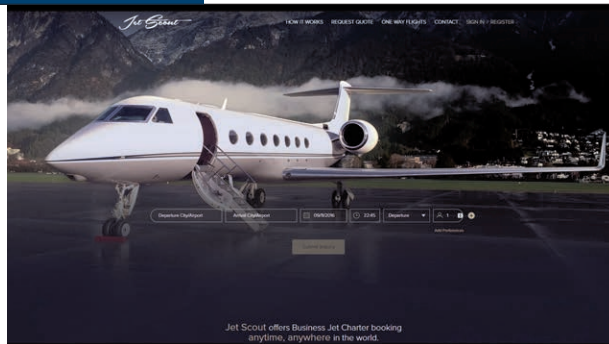
At Etihad Flight College, the Phenoms are used from the outset to instruct students on the multi-crew pilot licence (MPL) course. MPL is an innovative competency-based approach to flying training using multi-engine aircraft. Introducing multi-crew pilot operations from the onset training is more effective, as airline flight crews operate as a team.

The Phenom has the same type of modern cockpit displays that tomorrow's airline pilots can expect to find in the Boeings and Airbuses that they will be flying, so using the Phenom eases cadets' transition to airliners.

**Lineage 1000 jet interior: Almost half of 25 Lineage owners are based in the Middle East.**



The user-friendly interface has been thoroughly tested and developed “to serve even the most complex booking scenarios”, says Stefano Costi.



Inquiry Inbox

Show: All

NR.	ING. DATE & TIME (UTC)	DEPART (UTC)	DEPART (LOCAL)	FROM	TO	PKX
18	THU, 16.02.2017 10:30	FRI, 17.02.2017 09:30	FRI, 17.02.2017 10:30	LE BOURGET, (EPPH) EUROPE	SARBERMOEN, (ENGA) EUROPE	2
16	THU, 09.02.2017 15:42	SAT, 10.02.2017 20:45	SAT, 11.02.2017 15:45	TETERBORO, (KTEB) NORTH AMERICA	SUTTON, (EGOW) EUROPE	7
15	THU, 09.02.2017 09:03	SAT, 10.02.2017 09:15	SAT, 11.02.2017 09:15	LOS ANGELES INTL, (LAX) NORTH AMERICA	TETERBORO, (KTEB) NORTH AMERICA	7
14	WED, 08.02.2017 10:00	THU, 09.02.2017 14:00 SAT, 10.02.2017 14:30	THU, 09.02.2017 15:00 SAT, 10.02.2017 15:30	LE BOURGET, (EPPH) EUROPE BARAJAS, (EIMM) EUROPE	SARAJAS, (EIMM) EUROPE LE BOURGET, (EPPH) EUROPE	1 1
13	FRI, 03.02.2017 18:26	SAT, 04.02.2017 17:30	SAT, 04.02.2017 18:30	PEREYOV, (EHPB) EUROPE	DUBLIN INTL, (EIDW) EUROPE	1
12	FRI, 03.02.2017 12:39	FRI, 03.02.2017 20:45	FRI, 03.02.2017 12:45	LOS ANGELES INTL, (LAX) NORTH AMERICA	HONOLULU INTL, (HNL) NORTH AMERICA	4
				GENOVA, (EGLI) EUROPE	TETERBORO, (KTEB) NORTH AMERICA	



# JetScout plots a trail to streamlining the market

*A new innovative charter sales platform was showcased in Dubai and Stefano Costi, managing director of Jet Scout, tells Vincent Chappard that industry signals look “very positive”.*

In a very fragmented market, a charter sales platform called Jet Scout sets out to provide the business aviation community with improvements in price, timeliness, quality, comfort, security, flexibility and efficiency, according to the firm’s managing director, Stefano Costi.

“We strongly believe that the new system will provide an innovative market approach, not only for the business jet traveller but also for charter operators and charter brokers,” said Costi, who has flown almost 8,000 hours on business jets.

The user-friendly interface has been thoroughly tested and developed “to serve even the most complex booking scenarios”, he added. A team of experts studied “the inefficiencies of current marketplaces, apps and websites” before coming up with this system, which, according to Costi, will streamline the industry.

“We know the expectations of the industry and how Uberisation has revolutionised end-users’ bookings. We can serve all the needs of the modern private jet users.”

Jet Scout’s algorithm combines more than 200 parameters to find the optimum offer for the traveller’s journey, while respecting all safety and security regulations. It offers a streamlined search engine running on one unique platform for B2B and B2C use.

After registering and giving fleet details, operators can use their own integrated sales platform and have direct access to new clients. The “white label platform” opens new perspectives as a sales tool. “We are opening the door and everybody is welcome,” Costi said.

“Operators will enjoy some specific features such as ad-hoc calculated route distances, custom operational costs, negotiated handling fees for specific airports, rule-based fees and many other customised options,” he explained.

For automatic quotes to work, operators need to

provide detailed pricing information as well as their valid air operator certificate. According to Costi, the goal is that “pricing should be done in a way that it is binding”.

The new system offers a freedom of choice to the client. “You have no influence on your clients. They have the total freedom.” It is designed to boost charter sales with its rapid confidential search and personalised options.

The platform also simplifies jet chartering with a fast and easy booking process. The public platform is free to end-users and is open to private jet flyers all over the world. Personal assistance is available at every stage.

### Constant update of information and data

Costi, who has been involved in business aviation software design since 1989, underlined that quality was of utmost importance to bring trust and sustain the web booking service. “Full-time support and video tutorials are available at every step. There’s also a constant update of information and data,” he said.

“We are spreading our wings worldwide. We are showcasing our sales platform and meeting software providers. Latin America is an emerging market. Asia is an important market. We also have Central Europe, Russia and North America.”

The Middle East, he said, was an interesting and vibrant market. “There are good opportunities and discussions are in progress for connections in and out the region. When people see their own aircraft being quoted in their own currency, it’s quite exciting.”

Many more additional features, currently being beta-tested, will soon be available.

“This is just the beginning. Any system has an evolution. From a technical point of view, it is the market that will tell us if we are wrong or right,” Costi concluded.



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# HOW AVIONAV IS SWITCHING ON

*Tunisia is growing its own indigenous aircraft manufacturing business and is now looking for wider market reach, as Vincent Chappard discovers.*

**D**eveloping light aircraft in Tunisia has been a challenge met by Sousse-based Avionav, despite being in a segment of the market where it is competing with well-established manufacturers.

However, the company has bigger ambitions, according to its founder, Ferid Kamel.

Avionav was set-up in 2007 by two Italian manufacturers in Mateur. It was later bought by a group of Tunisian engineers and shifted to Sousse.

“Since then, we have been doing our very best to give entire satisfaction to our clients through high quality and top-of-the-line products at very reasonable prices, 30% less than our competitors,” Kamel said.

More than 1,300 of its models are now flying and around 40 light aircraft (two-four seats) come off its production line each year.



**Ferid Kamel:**  
“It’s a very ambitious project.”

The aircraft are involved in many different missions, from training and agricultural roles through to advertising banner towing and leisure flying.

The company has a diversified and broad market including the US; Europe (Belgium, France, Italy and Spain); Latin America (Brazil and Argentina); Asia/Middle-East (Pakistan, UAE and Iran); and Africa (Tunisia and Algeria). New markets are being tapped like Costa Rica, Czechoslovakia and Qatar, according to Kamel.

“Africa is a very promising market. We are currently discussing with Senegal and Mauritania,” he said.

This development shows the determination of Avionav and other flourishing North African companies to have a role in the aviation sector by emphasising their strengths of tradition and geographical location, at the crossroads between the Middle East and Mediterranean Europe.

Avionav has five models, of which four are on the production line. Its design and engineering team is presently polishing a fifth prototype, the Sea Xilon, a four-seater amphibian seaplane that



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# THE LIGHTS IN TUNISIA

has been specifically designed to land on lakes and the sea as well as on a hard runway. There will also be a two-seat version. "It's a very ambitious project, which requires much resource. Hopefully, the first two prototypes will be ready in a year," said Kamel.

The company can deliver any of its aircraft one month after being ordered. Which is "quite rare" in this sector, says Kamel proudly.

For its high-winged Rally aircraft, the company has chosen carbon fibre for its numerous advantages. It is ultralight aircraft manufacturers (ULM) and light sport aircraft (LSA) certified.

Century (low-wing) with the same certification, has proven to be robust since 1991 when it came on the market.

Certified experimental in the US, Fury is an extended variant of the Century. It can accommodate two more seats.

The RG is another variant derived from the Century. This two-seater, with a retractable gear, needs another certification.

Avionav also provides design and engineering



The low-wing Century has celebrated more than 25 years in production.

services to its clients in many fields of expertise including: computational fluid dynamics (CFD), radar Doppler multifunction (RDM), structural analysis, electrical design and certification.

Evada Aircraft, affiliated to the Swiss company, MCI, also wants to take its share of this niche market with its "cost-effective" aircraft models, the Evada A2, powered by a 130hp Rotax 915 engine, and the Evada A4, equipped with a six-cylinder Lycoming O-540 engine.

Both models will be equipped with a full

avionics and a retractable gear, enabling them to land on water or a hard runway. Retractable skis will be offered as an option.

"Our goal will be to have both the A2 and A4 Evada aircraft prototypes completed and certified with more than 100 units sold before this time next year," said company CEO, Joseph Bourne.

Avionav and Evada Aircraft have entered into discussions over contract manufacturing and services with the view to launching the prototype of the amphibian aircraft.



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Ali Alnaqbi offers a warm welcome to Marrakech.



## Opportunities are growing on the road to Morocco

*The Middle East & North Africa Business Aviation Association (MEBAA) Show Morocco takes place in September and the organisation's founding and executive chairman, Ali Alnaqbi, talks to Ella Nethersole about the outstanding business aviation opportunities in that country, adding that the event is the perfect business platform.*

In the last few years, Morocco has fast become the hub of business aviation of North Africa. Ali Alnaqbi, believes it is due to a combination of factors, including strong support from investors and the government.

"The industry is burgeoning at the moment, with major players investing heavily in the region and the government strongly committed to supporting infrastructure growth," he said. "Now is the ideal time to explore the opportunities offered by the region and the MEBAA Show Morocco provides the ideal platform to do so."

The two-day event will take place on September 12-13 at Marrakech Menara Airport, having moved to a larger location to accommodate growth since its inaugural edition in 2015.

The event is expecting to attract more than 2,500 trade visitors – an increase of almost 23% from the inaugural show – and host 65 exhibitors. The MEBAA conference takes place the day before the show (September 11).

MEBAA Show Morocco represents all sectors of the industry, from aircraft manufacturers to maintenance companies and FBOs, and visitors to this year's event will have access to the key players in the region's business aviation market.

### Unparalleled opportunity

"We are anticipating an increase in exhibitor numbers of almost 15% over the inaugural event," said Alnaqbi. "It will provide an unparalleled opportunity for face-to-face meetings, networking and accessibility, which are so important to the way business is done in the region.

"The show will also include a static display of the latest business aircraft, with many of the key OEMs having already confirmed their space in the static park."

Boeing Business Jets is one of the key names already confirmed, with other exhibitors hailing from a range of locations – including Africair from the USA, Jet Aviation from Switzerland, Jetex from the UAE, which has recently

opened an FBO in Morocco, and Gulfstream, which is supporting the event as its silver sponsor.

Local companies will also be represented, with Morocco-based Air Ocean Maroc attending for the second time.

"As a strategic location with easy access to Europe, the Middle East and the rest of Africa, Morocco has become a popular destination with corporations such as Boeing looking to expand internationally, and the aerospace industry in the country benefits from ardent government backing," said Alnaqbi.

"In addition, reports state that Morocco's 2020 aerospace goals include bringing in 100 new investors, creating 23,000 new jobs and generating \$1.6 billion in new revenue."

### Morocco the most active market

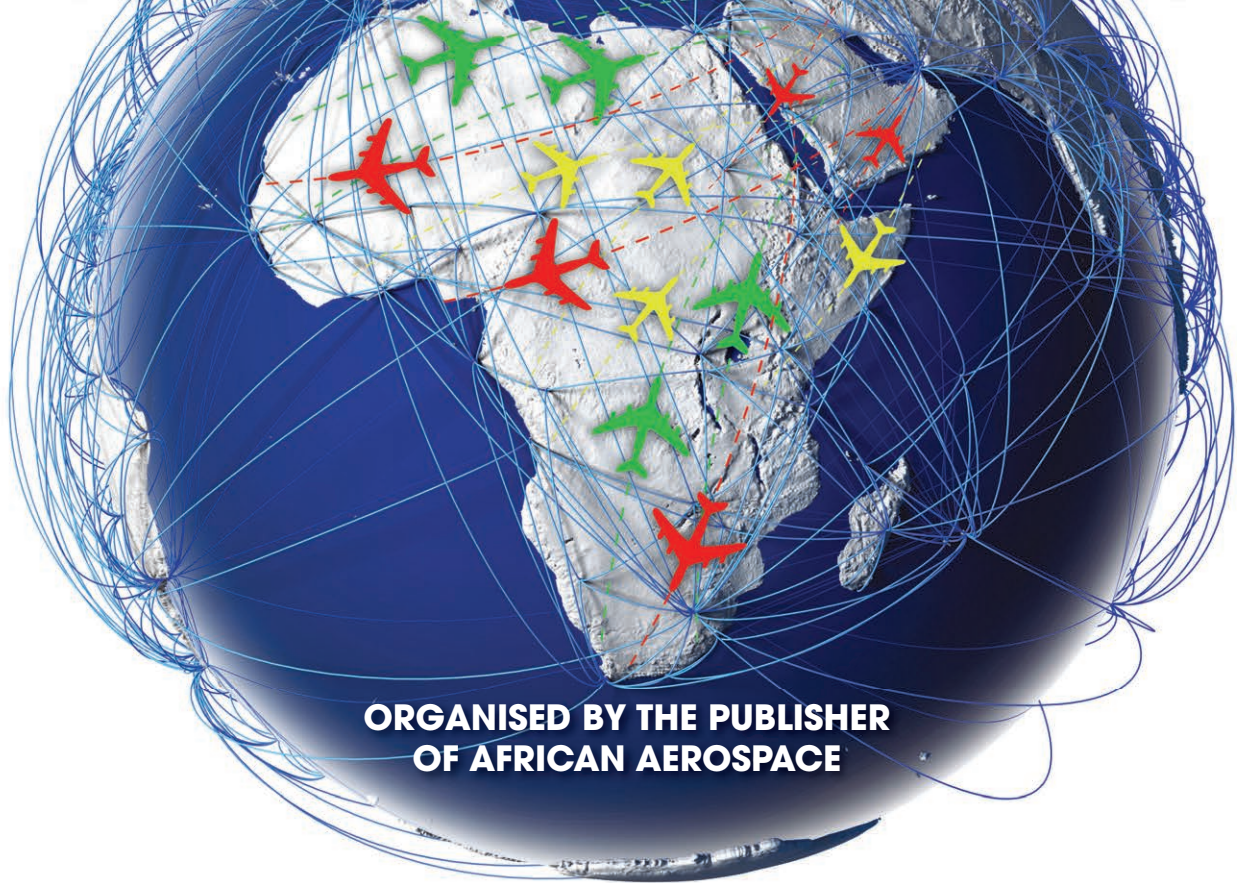
The Moroccan aeronautics sector posts an annual growth rate of 15 to 20%, and Bombardier reports historic average economic growth in the region has been 4.4%, stating that compound annual fleet growth in Africa is predicted at 3.2%. Morocco is the most active market with 50% of North African aircraft movements.

"The African business aviation market has been resilient through the global financial crisis and new aircraft sales fared better than in developed markets such as Europe and North America," said Alnaqbi.

"About 12,000 Moroccans now work in the aerospace industry, from almost none 10 years ago, and that figure is predicted to rise by Hamid Banbrahim El-Andalousi, president of the Moroccan aerospace industries association (GIMAS), to 35,000 by 2020."

Alnaqbi added: "When we launched the MEBAA Show Morocco in 2015, it clearly demonstrated the importance of business aviation to the growing North African market. With the show moving to a new site at Marrakech Menara Airport for 2017, we expect this to continue and are looking forward to a fantastic event."

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*Tracking baggage throughout the journey will soon become an industry standard, with the Middle East leading the way. Keith Mwanalushi gained some insight at the SITA IT summit in Brussels.*

## BAGS OF SECURE IDEAS

**P**reparations are under way across the air transport industry for a major step-change in the way baggage is handled.

Starting in June 2018, the International Air Transport Association (IATA) will require its member airlines, which represent 83% of total scheduled traffic, to keep track of every item of luggage, from start to finish, under Resolution 753.

Airlines will also be required to share that tracking information with all involved in delivering those bags back to passengers at their final destination. The intention is to improve customer service at a fundamental level and to drive down industry costs.

“Baggage management is increasingly important these days,” explained Jihad Boueri, SITA vice president for airports solutions for Middle East, India and Africa. “Firstly, from the airline’s side, because of IATA’s Resolution 753, they should track the baggage throughout the journey until it is delivered safely to the passenger, including in transit.”

The second aspect, Boueri highlighted, was the growing trend towards self-service bag drop technology.

SITA recently reported that baggage management by the world’s airlines



Mishandled baggage has fallen 70% due to investment in technologies.

improved again last year as the industry focused on technology investments and prepared for the IATA directive. According to the air transport IT specialist’s baggage report 2017, the rate of mishandled bags was 5.73 per thousand passengers in 2016, down 12.25% from the previous year and the lowest ever recorded.

By all measure this is welcome news for the rising number of passengers, which last year hit an all-time high of 3.77 billion.

According to SITA, the rate of mishandled baggage has fallen 70% since 2007 due to investment in technologies and process improvements by the world’s airlines and airports. Over the coming 18 months, this is expected to improve even further.

What has changed is that airlines, airports and the passenger are all interested in baggage solutions. “Previously, it was left to the airport. It was the airport’s responsibility but now we see more airlines coming into the baggage reconciliation and tracking area.”

Boueri said Turkish Airlines was currently implementing its system. In April, Qatar Airways announced it was

Continued  
on Page 70

## CONTINUED FROM PAGE 69

the first airline in the world to achieve compliance with Resolution 753 at its hub in Hamad International Airport (HIA).

The certification has been achieved on the back of Qatar Airways' baggage management system – what the airline refers to as “HAQIBA.” The system was developed in-house and integrates in real time with the Qatar Airways website and mobile app.

The Qatari airline now offers real-time updates on checked baggage on its website and mobile app, providing what it says is a hassle-free baggage experience. The mobile app provides notification to passengers with relevant updates on the bag, as well as the ability to retrieve the details on a need basis.

The information includes various stages of the baggage-handling process such as check-in, transfer, arrival, as well as reference to bag tags and baggage belt. This information guides passengers during the journey and provides insight into any instance of delayed or lost baggage.

**Critical pinch-point**

A critical pinch-point in the bag-handling process is when passengers and their luggage need to move from one aircraft to another, or from one carrier to another. Bags have a higher risk of being mishandled at this time, particularly if connections are tight.

In 2016, according to SITA, close to half (47%) of delayed bags were in the process of being transferred. Introducing mandatory tracking at this point of the process will provide real-time data that can be used to avoid delays.

Mishandled baggage negatively affects both the passenger experience and the airline's finances and SITA's report shows that the financial costs remain high, despite the 12.25% drop in the mishandled rate. The global bill for recovering and reuniting passengers with their bags was in the order of \$2.1 billion in 2016.

“In the region, Royal Air Maroc are negotiating with us now for a total solution linked to baggage,” Boueri revealed. He stressed there was a growing collaboration between airlines and airports on solving baggage-related issues.

“For the airports, they have to sort out the check-in facility. So, if you do a web check-in at home and you are travelling with bags, you will still have to go to the counter and check-in. This is why we see more requests from airports for self-bag drop so that the passenger can handle the baggage and check-in at the same time.”



**Airports and airlines are working together to resolve baggage issues.**

In addition to the airport and the airline, SITA is working towards the passenger experience and keeping them informed. “It's good to know that your baggage is travelling safely and IATA's initiative will allow the airline to track it but it's also important that the passenger knows where his luggage is and this is where we come in with some solutions,” Boueri said.

For instance, SITA's ‘BagJourney’ solution is the first community-based baggage tracking system that provides an end-to-end view of the baggage journey using data from multiple sources.

“We are able to track the bag and inform the passenger's mobile phone. If there is a delay, or if it's in transit, the traveller knows. We can remove the frustration baggage issues cause, for instance knowing that the bag is arriving on the next flight so that you don't wait at the airport.”

Boueri explained that SITA is capable of providing this service through what is known as the ‘bag message’. The airport

or airline will build its own application through the SITA application-programming interface (API).

He explained that, at any point, readers would detect the bag and tell the passenger exactly where it was, either at the airport, in transit or on the aircraft.

“This message is sent by the airline to the API and then forwarded to the passenger, but the airport or airline has to build their mobiles apps – or we can build it for them. SITA does all the infrastructure.”

In terms of investment, Boueri said it was minimal and required a simple subscription. “It's easy, you pay as you go by message essentially, through the subscribing system.”

The SITA report shows that three of the top four mobile services passengers say they would definitely use the system, if available, in relation to tracking the status of luggage.

**Smartphone or tablet**

There is a reflection of concern passengers feel about what's happening to their bags, which was also noted in SITA's report last year. As well as the desire to track their bags in real-time via an app, detailed earlier, 66% would report mishandled bags via their smartphone or tablet at the arrival airport; and 62% would receive bag collection details on their smartphone or tablet.

The desire for mobile travel services that allow passengers to personalise their trip or make their journey better by booking extras such as taxis, hotels and tickets for attractions, is underscored by the 59% of passengers who say they would use a digital travel concierge.

As baggage-tracking takes a higher profile within the industry and among passengers, it opens the door for IT specialists and for aviation outsiders to come up with smart baggage solutions.

Industrial internet consortium members GE Digital, M2Mi, and Oracle, supported by integration specialist Infosys, are leading a new airline and passenger test bed called ‘smart airline baggage management’.

This aims to reduce the instances of delayed, damaged and lost bags. The project will also address the baggage requirements of Resolution 753.

The smart airline baggage management test bed, which is part of a broader aviation ecosystem vision, is also intended to increase the ability to report on baggage, including location information, to prevent theft and loss; and to improve customer satisfaction through better communication.





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Existing aviation security standards and detection capabilities are generally very effective and incorporate high standards of technology. However, the constant changing threat from terrorism means standards are continuously under review – and the public remains at the trailing edge of any changes to screening procedures, often leading to frustration.

Analysts at market research firm, Technavio, predict the global airport passenger screening systems market to grow at more than 4% annually between 2017 and 2021 as the recent increase in global air traffic across has intensified the need for effective passenger and baggage screening systems to maintain operational efficiency and security.

As passenger security screening remains a crucial aspect of airport operations, enhancement of the existing processes can help in improving on-time performance and efficiency. In recent times, more focus has been given to amending screening capabilities, both by governments and private industry.

In March, the US Department for Homeland Security (DHS) confirmed a ban on devices larger than a mobile phone on flights from 10 Middle Eastern and North African airports. This was quickly followed by a similar announcement from the British authorities. Airlines in the region reacted swiftly to meet the new mandate but industry associations continued to voice serious concerns about the impact of the ban, while taking into consideration the issue of safety and security.

#### Ban was lifted

In Mid-July, the ban was lifted on flights from those places meeting a new, undetailed, set of security criteria. In a statement, a Transportation Security Administration (TSA) spokesperson said: “Etihad, Turkish Airlines, Qatar Airways and Emirates Airline have initiated the process for lifting the personal electronics device ban by alerting TSA they are ready to comply with the enhanced security measures.”

Royal Jordanian and Kuwait Airlines followed days after and at the time of writing, Saudia said it is working with Saudi Arabia’s General Authority of Civil Aviation (GACA) to implement the new DHS requirements for all US-bound flights, and expects that passengers on its flights to the US will be permitted to take large personal electronic devices into aircraft cabins by late July.

The International Air Transport Association (IATA) April 2017 figures indicated passenger demand in general has



# SCREEN TEST

*Evolving threats to aviation security and the approaches used in confronting them are putting pressure on airports and passengers to adjust to new screening procedures, as Keith Mwanalushi reports.*

surged globally but the laptop ban badly affected Middle East-US traffic. The route-level data from March (the most recent month available) shows that revenue passenger kilometres (RPKs) flown by Middle East airlines to the US fell in year-on-year terms by 2.8% for the month. This was the first annual decline recorded for this market in at least seven years.

While traffic growth on the market segment was already slowing, the decline is consistent with some disruption from the device ban that was announced on March 21, as well as a wider impact on inbound travel to the US from the Trump administration’s proposed travel bans.

#### Avoiding routes

Alexandre de Juniac, IATA’s director general and CEO, said there were indications that some passengers were avoiding routes where large device bans were in place.

American Airlines and the TSA have been working on a possible solution that could solve the problem and other related screening issues. The airline is testing a computed tomography (CT) scanner in one checkpoint lane at Phoenix Sky Harbour International Airport’s Terminal 4.

CT checkpoint scanning equipment

aims to enhance threat detection capabilities by providing a 3D image that can be viewed and rotated for a more thorough analysis.

“The safety and security of travellers is the number one priority of TSA, and our partnership with industry, such as American Airlines, is critical in helping develop innovative and critical security enhancements,” said TSA acting administrator Huban Gowadia.

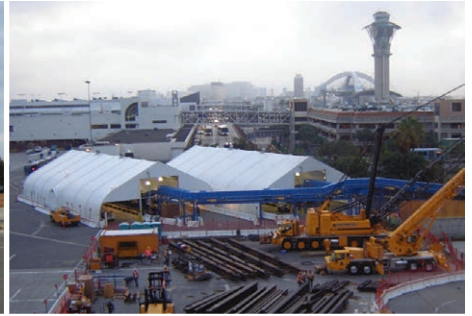
“We already use this type of technology for checked baggage, and we expect these smaller checkpoint-sized machines will provide the same high level of security.”

The new CT screening equipment shoots hundreds of images with an X-ray camera that spins around the conveyor belt to provide officers with a picture of a carry-on bag to ensure it does not contain a threat item.

The system applies sophisticated algorithms for the detection of explosives, firearms and other items banned in carry-on baggage.

Three-dimensional CT technology could make it possible to allow passengers to leave liquids, gels and aerosols, as well as laptops, in their carry-on bags at all times, which would result in a quicker throughput and less bin use.

**Three-dimensional CT technology could make it possible to allow passengers to leave liquids, gels and aerosols, as well as laptops, in their carry-on bags at all times.**



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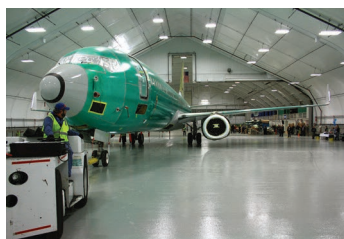


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*TAV Airports is growing its presence in Saudi Arabia with the addition of three new gateways under concession.*

*Keith Mwanalushi looks at the opportunities in the Saudi market.*

# SAUDI OPENS THE GATEWAY TO GROWTH

**E**arlier this year, airport operator TAV Airports sailed through a selection process to sign an agreement with the Civil Aviation Authority of Saudi Arabia (GACA) regarding the expansion and operation of the three airports.

TAV and its partner, Al Rajhi Group, will be operating Yanbu, Qassim (widely known in the air-travel industry as ‘Gassim’) and Hail airports for 30 years.

The move represents a significant milestone for the Turkish airport operator as it increased the number of airports it operates worldwide to 17 – having started its first operation 17 years ago at Istanbul Atatürk Airport.

The three Saudi airports will see an investment of some \$400 million for the development of new terminals and service units.

## Concession agreement

TAV Airports chief executive, Sani Sener, said that following the signing of the concession agreement for the three airports on June 8 2017, the next step would be the start of construction of the new terminal buildings. “The construction period is expected to be two or two-and-a-half years.”

Providing service to approximately 3.6 million passengers in 2016, Yanbu, Qassim and Hail airports will be able to raise this to approximately 11.5 million passengers per year with the new investment.

TAV expects to take over the operation of these three airports within this current year. “TAV’s success in the Madinah Airport project, which was the first airport privatisation in Saudi Arabia, opened new doors in this country,” said Sener.



There are some high-growth global markets that capture the attention on a regular basis – China, India and Indonesia have all seen rapid growth in the last five years.

However, Saudi Arabia has quietly grown as fast as any of these markets. According to data from air travel intelligence company OAG, since 2012, capacity from the country has increased

**John Grant: “The key question is more around the future opportunity and mix of traffic rather than the impressive growth of the last few years.”**

by 63% to nearly 650 million outbound seats per year, with a solid 9% growth expected in 2017.

Such growth may explain why overseas airport operators are increasingly interested in Saudi airports as potential acquisitions.

Sener said Hail Airport is mostly domestic passengers, whereas Qassim is mostly international. “There are no transit passengers in both airports. Qassim holds numerous important events throughout the year and has various international hotel chains. As a result, both business and leisure passengers are using the airport.”

## Major hub markets

A closer analysis by OAG reveals that Qassim, the larger of the two airports, will operate 1.2 million scheduled outbound seats this year spread across 23 city pairs, of which 15 are to international destinations with connectivity to the major hub markets in the region, such as Istanbul, Dubai and Doha, firmly established.

“Indeed, international capacity at Qassim is now one-third larger than domestic capacity and has seen a near five-fold increase over the last five years as carriers such as Flydubai, Al Masria Universal Airlines and Turkish Airlines have launched scheduled services,” said John Grant, senior analyst at OAG.

Grant said low-cost airline capacity now accounted for more than 26% of all capacity at the airport, with Flydubai the largest low-cost operator, followed closely by Flynas.

Located in the centre of the Arabian Peninsula, Qassim is one of the 13



administrative regions of Saudi Arabia. Its airport is the gateway to the region, where the majority of the country's agricultural production takes place and the area is a significant tourism destination.

By contrast, with slightly fewer than 750,000 scheduled seats in 2017, and with only seven airlines serving the market, as opposed to the 14 operating from Qassim, Hail is clearly the smaller of the two airports.

Grant said international connectivity is currently limited to Dubai, Abu-Dhabi and Cairo, with 32% of all capacity at the airport provided by low-cost airlines. "However, for both assets, the key question is more around the future opportunity and mix of traffic rather than the impressive growth of the last few years."

Grant feels that with the domestic market already well served, the expansion of international services will be a key part of the future outlook. Analysis of OAG's traffic data suggest that there are a range of unserved markets from both airports, although many are long-haul in nature, such as Manila and Jakarta.

Closer regional markets do, perhaps, offer opportunity: "Neither airport has any scheduled service to the Indian sub-continent and Lahore, Islamabad, Delhi

and Karachi are among those unserved markets where, perhaps, low frequency low-cost airline services could be operated in the coming years subject to the necessary bilateral approvals being in place."

For Qassim and Hail, the recent increases in capacity have been significant, perhaps to a point where further potential increases in capacity in the short-term may be less than seen in recent years.

#### Slight reductions

"Certainly Flydubai, Turkish Airlines and Nile Air have all made slight reductions to their 2017 scheduled capacity compared to 2016, perhaps suggesting that demand is not growing quite as quickly as supply has in recent years," Grant suggested.

The emerging economy of the Middle East will see the strongest international passenger growth, with operators recognising the value of connectivity to drive global trade and development.

Around 80% of the world's population lives within an eight-hour flight of the Gulf, meaning that by routing through the Middle East, carriers can aggregate traffic and offer a one-stop service between many city pairs that would not otherwise offer such direct itineraries.

**Sani Sener:**  
**"We will continue to evaluate new opportunities all around the world, particularly in developing countries."**

"Longer term, and over the course of a 30-year concession, the outlook for growth from the secondary airports in Saudi Arabia is certainly positive.

"If much of that growth is built around international services that typically generate higher revenues per passenger, then TAV and its partner will be delighted with their investment," said Grant.

Sener emphasised that the operational strategy has always been customer-centric.

He said one of the most important parts of a development project was the operational readiness and transfer (ORAT) process.

"The aim is to start the operations effectively and in a timely manner at the end of the construction. We've followed this process with our experienced ORAT team in Madinah Airport and will do the same for Yanbu, Qassim and Hail airports, together with our local partner, Al Rajhi Group."

TAV has been operating Madinah Airport in Saudi Arabia since 2012. The company also has operations at Jeddah, Riyadh and Dammam airports.

"In the upcoming periods, we will continue to evaluate new opportunities all around the world, particularly in developing countries," Sener said.

# OMAN ON EMISSION

*Managing global airport carbon emissions has become increasingly important and Muscat International Airport in Oman is determined to meet the challenge, as Keith Mwanalushi reports.*



**Musab Al Rawahi:**  
“We want to reach the full level of accreditation.”

In April this year, Muscat International Airport announced it had completed the carbon emission mapping first step in its aim to achieve Airports Council International (ACI) environmental accreditation.

At that time, the Oman Airports Company (OAMC) said it believed in the airport’s environmental responsibility and was committed to addressing climate change within the context of the environmental strategy.

Since then, Musab Al Rawahi, senior environmental specialist at OAMC, has explained more about how the organisation achieved the full level one international ACI carbon accreditation.

The process involved two years of data collection and registration with the ACI programme, also auditing the source of emissions, and certification.

“OAMC’s ambition towards the environment is not only obtaining level one, but to enhance the programme to receive subsequent levels and reach zero emissions. We want to reach the full level of accreditation in the coming years,” said Al Rawahi.

Robert O’Meara, director of media and communications at ACI Europe, which oversees the programme, explained: “There are four levels of accreditation available (mapping, reduction, optimisation and neutrality)

and to apply for any of them, the airport has to complete its programme application, supported by the necessary evidence that it has undertaken the steps required.”

He added that the application needed to be verified by an independent third-party (essentially, an auditor) and then it would be reviewed by the independent programme administrator in London. “Once they are satisfied that the application meets the criteria required by the level the airport is applying for, then they grant permission for the accreditation certification to be generated,” he said.

There are other airports in the region undergoing the process. At level one, (the mapping stage), they include Marrakech Menara Airport and Casablanca Mohammed V International Airport.

Dubai International, World Central and Sharjah are at level two (reduction) and



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**Muscat International has reached Level 1 accreditation.**

Queen Alia International and Hamad in Doha are at level three (optimisation).

Al Rawahi admitted to some challenges when it comes to minimising emissions and mitigating them. “Yes, there is always a challenge when it comes to emission control, especially where the airports are growing and there is a lack of environmentally-friendly equipment and buildings.”

He said to overcome these challenges new technologies and programmes were being adopted such as the use of solar power systems, building management techniques, and a culture change in terms of energy use awareness.

O’Meara noted that the programme had challenges and that one of them could

be scale of resources available: “A very small regional airport might not necessarily have the available resources or personnel to undertake the exercise of applying for certification, particularly in view of the various documents it has to provide,” he said.

On the flip side, he noted that a very big airport might have the resources, but the scale of its operations might be so broad that it would take a lot of time to execute the process of applying for certification at the appropriate level. “However, these are challenges that can be addressed with the right approach to personnel resources and project planning.”

ACI has sought to make the programme

more user-friendly by initiating, a couple of years ago, an online application process.

“That has certainly helped,” noted O’Meara.

There are many things that airports can do to address their environmental impact – investing in biodiversity, water management, noise mitigation, and so on. However, airport carbon accreditation is focused on the activities that affect the airport operators’ CO2 emissions, so it doesn’t consider all environmental initiatives.

O’Meara also highlighted the diversity of efforts undertaken so far, pointing out that activities and investments by airports varied hugely from one region to another due to the climate circumstances and other reasons – for example, an airport investing in a photovoltaic park harnessing solar power to generate electricity may be an excellent choice in Greece, but it’s not necessarily a solution that fits as well in Ireland or Denmark.



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North Africa is an emerging market, especially for business aviation. **Vincent Chappard** talks to the Office National Des Aéroports du Maroc (ONDA) CEO about the airport development in Morocco ahead of the Middle East Business Aviation Association (MEBAA) show scheduled for Marrakech in September.

# ONDA DRIVES THE WAY FORWARD

**O** NDA has established a 10-year partnership with MEBAA in North Africa to organise this event and at least 65 exhibitors and more than 2,500 professional visitors are expected for this second edition.

ONDA has recently signed two agreements to cater for ground-handling services for business aviation and to manage exhibitions. The deals are with Jetex for Mohammed V, Marrakech, Rabat, Agadir and Dakhla airports, and with Swissport for Mohammed V, Rabat, Marrakech and Tangier airports.

“These FBOs mark a new strategic step in the development of business aviation activities at Moroccan airports,” stressed El Aoufir. “They will bring a significant improvement in reception and offer tailor-made services with the best international standards.”

The total investment is more than 130 million Moroccan Dirhams (\$13.4 million).

## Strong desire

“We have a strong desire to pursue the development of this sector to become a regional and continental business hub”, added El Aoufir.

ONDA wishes to make business aviation in Morocco a safe, efficient, profitable and an economically viable activity, he said.

Morocco registered an air traffic record in 2016 with its airports welcoming 18.2 million passengers. All traffic components have shown positive figures: up 3.58% for passenger traffic, 1.16% for aircraft movements, 6.52% for freight and 11.1% for over-flight traffic.

ONDA also recorded double-digit growth for Rabat-Salé (up 23.69%), Laayoune (19.95%) and Dakhla (20.96%) airports.



Flights from Europe account for 68.87% of passenger traffic; domestic flights 10.52%; the Middle East and the Far East 7.60%; and Africa 7.08%.

The Mohamed V international airport in Casablanca captures 47.25% of the traffic, followed by Marrakech with 21.35%, Agadir 7.32% and Fez Saïss 4.90%.

Morocco needs more modern airports to take advantage of its potential and solidify its position as a commercial and aviation bridge between North Africa, Europe and the Middle East. ONDA is engaged in a strategy to sustain the development of airport infrastructure through extension works, modernisation and new construction projects, to support the increase in air traffic and the tourism strategy ‘2020 Vision’.

The new airport terminal, Menara Marrakech, inaugurated in December 2016, is a vivid example.

“This expansion brings the overall

capacity of this airport to nine million passengers per year. It will meet the growth and capacity requirements of the next decade,” said El Aoufir.

Innovations include the commercial ‘walkthrough’, a concept that will be extended to other airports with high development potential, and free WiFi. Telescopic footbridges were also deployed for the first time last July to receive long-haul flights.

Discussions are on-going on the construction of a second airport in Marrakech to accompany the dynamism of the tourist sector of the region. According to ONDA: “In the medium term, this extension will not be able to accompany the evolution of the traffic expected by the Moroccan airport master plan.”

**Zouhair Mohammed El Aoufir: “These FBOs mark a new strategic step in the development of business aviation activities at Moroccan airports.”**

## Flagship projects

The modernisation of the Mohammed V Airport remains one of ONDA’s flagship projects. The economic capital of the kingdom was the first city in North Africa to host the A380 on March 26. The flight was operated by Emirates from Dubai.

The airport’s Terminal 1 project was halted for more than four years with work resuming at the end of 2014. This situation has created severe constraints on airport operations and has limited its capacity. In its current configuration, the airport welcomed 8.6 million passengers in 2016, much more than its actual capacity of 7 million. This operation was possible due to the permanent optimisation of spaces and flows.

According to local press, “The extension of the terminal will increase the overall capacity of the airport to 14 million passengers”, recalls El Aoufir.

The new terminal will also feature state-of-the-art equipment such as





automated luggage handling systems, interactive check-in terminals, boarding bridges and safety equipment.

Terminal 2 will be extended with the construction of a new control tower for commissioning by 2021. By then the airport plans to accommodate 21 million passengers.

Morocco has also completed large-scale projects at its regional airports.

#### Increase capacity

The new airport terminal at Fez Saïss will increase its current capacity from 500,000 to 2.5 million passengers per year. With a 3,200m runway, it has a parking area that can accommodate six medium and long-haul aircraft simultaneously. Funded by ONDA and the African Development Bank, the cost of the project is estimated at \$49.25 million.

Fez Saïss Airport is served by six airlines, including Ryanair, Royal Air Maroc, Jet Air Fly, Air Arabia, Transavia and Vueling. They operate routes to about 20 European destinations. Since June 2017, new routes (to Italy, Belgium, France and the United Kingdom) are

### NAS on board in Morocco

**National Aviation Services (NAS) Kuwait has won a 10-year contract to manage commercially important people/passengers (CIP) lounges in nine Moroccan airports (Casablanca, Rabat, Marrakech, Fez, Tangier, Agadir, Oujda, Dakhla and Laayoune). NAS will operate under 'Pearl Lounges' brand.**

**NAS is prepared to invest in developing these airports and enhancing related aviation services. This includes cargo warehouses, passenger terminals, lounges, fixed-base operators, etc. It is also committed to hire, train and develop local talent to create new job opportunities and build capacity.**

**"Our operations in Morocco will not only make travel easier and more comfortable for passengers but will also help position the quality of passenger services at Moroccan airports with the best in the world," said a NAS spokesperson.**

operated by the Moroccan subsidiary of Air Arabia. Ryanair has also scheduled new destinations (Bremen, Munich and Seville) for winter 2017.

ONDA is also looking into freight development. Airfreight has been increasing steadily since 2013 and recorded 68,698 tonnes last year,

A multi-party agreement was engineered in May 2016 to develop air freight centres for airlines and operators requiring access to the runway. Other

projects include warehouses, freight forwarders, logistics operators and general services.

Four airports (Casablanca, Rabat, Tangier and Agadir) were identified for an investment of 865 million MAD (\$9 million).

Faced with the increasing threats to the safety and security of airports, ONDA has invested heavily in human resources and equipment. The aim is to ensure the protection of civil aviation in all the country's airports.

#### Efficient equipment

These investments include the acquisition of high-quality and efficient equipment, the strengthening of video surveillance and access control systems, the installation of anti-intrusion systems at airport fences, and emergency management.

Morocco wants to inject dynamism in its economy and become a gateway to other markets by investing in airport infrastructure. "We must think and plan now to meet demands in 2030/35," said El Aoufir.

**Above:  
Futuristic design  
and innovation is the  
hallmark of the new  
terminal at Menara.**

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**Alexander Manakos:**  
 "Connectivity would be enhanced if passengers could connect from one flight to another in the same airport."

# IRAN'S MASTER PLAN

*Iran has expressed interest in the continued development of its airports, particularly in the capital, Tehran. Keith Mwanalushi discusses the importance of this initiative with an expert from Lufthansa Consulting.*

It's been widely reported over the last year that Iran's civil aviation organisation has called for private sector partnerships in aviation-related projects in the country.

A number of memorandums of understanding (MoUs) have been signed with various international organisations to attract more investors to develop the country's network – airports in particular.

Local sources say at least 27 existing airports will be undergoing rehabilitation and refurbishment that should go a long way in reigniting Iran's aviation industry following the lifting of international sanctions last year.

MoUs include those announced for interest in the construction of a new passenger terminal at Mehrabad International Airport (THR) and the renovation of the terminal building at Imam Khomeini International Airport

(IKA) – the two major commercial airports serving Tehran and the busiest international air passenger gateways to Iran.

Tehran-Mehrabad has historically been the capital's primary gateway. However, that title now firmly rests with Imam Khomeini as the main international airport.

**Increase capacity**

IKA, about 35km southwest of the Iranian capital, currently has capacity for around 6.5 million passengers per year. The airport's new terminal, reportedly due to be built in five years, will increase that capacity to 20 million.

Iran Airports Company (IAC) recently announced that the airport development projects, worth \$2 billion, are planned for five airports in the cities of Tehran, Shiraz, Mashhad, Isfahan and Ahwaz.

Alexander Manakos, partner and head of market - Middle East at Lufthansa Consulting believes that, in light of the long-term plans to establish a central hub for passengers and cargo in Iran, the renovation and expansion of airport infrastructure is of great relevance, particularly taking into account the existing hubs in the region.

"However, the airport infrastructure is only one aspect," he pointed out. "The key to success will be to establish a framework and infrastructure at existing airports that attract business, like the airport city that is planned to be developed at Imam Khomeini International Airport."

Furthermore, Manakos indicated that future infrastructure needed to allow for a smart integration of different modes of transport for the development of the

CONTINUED FROM PAGE 81

cargo business. “With the specific situation of Tehran, it might be worth looking deeper into connectivity, which obviously is not ideal with the two airports. The development of a rail link between the city of Tehran and Imam Khomeini Airport is one step to improve this situation. However, in the longer term, connectivity would be enhanced if passengers could connect from one flight to another in the same airport.”

Last year, several MoUs were signed for proposed expansion works. But it remains unclear how far these ‘understandings’ have gone towards actual confirmed contracts.

In January 2016, the Iranian Ministry of Roads and Urban Development, the Iran Airports Company, and VINCI Airports of Italy, signed a MoU for the concession for Mashhad and Isfahan airports, with plans to renovate, extend and operate both facilities.

The airport in Mashhad, which recorded 8.2 million passengers in 2014, is located in the northeast of the country and serves the country’s second largest city – a holy place that attracts more than 20 million pilgrims every year.

### Iran’s third largest city

Isfahan Airport, with 2.6 million passengers in 2014, serves Iran’s third largest city, the capital of the Persian Empire in the 16th and 17th centuries, which is renowned for its rich cultural and historic heritage.

During the same month, another MoU was signed between the Iranian authorities and Aéroports de Paris, within its consortium, to develop IKA. The plan was for the renovation of the existing terminal and also the design, construction and operation of new terminals. The project should have brought the capacity of that airport up to 34 million passengers by 2020, a huge uplift on the current capacity of 6.5 million.

However, sources in Paris have revealed that, while the French company is still prepared to assist the Iranian authorities, the MoU has since been cancelled in favour of launching a public tender for the airport concession – and the process is reportedly on-going.

Iran has a large number of airports of different sizes and in various conditions.

Manakos feels that, from the perspective of growth of the civil aviation sector and the positive socio-economic impacts, the key to success will be to look at the bigger picture and make sure that development measures are effective for the country as a whole.

“This means not only including the large, profitable airports but also ensuring that airport infrastructure will complement and interlink with the development of other modes of transport,” he said.

Another aspect is that airports can offer great potential for private sector investments. “Countries like Iran provide huge opportunities from the perspective of both the private sector and the government. Bearing in mind that access to the market was limited for quite some time, there is obviously a backlog for airport infrastructure investment, which could trigger additional growth,” he said.

However, after the enthusiasm that was visible about a year ago among many foreign companies, things seem to be getting back to a more realistic level. “Foreign companies and their Iranian counterparts are now looking into the long-term perspective,” Manakos observed.

Of course, there are manifold challenges with the Iranian market, as with other parts of the world. “A key challenge that we see in the current environment is the geopolitical stability,”

stability and geopolitical developments in the region might be the greatest challenges presently.

Despite the difficulties, the good news is that, post sanctions, it seems there is the political will to unveil the investment potential of Iranian airports to global investors and to gain their confidence.

According to Airbus, Iran is forecast to require some 400 to 500 new aircraft to modernise as well as to grow its existing passenger fleet to catch up with years of pent up demand on domestic, as well as international, routes.

Just months after sanctions were lifted, flag-carrier Iran Air and Airbus signed a firm contract for 100 aircraft – covering the narrow and wide-body product lines. The agreement was subject to US Government Office of Foreign Assets Control (OFAC) export licences, which were granted in September and November 2016. These licences are required for products containing 10% or more US technology content.

Airbus coordinated closely with regulators in the EU, US and elsewhere to ensure understanding and full compliance with the joint comprehensive

**“Countries like Iran provide huge opportunities from the perspective of both the private sector and the government.”**

**ALEXANDER MANAKOS**



observed Manakos, pointing to the current period of instability in the Middle East region. When discussing terminal construction, airport expansion and development of related infrastructure, he emphasised the importance of substantial long-term investments. “When private investors become involved, they will take a very close look at the levels of stability that they expect for their investment. This will certainly affect financing and risk premium as well as contractual exit and termination clauses.”

The situation in the region might not directly influence the situation in a country, but it might have a strong effect on the neighbouring markets, which are also key for the development and growth of air traffic and logistics in the country.

The expectations for long-term

plan of action (JCPOA).

In January this year, Iran Air took delivery of its first new aircraft, an A321, in a handover ceremony in Toulouse (France).

By March, the carrier welcomed its first wide-body from that order – an A330-200 – to coincide with the airline’s 56th anniversary.

Meanwhile, Lufthansa Consulting will be on hand to provide its portfolio of consulting services for airports in the Iranian market. “Although our brand is rooted in the airline industry, we are a consultancy that serves a wide range of clients in the aviation industry. We support airport clients with our international expertise in infrastructure, commercial and operations,” Manakos summed up.



# THE EVOLUTION OF IKA

*As Tehran's Imam Khomeini Airport (IKA) continues to grow as the main hub for the Iranian capital, **Mohammad Razazzan** looks at the development of the project.*

**I**mam Khomeini International airport is the largest in Iran – built over an area of 13,500 hectares and located 35km southwest of Tehran.

It currently has a capacity of 6.5 million passengers per year plus 120,000 tonnes of cargo. It is connected to the Tehran-Qom motorway via an airport access road.

The development of the airport began during the seventies, when the Imperial Government of Iran, in agreement with its western partners, decided to build a new international facility to make the city the main hub connecting Asia to western Europe and North America.

The government allocated a \$1 billion budget for the construction of the airport, which had an initial name of Ariamehr.

TAMS-AFFA, a joint venture between US design consortium TAMS and Aziz FarmanFarmaian and Associates, was

formed to design and supervise the construction of the airport. The original two-runway design was based on Dallas Love Field.

The process was stopped during the Iranian revolution and later cancelled. However, the Government of Iran subsequently decided to design and build the airport “using local know-how”.

To do so, the authorities selected French firm ADP “to head the local designers and engineering firms”. Kayson, a local general contractor, performed the process under a turnkey design-and-build infrastructure delivery model.

However, after two years, the contract “was abandoned and was awarded to a Bonyad (an Iranian charitable trust), with public cartel the Mostazafan & Janbazan (M&J) Foundation) taking over.

Once the construction of the terminal was achieved, the Iranian Civil Aviation

Organization decided to transfer the management of the operation, as well as the construction of the second terminal, to the Tepe-Akfen-Vie (TAV) consortium. This consisted of two Turkish companies (Tepe and Akfen) and an Austrian firm (Vie).

However, due to technical issues, the opening day was postponed to May 8 2004. Then, just prior to the opening, two local airlines refused to switch to the new airport.

At that time, Ali Abedzadeh, director of semi-privately owned Iran Aseman Airlines (now director of Iran Civil Aviation – CAO), said: “We are not flying from an airport run by foreigners.”

As a result, TAV officials were ordered to withdraw their personnel and equipment from the airport on May 7 2004 and Iran Air assumed the operation of the facility.

Although the airport was

**Above: An airport city is planned for Tehran IKA.**

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now managed by Iran Air, a few hours after its opening on May 8, the Revolutionary Guards of the Iranian Armed Forces closed it, citing security fears over the use of foreigners in the running of the facility.

Only one Emirates flight from Dubai was allowed to land. The second flight from Dubai, which was an Iran Air flight, was forced to land in Isfahan International Airport.

It took few days for the authorities to clarify this confused situation. However, finally on May 13, the airport was reopened. The deputy head of Iran's Joint Chiefs of Staff, Brigadier General Alireza Afshar, stated: "Because foreign companies will no longer be in charge of the airport's operation, security obstacles are removed."

In April 2005, the \$350 million Imam Khomeini International Airport was reopened under the management of a consortium of four local airlines – Mahan Air, Aseman, Caspian Airlines and Kish Air – although no formal contract appeared to have been awarded.

Later, management of the airport was transferred to the Iran Airports Company, which, on behalf of Iranian Ministry of Roads and Transportation, is in charge of operating all civil and governmental Iranian airports, except some belonging to special organisations like the Oil Ministry or armed forces.

**Warnings to travellers**

In 2005, Britain and Canada issued warnings to travellers to avoid using the Imam Khomeini International Airport due to concerns the runway may be unsafe. Iranian transport officials rejected the travel advisories and said the airport and runway had been inspected and approved by the International Civil Aviation Organization (ICAO).

On October 26 2007, it was announced that, as of midnight two days later, all international flights, except those bound to and from Damascus, Jeddah and Medina, were transferred to IKA, and it became Tehran's primary international airport.

In 2016, as a result of worsening ties between Saudi Arabia and Iran, all Hajj flights from Iran were terminated, rendering IKA the only international gateway to Tehran.

Three years earlier, the airport had handled 4,756 million passengers, a 20% increase over 2012. This made it the 11th busiest airport by international passenger traffic in the Middle East. The airport also handled 98,904 tonnes of cargo in 2013.

The total number of commercial



aircraft movements was 36,827 in 2013. In 2015 IKA handled 6.525 million passengers.

Subsequent to the lifting of nuclear-related sanctions in mid-January 2016, Air France became the first European carrier to resume flights to the Iranian capital, after having suspended them in 2008.

On April 17 2016, Air Asia became the first Southeast Asian airline to resume Tehran services by offering direct flights from the Malaysian and Thai capitals. It had originally suspended them in 2012.

On June 21 2016, Central Asian airlines, including Uzbekistan Airways and Air Astana, also started flights to IKA.

**Ramped up frequency**

Various other airlines, including British Airways, KLM, China Southern Airlines, Lufthansa and Thai Airways, have either resumed or ramped up frequency of their flights to Tehran.

IKA's first active (and as of July 2016, its only operational) terminal is expected to handle more than eight million passengers this year.

A second terminal, called the Salam Terminal, is currently under construction, with a capacity of five million passengers per year. It was meant to be opened in June 2016, but financing issues led to this being delayed until May 2017. While originally intended as a dedicated pilgrimage terminal, according to Iran's Minister of Roads and

**IKA's first active terminal is expected to handle more than eight million passengers this year. A second terminal, called the Salam Terminal, is currently under construction, with a capacity of five million passengers per year. The third terminal – the Iranshahr Terminal – is set to open in two-to-three years.**

Transportation, Abbas Akhondi, it will be open to all varieties of flights.

The third terminal – the Iranshahr Terminal – is set to open in two-to-three years. It is currently in its planning phase, with the development contract awarded to the Dutch engineering firm Netherlands Airport Consultants (NACO), a subsidiary of Royal Haskoning DHV.

It will have an expected capacity of 20 million passengers per year, bringing the airport's total passenger capacity to 30 million. Once the new terminal is opened, the current Terminal 1 will be used for domestic flights only.

**Instrument landing system**

There are currently two runways at IKA, of which only one is operational. This has been equipped with a category II instrument landing system (ILS) since August 2009.

A second ILS system was purchased seven years ago to serve the other runway but the selling firm refused to set it up due to sanctions against Iran. The ILS was installed by Iranian technicians but malfunctioned and was indefinitely switched off.

A third runway, positioned to the south of the existing runways and passenger terminal, is in the final stages of construction.

In October 2015, French corporation, AccorHotels, opened its Novotel and Ibis-branded hotels on the airport premises, marking the entry of the first international hotel chain into the Iranian market since the 1979 revolution. The two hotels are connected to the main passenger terminal by a skybridge passing through the currently unfinished airport metro station.



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## SHOW FINDS THE PERFECT RECIPE

*Organisers of this year's Airport Show in Dubai predictably dubbed it the biggest yet – but, as **Barbara Saunders** reports, this time they got it right with co-located events taking the profile of the 17th annual exhibition to a new level.*

**M**ore than 300 exhibitors from 50 countries packed the core show, which was as high-tech as you could get and bore a striking resemblance in part to the GITEX technology extravaganza that fills the same venue – the Dubai World Trade Centre – every October.

The show was a launch pad for what many claimed were 'world firsts', as suppliers focused on an industry now more than ever at the cutting-edge of transformation.

Technology was ever-present with everything from contactless energy and data distribution, termed as the smart future of airfield lighting, to airport-oriented ICT solutions, including aviation cloud, visualised airport operation and panoramic video surveillance solutions and intelligent baggage-handling.

Oman Airport Management Company (OAMC) introduced the world's first virtual reality applications, while Nucotech rolled out a global breakthrough 3D scanner.

The real story behind the show's expansion, though, lies in co-located events. This year there were three, including the World Travel Catering and Onboard Services Expo Middle East

(WTCEME), the second general assembly of the regional chapter of Women in Aviation, and the CAPA Centre for Aviation global airport leaders' forum.

The fourth edition of WTCEME featured more than 70 exhibitors from over 30 countries selling a range of food, snacks, drinks, food packaging, processing, preparation and preservation equipment, tableware and chinaware and all things aimed at making the airport and airline in-flight catering experience better, faster, more cost-effective and quality and health focused.

At times the show bears a striking resemblance to a culinary competition, with chefs busy cooking up the latest fare using innovative touches worthy of an executive cook-off.

If anyone were in any doubt about the determination of women to make themselves felt on the Middle East aviation scene, attendance at the second general assembly of the regional chapter of Women in Aviation, co-located at the Airport Show, would have eased their misgivings.

With a region-wide audience of

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**Women in the Middle East have their eyes firmly fixed on an industry and a geographic area that is expected to provide approximately 750,000 jobs and require more than 55,000 pilots and 62,000 technicians by 2020.**

#### CONTINUED FROM PAGE 87

more than 250 – up from just 50 a year ago – and a slew of sponsors showing a three-fold increase in support, the reality is women in the Middle East have their eyes firmly fixed on an industry and a geographic area that is expected to provide approximately 750,000 jobs and require more than 55,000 pilots and 62,000 technicians by 2020.

“This region offers excellent career opportunities in aviation industries,” said Mervat Sultan, president, Women in Aviation, Middle East Chapter. “It empowers women in highly skilled roles across the sector, which is a major initiative of regional governments and an important element of their economic diversification strategy.”

#### Signs positive

Sultan said all the signs were positive. Since the chapter was launched four years ago, it has grown to a membership base of more than 500. “So far, membership has been free but we will soon be introducing a small fee to cover administration costs,” she said.

At the second general assembly the audience, many of them young graduates in a range of aviation disciplines, were looking for inspiration. They found it through several role models, among them Captain Hanadi Hindi, the first female commercial pilot from the Kingdom of Saudi Arabia.

Hindi, who qualified four years ago being type rated on the Hawker 800, had a three-pronged strategy for achieving in the sector – patience, dedication and commitment.

“You have to have a plan and a timeline and be optimistic,” the Mecca resident told the audience. “And there are things to be optimistic about. Let’s face it, things are changing and it’s a

lot better now than it was 10 years ago. Back then it was really hard for us to even enter the aviation field.”

Patience is something Hindi knows a lot about, as she’s currently job hunting for that elusive role within a country where women are, as yet, not allowed to drive a car, let alone pilot an aircraft.

“I have been offered roles with organisations in other Gulf countries but I’m not leaving Saudi Arabia. I want to serve my country and I am optimistic. Things are moving. My attendance at the assembly, for instance, was sponsored this year by Sky Prime Aviation Services, which is a Saudi company.

“I am very optimistic because of Saudi Arabia’s Vision 2030, the blueprint for the kingdom’s future, which gives hope for women in aviation and for female Saudi pilots.”

Another Gulf mentor – this time an Emirati – pulled no punches in her belief that young Middle Eastern female graduates aspiring to the industry had to be realistic and determined.

Engineer Suaad Al Shamsi, who was the first female UAE aircraft engineer when she worked for Emirates Airline and is now consulting on major aviation projects in the country, said her own path to success was hard won.

“I had to undergo three psychometric tests, two exams and three interviews to see if I was considered suitable as an aircraft engineer,” said Al Shamsi, who is a member of the board of directors, Women Aviation International, Middle East Chapter.

All speakers agreed the winds of change are blowing across the regional landscape.

Victoria Redshaw, vice president talent, assessment & development at Dubai Airports, who has spent a year putting a dedicated team together to drive her function, said the

development of women would be given particular attention.

“We will shortly start to roll out our development campaign and we will offer development programmes specifically for women, with a special emphasis on Emiratisation,” she said. Redshaw said the landscape was flush with opportunity. “Emirati females currently outperform their male counterparts academically, so the potential in this country is huge. But, we do need to do more.”

And the evidence of change is there for all to see, according to Roula Droubi, director Middle East industry and community engagement for Boeing. She said that of the 99 students from the MENA region that her company sponsored for internships in Seattle last year, 61% were female, which compared to a worldwide average of 47%.

#### Words of caution

Both Al Shamsi and Hindi sounded words of caution to the audience that success in the field could come at the cost of personal sacrifice.

But, despite any hurdles, women can succeed in the region’s aviation landscape, according to the irrepressible Hindi. “Aviation is a vocation. If you don’t have a passion about it, you will falter in the middle of the road. If you have that passion, then anything is possible. Before I started my training, I was told I would not have a chance. Now I’m qualified and just waiting for the call. We all have to try to make it for the next generation!”

The CAPA global airport leaders’ forum, hosted for the first time by the Airport Show, drew a significant and high-profile crowd.

Delegates from 27 countries, from South America to South Africa, Canada to Australia, were all highly focused on identifying strategies to overcome challenges and seize the moment in the industry’s most transformative era.



**Airport Show 2017 was a resounding success with more than 7,200 aviation decision-makers, international experts, and professionals attending the show.**

Despite the pockets of turbulence that have beset the airline industry, delegates heard that, with low fuel prices and low interest rates, the airport sector was operating in a fairly benign environment, albeit one tinged with a certain degree of uncertainty.

The UAE's General Civil Aviation Authority (GCAA) deputy director, General Omar Bin Ghalib, set the scene when he said the outlook for aviation in the Emirates up to 2025 could be summed up in two words – positive and challenging.

He also outlined the GCCA's plans to take the country to the number one slot in the air transport infrastructure rankings of the World Economic Forum's global competitiveness index by 2021 – the Emirates is currently in second place.

The goal, said Bin Ghalib, was a highly focused one and a commitment in the country's national agenda – and there, he appeared to hit the entire nail on the head for the industry worldwide. Airports, delegates heard repeatedly, were no longer just infrastructure, but now key business assets in a country's, or a destination's, growth strategies.

Two people, in particular, hammered home the link between gross domestic product (GDP) growth – national or regional – and airports. The TAV Group's CEO, Sami Sener, said airports are a nation's or a region's first and last impressions. "Airports are the showrooms of your country. They speak to your capabilities in infrastructure, operations and financing," he said. Turkey's full-on transformation and privatisation of Ataturk Airport, although benefiting from the simultaneous rise of the national airline, was a case in point, going from handling just 10 million passengers in 2000 to 60 million last year. "Turkey would have lost \$4 trillion in GDP by 2025 if it failed to address its airports' competitiveness."

Paul Griffiths, CEO of Dubai Airports, said

GDP and passenger growth were inextricably linked. "We have to think forward and we have to think big because of that inextricable link," he said. And thinking big, Dubai has a plan out to 2050 to handle 146 million passengers.

By 2030, said Griffiths, the airport industry will account for 45% of the emirate's GDP and 35% of its total employment.

But the over-riding message was that, in ensuring airports live up to their GDP growth potential, they had to change and become massively customer-centric. "We have to consider now things that we didn't before – technology, urbanisation, economic balance of power, which is radically shifting, and resource scarcity," said Griffiths.

**Computing power**

The Dubai Airports CEO believes computing power holds the key. "If you can double the throughput, you double the capacity. We must be the only industry that wants to lessen the time we engage with the customer. The idea of getting rid of queues is something for airports around the world to concentrate on."

That's something Griffiths knows about, having reduced passenger wait times at Dubai International by as much as 10% during the first quarter of this year thanks to new technologies at the world's busiest airport for international passenger traffic.

In the first quarter this year, 84% of transfer passengers were processed within five minutes, 68% of arrival passengers were processed within 15 minutes, and 87% of departing passengers were processed within 10 minutes.

The introduction of the automated immigration smart gates is said to have pushed transaction times down to an average of 10 to 15 seconds per passenger.

Both Griffiths and Christina Cassotis, CEO of Pittsburgh International Airport, who led its turnaround after it lost huge throughput with the de-hubbing by US Airways, said to progress the industry had to look for lessons from other sectors, in particular retail, hospitality and technology.

Cassotis said her turnaround had come about through linking closely with the community. Pittsburgh, she said, now has a "robust, two-way dialogue with airlines" and was working with Carnegie University on airport innovation. "We have become an airport innovation lab. We want to know what the coming technology is and to pilot it at our airport to be in on the ground floor of rapid development. We inspire regional growth and prosperity, otherwise we would be a drag on the community and a drag on growth."

The good news for all attendees is that, despite a soft global economy, finance for airport development appears buoyant. For Sener, the way forward is private-public partnerships (PPP).

"Governments benefit from PPPs because they reduce project development risk and create new revenue streams," said the man who has led PPP projects in six countries, including for Medina Airport in Saudi Arabia – the first PPP airport project in the Gulf.

**Growth cycle**

Steven Fitzgerald, head of asset management of HTL Morrison, the specialist investment company for infrastructure assets, said the alignment with the GDP growth cycle was vital to secure a share of the "plentiful finance around to build capability". He counselled: "One of the things that airports need to continue to emphasise is that they are aligned to their communities and their country in as much as they are aligned for growth."

But Fitzgerald cautioned lenders would also look for more openness. "We want to ensure that capacity is not tied up with particular airline groups, otherwise there will be blockages to growth – most countries have now got their heads around that and are starting to open up access. You have to look five years ahead."

Advice abounded throughout the forum: put the customer at the heart of the experience; embrace technology; look to other sectors for clues; align with national and regional agendas and the local community and look for private sector finance.

Yet, despite challenges posed by shifts of travel power from west to east, soft airline operating conditions and economic uncertainty, the industry, said OAMC CEO, Sheikh Aimen Sultan Al-Hosni, was holding its own, and would continue to display resilience.

"You are working in the right sector. The aviation industry is really promising and the airlines have benefitted from low oil prices with the industry overall delivering profits four years in a row. If you were working in the oil and gas business, you might be looking for a job right now."

*The biennial International Defence Industry Fair (IDEF) took place in Istanbul from May 9-12. Unprecedented security was the story of the show's first day due to the presence of Turkish Prime Minister, Binali Yildirim. Despite at one stage having his camera confiscated, Alan Warnes reports in both words and pictures.*

# R-R deal takes Turkey closer to fighter dream

IDEF 17 provided us with a chance to gauge the progress of Turkey's domestic aerospace defence industry – and we weren't disappointed.

Hall 12 was the magnet – with Aselsan, Havelsan, Roketsan and Turkish Aerospace Industries (TAI) taking up the bulk of the space.

Other notables were Tubitak SAGE, Bayraktar and Vestel, while the pick of the foreigners included BAE Systems and Pakistan Aeronautical Complex (PAC).

Rolls-Royce was also present with its new Turkish joint venture partner, Kale Group.

On the eve of the exhibition they announced that they would bid together to develop the national engine for Turkey's new indigenous fighter, TF-X. Turkey's aspirations to design and build an indigenous fighter, TF-X, came a step closer at IDEF.

In a ceremony at the TAI stand, Stephen Phipson, head of the UK's Defence and Security Organisation (DSO) and Dr Ismail Demir, Turkey's Undersecretary for Defence Industries (Savunma Sanayii Müstearı, SSM), signed a phase 1 agreement set to span four-years and worth more than \$100 million. It will pave the

way for future TF-X cooperation, the first of many multi-million pound contracts between British and Turkish firms over the life-time of the project.

The fifth generation twin-engine fighter is expected to make its first flight in 2023, to celebrate Turkey's 100th anniversary, and enter Turkish Air Force service in 2029.

With an urgent need to speed up the jet's preliminary design review (PDR), a decision on the jet's powerplant is expected by the end of the year. Rolls-Royce, in partnership with Kale Group, is bidding, as is Eurojet.

## Immediate requirement

Another immediate requirement is the selection of a flight control system, with Leonardo keen for a piece of the action.

BAE Systems managing director military air and information, Chris Boardman, said: "These are the most important decisions and they have to be made by the end of the year if the 2023 deadline is to be met."

TAI and BAE Systems, which was selected as the foreign collaboration company in mid-2015,

also signed an agreement on how the two companies will work together.

The Turkish Government is seeking the new fighter to replace its fleet of F-16s, with the block 30s being the first.

The F-16s will be replaced, one for one, so there will be a need for around 250 new aircraft to work alongside the F-35A Joint Strike Fighters on order by the Turkish Air Force.

In 2029, six years after first flight, deliveries of serial production aircraft will begin. It's an optimistic plan, but Boardman is confident that the deadlines can be met, based on previous experience on the likes of Mantis.

TAI chairman and CEO, Temil Kotil, was delighted by the announcement, believing that TF-X will launch the company into the big time. "We will require many engineers to carry out this contract, to work alongside BAE personnel. They will be our future and the ability to launch TAI into a new era."

Kotil said that TAI was keen to complete the PDR within three years instead of four – he appears to be a man keen to speed up TAI progress.

## Two new AAMs unveiled

The unveiling of two new air-to-air missiles, the first ever to be designed in Turkey, caused quite a stir on the first day.

It was due mostly to Turkish Prime Minister, Binali Yildirim, making his way to Tubitak SAGE (defence industry research and development institute) with the press on his heels and personal security personnel in tow.

There, he pulled back the covers to reveal the Peregrin within-visual-range (WVR) and Merlin beyond-visual-range (BVR) air-to-air missiles (AAMs). They are both expected to be among the bids to arm the indigenous needs for the TF-X programme well into the next decade.

According to Turbitak director, Erdal Cakmak, they have been under Project Goktug development since 2012. He added: "Both missiles should be integrated and test fired within the next two years."

According to one source, the Peregrin (Gokdogan) has a range of 30kms (20 miles), while the larger Merlin (Bozdogan) has around 65kms (40 miles). They may be at the design stage but Cakmak believed: "It



The two new air-to-air missiles unveiled by Turkish Prime Minister, Binali Yildirim, on the opening day. The bigger Bozdogan (Merlin) beyond-visual-range missile is on the left, while the Gokdogan (Peregrin) within-visual-range AAM is on right.

was an appropriate time to show them off."

While Tubitak SAGE has designed both AAMs, a decision on which company will be responsible for producing them has not been taken. In the recent past, when Tubitak SAGE developed the SOM stand-off missile for the F-4E and F-16 and SOM-J for the F-35, Roketsan took on the production.

The government-backed institute claims the Peregrin will have a high-resolution dual-colour imaging infrared seeker, with a comprehensive off-boresight capability, along with advanced counter-measures. The Merlin has a solid-state radio frequency seeker built by Aselsan, with an advanced counter-measure capability and datalink update.

The UK and Turkey signed a TF-X agreement on May 10, which could lead to 250 aircraft being delivered to the Turkish Air Force.



## Vestel UAV shows plenty of variation

Vestel Defence Industry was exhibiting its new UAV, the Karayel-SU (Silahlı Uzun – long version) – so called because of its 13-metre wingspan.

With its 120kg under-wing payload it can be armed with four weapons, with the example at IDEF fitted with two lightweight semi active 22kg smart micro munition mini Akıllı Muhimmat – Laser (MAM-L) and two 8.5kg MAM-C (Cirit) under each wing. Both have a range of 2.8kms.

There are four variants of Karayel tactical UAVs. The original system is used for surveillance with an endurance of 16 hours; the armed Karayel-S has an endurance of eight hours; the Karayel-U, with a 13-metre wingspan but only for surveillance; and the Karayel-SU. The latter has an endurance of 20 hours with an EO/IR turret – the version on show was a L3 Wescam system. With a 60kg payload it can stay up for 12 hours and with 120kgs, for eight hours.

During June 2016, the Karayel-SU fired live munitions during a demonstration to the Turkish land forces but a Vestel spokesman claimed that there had been no conclusion to those trials.



The larger Karayel-SU is the next UAV to come from Vestel. It has a larger wingspan and can carry more munitions.



A full-scale mock-up of the Hurkus C on display at the TAI Stand.

## Endurance seals Hurkus C agreement

TAI signed an agreement with Turkey's SSM at IDEF to launch the armed Hurkus development and serial production project.

The Turkish Army Aviation has a requirement for 24 armed Hurkus Cs, with 12 of them being on option. The Jandarma also has a requirement for a further six, with six on option.

A full-scale mock-up of a Hurkus C (combat) light attack/armed reconnaissance aircraft could be found at the TAI stand.

Unlike the trainer Hurkus A and B models, these will be armed with the Laser-UMTAS long-range anti-tank missile and Cirit 2.75 inch rockets, but will progress to bigger weapons like the Teber 81 (Mk 82 bomb fitted with a Mubitak SAGE HGK-3 laser guidance kit), Teber 82 (Mk

81 bomb fitted with HGK-5 laser guidance kit) and machine gun.

According to Ozcan Oertem, TAI's aircraft group vice president: "The advantage for the army is that the Hurkus C will utilise the same weapons as the T-129 ATK helicopter. It can stay airborne for four hours – an endurance you can't find on a helicopter. The army is considering them for its combat air patrols and fast response team and that's why there will be an EO/IR turret underneath."

TAI has converted one of the Hurkus A development aircraft into the C prototype – the main difference between the two is a self-protection system, an Aselsan cockpit and the ability to fire weapons.

## Armed Bayraktar UAVs pack a punch

The Bayraktar tactical unmanned aircraft system (UAS) is probably the most successful indigenous UAS built in Turkey.

After political issues over the acquisition of 101 Al Herons in 2009, Turkey embarked on development of the Bayraktar for the domestic market.

Having earlier produced the prototype tactical block 1 (TB-1) in 2005, the company opted to develop a TB-2 variant for the army.

The platform has recorded 15,000 hours since being introduced into service in September 2015. The first 12 were delivered in two batches – six by November 2014 and another six by June 2015. Initially they were used for the intelligence, surveillance and reconnaissance (ISR) role with the army, which started testing an armed version in December 2015, with first firing in June 2016.

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

With weight being a critical factor, Roketsan has designed the mini smart munition (MAM) with the



The Bayraktar tactical UAS has been used against Daesh in Syria.

laser version (MAM-L) on display underneath the UAS. Bayraktar added: "The UAS is currently fitted with two pylons, but an additional two pylons will be added this summer. It does reduce the duration – without weapons it can fly 24 hours and with a full weapons payload for 14 hours. But that's still a lot!"

The Bayraktar UAS has been used in Syria against

## Turkey's Super Mushshaks

After nearly a year of discussions, the Pakistan Aeronautical Complex (PAC) Kamra and the Turkish Air Force finally sealed a deal for 52 Super Mushshaks at IDEF. The PAC chairman, Air Marshal Arshad Malik, signed the contract with Dr Ismail Demir, Turkey's Undersecretary for Defence Industries, after the 260hp trainer was selected in August 2016.

All the aircraft will replace the Turkish Air Force's fleet of SF260s and Cessna T-41s for student pilot/undergraduate training. They will be fitted with the Garmin 950 avionics in the cockpit. The first pair will be supplied within nine months, according to the PAC chairman. The remaining 50 aircraft will follow within three years.

It is unclear as to where the aircraft will be produced; some believe it would be easier for them to be produced in Pakistan, whereas the government is keen to carry out the work in Turkey.

## TAI unveils utility helicopter

TAI showed off its brand new indigenous utility helicopter for the first time. The T625 designation is derived from the six tonne weight of the helicopter, two engines and five rotor blades.

The full-scale mock-up, fitted with elements of the real helicopter, is expected to make its first flight on September 6, 2018. There will be two more prototypes that will follow in six-month intervals, according to executive vice president, Metin Sancar. Each will be used to speed up the certification of the helicopter.

"In the military market, the Turkish Army and Turkish Air Force has an ageing fleet of UH-1Hs, while the Turkish Police have also shown interest," said Sancar.

The military derivatives will cover the utility role as well as search and rescue, which will include a hoist being attached.

The helicopter should be completed by the end of the year and ground-testing is expected in early 2018. Turkish certification is being targeted by the end of 2020 and European Aviation Safety Agency (EASA) certification afterwards.



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*The aerospace industry came together in June for the 52nd Paris International Airshow. With temperatures on the Le Bourget tarmac hotter than the Gulf, exhibitors and visitors were seeking respite in the shadows. But, rated as one of the best shows in recent years, Alan Peaford ventured into the sunshine to share highlights of the world's biggest industry event.*

# Baby boomer opens the way for supersonic again

**B**oom Supersonic used the Paris show to unveil the completed design of the XB-1 supersonic demonstrator, the subscale prototype of the proposed Boom supersonic passenger airliner.

When it flies next year, the XB-1 will be the world's fastest civil aircraft, and it will demonstrate in flight the key technologies for mainstream supersonic travel.

Blake Scholl, founder and CEO of Boom Supersonic, said the dream of delivering a supersonic aircraft that would be affordable was coming closer.

"We now have everything required to build history's first independently developed supersonic aircraft – the funding, technical design, and manufacturing partners," he said

## Refined and optimised

The XB-1 design has been refined and optimised since it was unveiled last year. The completed design has passed a major external review, verifying that it meets performance and safety standards ahead of component manufacturing and assembly.

Among the major changes, the XB-1 now has a third inlet located in the tail. This new inlet design provides greater propulsion system stability, improving aircraft performance and safety.

In addition, the XB-1 wing design has evolved with the vertical tail modified to improve performance in crosswind conditions.

The XB-1 demonstrator will fly with General Electric engines, Honeywell Avionics, Tencate carbon fibre prepreg, and 3D-printed components from Stratasys. Final assembly and



Blake Scholl reigniting the supersonic dream.

vehicle integration are taking place in Boom's facility at Centennial Airport, near Denver, Colorado.

The aircraft, which is in its core design, will carry a maximum of 55 passengers in business class seating and also now has an option for 30 first-class seats and 15 business class.

"You don't need lie-flat seats for three-hour flights across the Atlantic," said Scholl. "But we are planning to fly San Francisco to Sydney, which halves the current flight time to seven hours. We also think that there may be demand for the first-class option from the Gulf airlines."

Boom now has 76 orders from five airlines, although only Virgin Atlantic has been named.

"The new aircraft reservations are backed by tens of millions in non-refundable payments," Scholl said. "Airlines are excited for something new and different to offer their passengers and we're thrilled that major world airlines share our vision for a future of faster, more accessible supersonic travel."

First flight of the XB-1 demonstrator is planned for late 2018. Subsonic flight-testing will be conducted near Denver; supersonic test flights will take place near Edwards Air Force Base in Southern California.

Scholl is hoping for certification by 2022 with entry into service of the first passenger-carrying aircraft the following year.



## Debutant P-1 a boost for Japan

The Kawasaki P-1 maritime patrol aircraft made its Paris debut as it set out its stall for upgrade opportunities for the four-engine type.

In Japan, the aircraft will replace the venerable Lockheed Martin P-3C Orion and potentially could replace aging P-3Cs globally.

About 90% of the aircraft and its systems are Japanese-produced.

The aircraft features four IHI Corporation F7 engines with a bypass ratio of 8:1. This, along with the P-1's large wing area, aids performance at low altitudes.



Lockheed Martin's F-35 rocked the show with a stunning display.



## F-35 steals the show

Undoubtedly the star of this year's Paris show was the Lockheed Martin F-35. The fighter made a real display step-change, performing a high-g F-22-style display with a Lockheed test pilot at the controls. Pilot Billy Flynn said the new jet is more manoeuvrable than any

he had flown before. "We are crushing years of misinformation about what this aircraft is capable of," he said.

No stealth aircraft has visited the Paris show since the Northrop B-2 Spirit in 1995.



## New look for CleanSky Airbus helicopter

Airbus Helicopters unveiled a radical change in the configuration of its new high-speed compound rotorcraft, which is being developed as part of the European Clean-Sky 2 initiative.

Tomasz Kryszinski, Airbus Helicopters head of research and technology, said the box-wing design with pusher propellers offered performance and safety improvements over the wing-stubs Airbus Helicopters used on its X3 demonstrator programme.

The up-and-over configuration gives more lift and allows the wing surface to be doubled without a

related increase in the area exposed to the rotor downwash, preserving low-speed hover performance.

With the rear-facing propellers pushed further back, passengers are given a safe and unobstructed access to the cabin.

Kryszinski is confident that the Racer will be able to fly at about 180-190kt (333-351km/h) with one engine idled, at what he calls "ecospeed".

The fuel consumption in this configuration is much lower than in an equivalent conventional helicopter flying at 140kt.

## Qatar a lone voice in Middle East orders

The Middle Eastern carriers were unusually quiet at the Paris show, although Qatar Airways firmed up its order for 20 737 Max 8s, which was first announced last October, along with 40 options and purchase rights.

"We will take three or four from June next year. The first Maxes will be delivered in small numbers will replace older A320s that are going out of service from our mainline fleet," said CEO Akbar Al Baker.

He added that he was close to finalising the acquisition of a "very limited number" of Airbus A321neos, powered by the Leap-1A engine.

Meanwhile, Al Baker said he now expects Qatar's first A350-1000 to be delivered in December this year. It had previously been due to arrive during the summer.

## M-346 FA shows its bite

The wraps were taken off of an advanced version of Leonardo's M-346 at the show, with the fighter attack (FA) standard capable of performing combat duties and serving in an aggressor role.

On display at the static, the M-346FA showed its capacity to carry an array of air-to-air and air-to-surface missiles and precision-guided bombs. Its maximum weapons load will be more than 2t spread across seven stations.

## EVENTS



### Flight recorder revolution

Airbus is entering a partnership to develop a deployable flight recorder that will be initially introduced on the A350 from 2019.

The automatic deployable flight recorder will be a combined voice and data device, and is being developed in cooperation with L3 Technologies and Leonardo's DRS Technologies Canada arm.

It will be aimed primarily at transoceanic aircraft – the long-haul A350, A380 and A330 as well as the long-range A321LR.

The lightweight device will not need to directly capture information but, instead, will receive and store, in a memory module, an onward transmission of cockpit-voice and flight data.

It will be mounted in the vertical fin of the A350, close to the fuselage. A housing case with a spring mechanism will be installed inside the fin structure, providing a hollow into which the deployable recorder is inserted.

Deployment of the recorder would be triggered by significant structural deformation or an impact with water.



### Winging it: The A380's plus factor

Airbus announced plans for a proposed enhanced A380 – the A380plus – and unveiled a life-size example by utilising one of the original test aircraft (MS4), which had been donated to Le Bourget Museum, and adding new giant winglets that are the key feature of the new variant.

The A380plus will include other wing refinements that allow for up to 4% fuel burn savings. Added to an optimised A380 maintenance programme and the enhanced cabin features first shown at Aircraft Interiors Expo (AIX) in April, the overall benefit is a 13% cost per seat reduction versus today's A380, the European manufacturer said.

The new winglets measure approximately 4.7 metres in height (an uplet of 3.5m, and a downlet of 1.2m) and are designed to improve aerodynamics and reduce drag.

The A380plus will have an increased maximum take-

off weight (MTOW) of 578 tonnes, providing the flexibility of carrying up to 80 more passengers over today's range (8,200nm), or flying 300nm further. The aircraft also features longer maintenance check intervals, a reduced six-year check downtime, and systems improvements, which will reduce maintenance costs and increase aircraft availability.

The A380's biggest customer, Emirates, was not so sure. The airline's president, Sir Tim Clark, was at the show and said the Dubai carrier was reluctant to place an order until there was more clarity around the future of the programme.

Clark said he was interested in retrofit options, but said that Airbus was focusing on the new-build offer.

Emirates is due to take its 100th A380 in October. "After that we have another 40, so obviously, we would be interested in anything they could do," Clark said.

### Clear sky ahead for the well-connected

Pilots will be able to avoid clear air turbulence thanks to real-time weather information, while passengers can download movies at least as quickly as they can at home, thanks to Honeywell's Connected Aircraft, which stopped off in Paris on its world tour ahead of visits to Riyadh, Doha and Dubai.

These are just two of the myriad benefits that Honeywell says the additional capacity of the Inmarsat GX Aviation Ka-band satellite network can bring to airlines.

"Connectivity is not just about passengers," said Carl Esposito, president of Honeywell's electronic solutions business. "The Connected Aircraft can take data from all over the aircraft, from nose to tail, and help airlines work more efficiently with savings on fuel and maintenance."



Inmarsat's Frederik van Essen, senior vice-president strategy and business development, and Honeywell's Kristin Slyker, vice-president connected aircraft; Nate Turner, manager flight services; and Carl Esposito, president, electronic solutions.

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The prototype An132D was making its international debut at this year's Paris Airshow. While Antonov/KACST runs the project, it's the latter that owns the intellectual property rights of the aircraft.



# Rich future beckons for the 'Saudi' Antonov

**Alan Warnes** looks at the reason why the Antonov company has forged an unlikely partnership with Saudi Arabia and what it could mean for the new AN-132 transport aircraft, a prototype of which flew at this year's Paris International Airshow.

It will come as no surprise that Ukraine's Antonov has looked beyond Russia and to the international market to build the An-132.

The aircraft is a modern version of the An-32 transport aircraft, which made its first flight in 1976.

With two powerful Motor Sich engines, the An-32 was ideal for flying in hot and high climates. India was the first customer and others, like Bangladesh, Mexico, Peru and Sri Lanka, followed.

The proud Ukraine-based Antonov company has been building aircraft since 1946. However, the relationship once shared with Russia, the biggest market for its aircraft majority, no longer exists – annexing the Crimea and meddling in Ukraine's politics put paid to that.

So, to survive, Antonov has formed an unlikely partnership with Saudi Arabia. It has led to Riyadh-based King Abdulaziz City of Science and Technology (KACST) taking a 50% stake in the aircraft, while KACST's manufacturing arm, Taqnia Aeronautics, will build the aircraft in Saudi.

Billed as a lightweight multi-purpose aircraft, Antonov and the Saudis believe it can replace not just An-26s and An-32s but, even more ambitiously, the C-130 Hercules.

In October 2015, when the Pratt & Whitney PW150 was selected to power the An-132, Oleksandr Kotsiuba, first vice president of Antonov, said: "The global market demand for the An-132 is estimated at as many as 200 units between 2018 to 2025. We are reaching a new level of international partnership and quality of our aircraft."

Antonov has not only built relationships with Saudi Arabia, but with America too, working with the likes of Pratt & Whitney (for



Flexible space on the deck of the An-132.

Continued  
on Page 98

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the engines), Honeywell (avionics) and Dowty (propellers). It must have come as a blow to Ukraine's Motor Sich, which provided the powerplant for the An-32 over many years.

KACST's Dr Khaled A Alhussan said work on the lightweight multipurpose aircraft started three years ago. "It has been designed to compete in the international market and, working with such well-known and reputable companies as Pratt & Whitney, Honeywell and Dowty, adds extra value to the aircraft. We had two teams working around the clock on the project; that's why we were able to build the aircraft in just 18 months."

A new joint venture company between Antonov, KACST and Saudi Arabia's Taqnia Aeronautics, will see the transfer of technology as well as training of Saudi personnel.

The Ukraine manufacturer first announced its plans for the An-132 on May 13, 2015. It was rolled out on December 20 last year and then flew for the first time from the company's Kiev factory on March 31. By June 21, the aircraft had made 31 flights and flown 55 hours.

#### Intellectual property rights

While Antonov and KACST have developed the turboprop aircraft jointly, the latter will own the intellectual property rights and is the engineering design authority for the type.

At this year's Paris International Airshow, we got a chance to see the An-132D prototype up close and in the air. It was impressive and, if kept at the right price, could be a winner.

The two-crew, modern, glass cockpit, designed by Honeywell, is light years away from the An-32. With an in-built auxiliary power unit, the An-132 can operate autonomously from unprepared airfields. The aircraft can reach a cruising speed of 265kts (500km/h), a top cruising altitude of 29,500ft (9,000 metres) with a maximum payload of 9.2 tonnes, compared to the An-32's 6.4 tonnes.

Unlike the An-32's Motor Sich engines, the Pratt & Whitney PW150As are positioned under, rather than over, the wing. The ramp can slide under the fuselage so, according to Antonov, the paratroopers can jump out of the back instead of the sides and airdrops will be easier.

There are also eight hard points, four under the wings and four on the fuselage. The Saudi contingency were keen to stress these weren't for bombs, which can be stowed on the side of the Bangladesh and Indian An-32s, but for electronic warfare pods and other podded systems for special missions.

As Saudi An-132 test pilot, Mohammed Ayasil, explained: "We are talking to the Royal Saudi Air Force; in fact we have a meeting with a general from RSAF this afternoon.

"We hope to announce a deal soon. We don't know for how many, but it won't be less than 30 aircraft. Among them will be intelligence surveillance and reconnaissance (ISR), light



The An-132's Honeywell cockpit is a world away from the An32's analogue displays.

#### Taqnia to produce Blackhawks

Riyadh-based Taqnia is set to build the S-70/UH-60 Blackhawk on its production line near the international airport by 2021.

Phase 1 will see up to 150 aircraft being built. "We opted for the Sikorsky helicopter because it is proven, with more than 4,000 S-70/UH-60s operational in 31 countries," explained Taqnia CEO, Major General (retired) Ali Alghamdi.

"We already operate them in Saudi – there are 135 on contract, of which 68 have been delivered. The land forces have received 42, with another 42 destined for land forces and medevac; while the national guard has 24 and another 24 on contract.

"The work will be done in conjunction with partners AEC, Al Salam and others – companies established by the likes of Boeing, BAE, and Pratt & Whitney over the last 30 years. They have helped in building these Saudi companies up and providing real capabilities in manufacturing and sub-assemblies of aircraft."

gunship and maritime patrol aircraft (MPA) configurations."

The Saudis are believed to be working with Orbital ATK on a gunship version of the An-132. The US company has had plenty of experience converting aircraft into gunships – aside from the US AC-130s, there have been Cessna 208s in Afghanistan, Lebanon and Iraq; CN235s for Jordan and, more recently, the Leonardo MC-27J for the Italian Air Force.

The An-132 brochure also detailed possible fire-fighting, medevac, electronic warfare, and search and rescue roles.

Ayasil, a former F-5 pilot and Hercules flight instructor, now working for Taqnia, said: "The transfer of technology and know-how to Saudi Arabia will allow us, in about 10 years, to have our own engineers and designers working on

aircraft in our kingdom.

"When the An-132 production starts depends on how the sales effort goes. We hope to get it under way in 2019/2020, with an initial 40% workshare, which will gradually increase. We designed the aircraft to operate in temperatures of up to 50°C, which is important when flying in Saudi Arabia; in very cold weather conditions and to fly up to 30,000ft in South America.

"During manufacturing we had Saudi engineers and technicians working on the An-132D. It was a first as we have never had them involved with manufacturing an aircraft before.

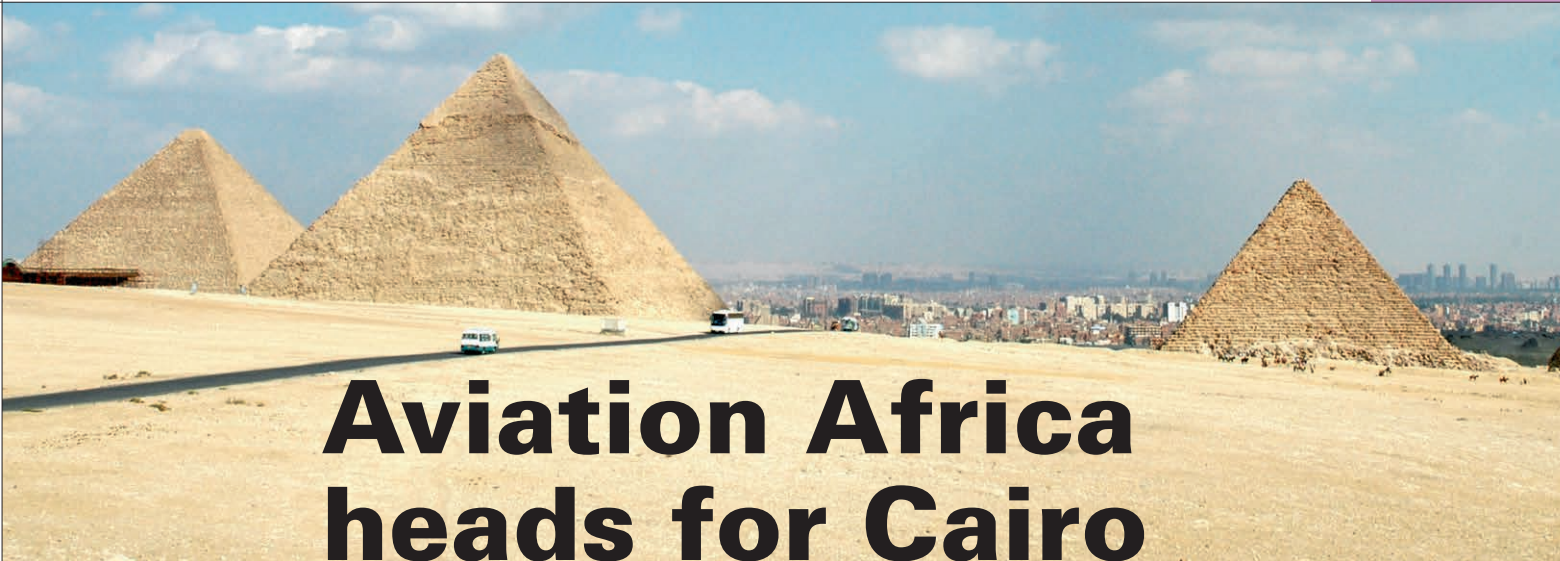
"We are also discussing the An-70 – it's needed in our country as is the An-178 but for now we are trying to concentrate our efforts on this aircraft before we look at others.

Taqnia Aeronautics is responsible for the aircraft's production in Saudi Arabia. "Taqnia is the manufacturing arm of KACST, which participates with a 50/50 share in research and development across nine different spheres," explained CEO, Major General (retired) Ali Alghamdi.

"Certification will take one year and, should we have an order, the Kiev facility will start production immediately but Saudi won't start until 2020. Initially, we will build about four aircraft per year.

"Special missions were all taken into account during the original design – structurally and engine wise it was designed for that – but it all depends on the customer.

"We believe we have a very powerful aircraft. When you compare it to the Airbus C295, which relies on the P&W PW127, and is capable of up to 2,940hp, our aircraft is twice as powerful because of its P&W PW150 powerplant. It has a thrust of 5,070hp."



# Aviation Africa heads for Cairo

*Aviation Africa, the exhibition and summit covering the full aviation and aerospace spectrum across the African continent, is to hold its third edition in Cairo on April 17-18 2018 under the auspices of the Egyptian Ministry of Civil Aviation.*

**B**uilding blocks for North African revival will be the theme of the two-day summit, which will focus on the key drivers to grow business and opportunities across the region.

Alongside the summit will be an exhibition area featuring more than 50 companies and organisations.

His Excellency, Sherif Fathi Attia, the Minister of Civil Aviation, said he welcomed the decision to bring the summit to Cairo. “We are working with the event organiser to shape the agenda,” he said.

“There are key issues affecting Africa in general – North Africa in particular – in subjects like aviation security, infrastructure needs and regional cooperation. The Egyptian Government is lending its full support and will be inviting our neighbours and friends across the region to be part of this important event.”

EgyptAir is to be the event’s host airline. Safwat Musallam, chairman and CEO of the EgyptAir Holding Group, said: “This gives an opportunity for all of our businesses to come together with suppliers, customers and competitors under one roof. We are very positive about the future but agree it is important that we can share ideas and get new ideas too.”

The holding group includes the national carrier as well as

regional carrier EgyptAir Express; EgyptAir Cargo; EgyptAir Tourism (Karnak) & Duty Free; EgyptAir Maintenance & Engineering; EgyptAir In-Flight Services; EgyptAir Medical Services and EgyptAir Supplementary Industries.

Mark Brown, chief executive of show organiser Times Aerospace, said: “We are also pleased to have MoUs from all of Egypt’s airlines, including charter, cargo and low-cost carriers. These will all have top executives taking part in the event and meeting with exhibitors. We are expecting delegations from other African governments and their civil aviation authorities and, of course, other airlines, business aviation operators and from companies across the Middle East and Africa.”

Alan Peaford, MBE, editor-in-chief of *African Aerospace* and *Arabian Aerospace*, will chair the two-day summit. “Cairo is the crossroads between the Middle East and North Africa and I would expect to see a lot of interest from the region – particularly given the close ties between Egypt and Saudi Arabia,” he said.

“There are a lot of misconceptions about the current situation in North Africa – but there are also some hard realities. Business has been in free-fall for a few years. Tourism is the key to the revival of North African fortunes and that involves some challenges in terms of security measures, in safety culture and political will.

“This cuts across our entire industry, from airline operations to maintenance and other service providers, through to airports, air navigation service providers and regulators.

“We proved at Aviation Africa in Kigali last year that the very open summit, addressing some challenging issues in an open and frank way and across the whole gamut of stakeholders, proved beneficial and I was delighted that His Excellency, the Minister of Civil Aviation, agreed that we should aim as high for the Cairo event.”

The Aviation Africa Summit and Exhibition will take place in Heliopolis, close to Cairo’s international airport. Further details on exhibition space, sponsorship and the programme can be found at [www.aviationafrica.aero](http://www.aviationafrica.aero)

**Aviation Minister Sherif Fathi Attia centre with Aviation Africa’s Mark Brown and Alan Peaford as the Egyptian Government agrees to host the 2018 Summit.**





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GE's new man in the Middle East explains to **Geoff Thomas** why the regional focus is clearly on growth.

# GIANT STEPS

**G**E Aviation's new VP sales in the Middle East and Turkey, Aziz Koleilat, is concentrating on further enhancing the giant US OEM's relationship with its customer airlines.

He is working in a region where the company – and its joint ventures CFM International and Engine Alliance (EA) – have more than 2,800 engines in service and a further 1,600 or more on the order book backlog.

The region for which Koleilat is responsible also includes Russia, the CIS countries and Pakistan, but our discussions concentrated on his growing work in the Middle East, the UAE and Turkey.

He explained: "GE has had a major presence in the Middle East since the 1930s but the growth of the region's large airlines and commercial aircraft operators has resulted in us establishing a newly-enhanced presence – based in Dubai – from where we can liaise more effectively with all our customers.

#### Increase the efficiency

"The most important thing to understand is that everything we do is based around the needs of our many customers and in helping them to increase the efficiency of each and every GE engine. This includes both the older established designs like the CF34, CT7 and CF6 in addition to the current CFM56, GP7200, GE90 and GENx powerplants.

"And, of course, we are also looking forward to the latest arrivals including CFM's LEAP and the GE9x.

"We are totally committed to working with our customer airlines and to building on our already strong and positive relationship with them."

GE has a growing presence on the ground in Dubai, where its technical and cooperation centre provides the ability, through data capture (some real-time) direct from operators, to provide airlines with information that enables them to increase efficiency on each engine.

The climate and operating environment in the region can be harsh for aircraft engines and Koleilat says that GE's long-established presence in the Middle East has enabled it to design its latest engines with this in mind.

"Over the years," he pointed out, "GE has learned how to design and build engines that operate efficiently and cost-effectively in all environments, including the hot and dusty conditions often found here. Each generation of engines has provided enhanced 'time on wing' over its predecessors. We're very proud of this."

GE's technical centre in Dubai, where Koleilat is also based, has grown exponentially over the past four years



**"Each generation of engines has provided enhanced 'time on wing' over its predecessors. We're very proud of this."**

**AZIZ KOLEILAT**

from a handful of employees to today's count of around 40. And the company has plans for this to grow to more than 100 people over the next year or so.

Commercial aviation worldwide has grown steadily over the past five decades but the oil-rich Middle East has demonstrated growth that surprised many pundits and analysts. And, despite regional political stresses and disagreements, Koleilat believes that this growth will continue over both the medium and long term for airlines operating both twin-aisle and regional aircraft.

It's this belief that has been one of the driving forces behind GE Aviation's move towards a greater presence on the ground.

#### Predictive analytics

An example of this is offered by Emirates Airlines, the world's largest operator of GE90-powered Boeing 777s. The airline says that, thanks to data sharing and predictive analytics, it's working with GE to make engine maintenance more efficient and cost-effective. The airline's forecasts show that it will save around 14 shop visits this year, saving many millions of dollars thanks to reducing planned GE90 removals by 56% from 2016 to 2017...with further improvements to come.

The analytics-based maintenance (ABM) programme run by Emirates and GE is enabling the health of more than 300 GE90 engines to be predicted accurately and this project is soon to be extended to the airline's Engine Alliance GP7200 engines that power its Airbus A380s.

It's a 'win-win' situation for both the airline and GE Aviation and new man Koleilat is looking forward to developing the project and building on the existing strong foundations and relationships that the giant US-based OEM has established over its many years in the region.

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# DTP goes with the flow

*Dubai Technology Partners (DTP), a leading GCC aviation systems integrator, could have two big announcements coming up in the near future.*

**Barbara Saunders**  
*reports.*

**E**stablished in 2004 in Dubai, DTP is a system integrator with a broad portfolio of solutions and services designed to support the aviation industry.

The company says it is on the verge of signing a significant contract for a flow management system with a major Gulf aviation hub. The contract will be operated in partnership with the Swiss person-tracking technology provider, Xovis.

DTP also anticipates making a major announcement by the end of this year for its new flight performance monitoring (FPM) solution, which provides real-time data and a holistic view of airport operations and flight-related processes, coupled with robust forecasting and decision support tools to improve on-time-performance (OTP).

Version one of the new FPM suite, according to MD Abdul Razzak Mikati, is winning substantial airline interest due to its OTP benefits and cost-saving abilities.

“One of the most critical challenges facing airlines and airports, not only in the region but also across the world, is meeting OTP,” said Mikati. “According to one estimate, it costs airlines as much as \$70 for each minute a flight is delayed and this is before you factor in potential loss of business due to any drop in customer satisfaction. The challenge of improving OTP has been further complicated in recent years with the on-going migration of traffic to

low-cost carriers. This has increased demand for 30-minute turnarounds, and combined with the introduction of larger aircraft like the A380 and 747-8, has caused increased ramp congestion and driven the need for more effective ground-asset utilisation.”

Airlines have a choice when managing turnarounds, continued Mikati. “They can continue to be reactive and tackle issues as they arise, or they can direct those efforts and resources to prevention and mitigation to ensure a smooth turnaround process.”

FPM utilises flight schedules, a highly configurable rules engine, and process tracking to provide operators with an overview of the current status of the flight and drills down to details of turnaround processes. Its precision time schedule (PTS) event-tracking mechanism re-evaluates and updates, in real time, the task status every time an above or under-the-wing activity takes place.

## Decision-making milestones

“Using FPM makes it possible to share all relevant flight airport collaborative decision-making milestones, towing status, check-in, baggage details, etc. among the various concerned stakeholders,” said Mikati. “It immediately flags any delay of a task that might affect other tasks and, based on the latest information, calculates the new target off-block time, which alerts the air and ground operations coordinators to take immediate proactive action to ensure on-time departure or minimise delay.”

DTP has prioritised its target segments as airlines, ground-handlers and airports. “We have been presenting the solution to multiple potential customers and have strong interest from airlines. We are looking to announce our launch customer at the Dubai Airshow and it will be a major Gulf carrier,” said Mikati.

The financial headwinds currently buffeting Gulf carriers could, said Mikati, deliver a windfall for the system which, he claimed, can lower airline costs and “deliver return on investment in a very short time span. It really helps them.”

Though the company is planning to initially focus sales of the made-in-the-UAE solution, which was developed in conjunction with DTP’s partner, SAP, in the Middle East and North Africa, Mikati said it is already “planting seeds in Europe, presenting to some initial partners over there”.

He explained: “The current plan is to target the smaller carriers over there, not with the full suite, but with a mobile app we have created for boarding system management, which is a holistic system that would provide them with a single data source.”

**“It costs airlines as much as \$70 for each minute a flight is delayed.”**

**ABDUL RAZZAK MIKATI**



*Passengers on many Qatar Airways' flights will soon be able to use high-speed in-flight Wi-Fi, thanks to Inmarsat's GX Aviation Ka-band satellite connectivity.*

**Steve Nichols** reports.

# FULL SPEED AHEAD FOR QATAR'S WI-FI

**Q**atar announced its intention to install Inmarsat's Global Xpress (GX) Aviation service across its flagship fleet back in April, but actually signed the contract in late May. This makes Qatar the first Middle Eastern airline to select the GX Aviation in-flight connectivity solution.

Akbar Al Baker, Qatar Airways group chief executive, said: "Qatar Airways prides itself on assessing and understanding the latest market innovations, demonstrating over and over again our ability to ride and guide trends in passenger preferences.

"By partnering with Inmarsat, we are confident that Qatar Airways will meet the highest expectations in the industry for in-flight broadband services, and avail ourselves of the many other new opportunities powered by connectivity."

Ben Griffin, Inmarsat's regional director Middle East and Africa, said the deal was negotiated directly with the airline rather than via a distribution partner at the request of the customer.

## Distribution options

"We are currently talking to other prospects within the Middle East, India and Africa across our distribution options," Griffin said. "We expect to be able to have news of various other customer commitments throughout the rest of the year."

Confirmed customers for the GX Aviation solution now include Lufthansa, Singapore, Norwegian, Air Astana, Air New Zealand, AirAsia and now Qatar Airways. Lufthansa was the first to go live.

Speaking at the Aircraft Interiors Expo in Hamburg, Leo Mondale, Inmarsat Aviation president, said: "Lufthansa is very satisfied with the performance of its Inmarsat GX in-flight connectivity, as are its customers – the net promoter scores from passengers using it are very positive.

"It's a huge pleasure to get some of our



**Leo Mondale:** "We're in a market that is like selling candy to a baby."

milestones behind us. You'll now see us doing very well. We're in a market that is like selling candy to a baby.

"The fact we have more than 1,000 aircraft in backlog at this point is an incredible milestone, given that GX Aviation only went live a few months ago.

"It is further proof that the in-flight broadband revolution has truly begun; passengers are demanding quality connectivity and airlines are endorsing Inmarsat's superior offering."

Mondale added that Inmarsat is starting to see the availability (or not) of in-flight connectivity affect passengers' buying habits. "It is becoming a deciding factor when passengers choose an airline," he said.

"Passengers prefer access to connectivity over in-flight entertainment – we've never seen a clearer roadmap for the future."

Qatar has said that the service will be

available to passengers on board more than 130 of its aircraft.

The Inmarsat GX technology, driven by Honeywell's JetWave hardware, had already been equipped on a line-fit basis on selected Qatar Airways' Airbus A350s.

Installations on the airline's remaining Airbus A350s, together with its Boeing 777s, are being completed on a retrofit basis this summer.

So what can passengers expect? As *Arabian Aerospace* technology editor, I was given a sneak preview of GX's capabilities aboard a press flight with Lufthansa back in April.

The test over Germany, aboard a Lufthansa Airbus A319 aircraft, saw the system delivering up to 14.2Mbps to the passenger.

## Streaming video

During the test flight, a laptop computer was used to see how Lufthansa's FlyNet would stand up to watching HD streaming video as well as general web browsing, e-mails and social media use.

An internet speed-measuring app was also used at various points in the flight.

The slowest recorded download speed (to the aircraft) was 1.4Mbps and the fastest seen was 14.2Mbps. The average speed to the aircraft was around 10Mbps. The average speed off the aircraft (uploading files) was around 5Mbps.

Latency (system delay) was around 600-800ms, which largely reflects the round-trip (at the speed of light) of the Ka-band microwave beam to the geostationary satellite and back to Earth, and which accounts for around 250-280ms depending on the relative location of the aircraft and the satellite in use.

Web page loading was snappy, as was the reception of e-mail. A 720P HD video was also streamed from YouTube and watched full screen. This played flawlessly for the five minutes it was watched.

As Qatar will be using the same fuselage-mounted antenna and Honeywell JetWave hardware as Lufthansa, there is no physical

A Honeywell JetWave fuselage-mounted antenna being installed.



reason why its speeds will be very different. It does depend upon the overall data package that Qatar has bought, but assuming it is similar to Lufthansa's, Qatar's passengers can expect the same performance.

Qatar Airways declined to comment at this stage on how it will charge for its in-flight connectivity usage. Many airlines are now adopting a 'per flight' model rather than a time or data-based package. This avoids "bill shock" for the passenger and also stops them running out of their data allowance mid flight.

For example, Lufthansa has adopted three different packages for its GX implementation – FlyNet Message (EUR 3), FlyNet Surf (EUR 7), and FlyNet Stream (EUR 12).

While FlyNet Message only allows the use of messaging services such as e-mail, WhatsApp or iMessage, FlyNet Surf also enables passengers to surf the internet. With the FlyNet Stream service package, video and audio streaming is also possible.

Lufthansa has blocked the use of VOIP and video conferencing apps, such as FaceTime. This means that you can't make or receive VOIP-based audio phone calls with the ground either. This was a policy decision by Lufthansa and not a limitation of the GX in-flight connectivity system.

Qatar could offer free in-flight Wi-Fi to all passengers as part of the overall ticket, or restrict

free access to business-class passengers, which is more likely.

Offering free access to all inevitably results in a high demand for the service, which can then result in degraded performance. So, paradoxically, it can make sense to charge for the in-flight connectivity to maintain a good level of service.

So how does the system work?

#### Geostationary satellites

Inmarsat GX uses three (and soon to be four) geostationary satellites. The first three I-5 Ka-band satellites, built by Boeing, are in orbit and cover the globe. A fourth satellite was launched in May and, at the time of writing, was being manoeuvred to cover Europe, the Middle East and Indian sub-continent.

Inmarsat said its final location would be advised in due course.

A statement said: "The fourth satellite adds further capacity to the GX network, as well as in-orbit redundancy that further upgrades the reliability and resilience of Inmarsat's service offerings."

Signals are sent to and from a number of dedicated satellite access stations (SASs) around the globe. These are located at Fucino in Italy, Nemea in Greece, Paumalu in Hawaii, Winnipeg in Canada, Lino Lakes in Minnesota, USA, and Auckland in New Zealand. Once on the ground

the internet protocol (IP) packets join the terrestrial networks.

The access stations are in areas that generally benefit from good weather and little rain – the Ka-band microwave signals are particularly susceptible to rain fade. If there is a weather problem at one SAS, signals can be temporarily re-routed to another.

This will all be transparent to Qatar Airways' passengers. The system can even move from one spot beam to another (known as a beam-to-beam hand-off) using a "make before break" technique, which minimises outages.

Even a change from one satellite to another may be accomplished in less than a minute. And, as Inmarsat has satellites spanning the globe (at least up to around approximately 80 degrees north and south latitude) the service should be consistent.

Inmarsat has plans to build and launch further Ka-band satellites and recently signed a contract with Thales Alenia Space to build a new satellite, which is targeted for launch in 2019.

It said this would provide capacity across the Middle East, Europe and the Indian subcontinent, which suggests that the fourth I-5 satellite may eventually be moved to another orbital slot.

Inmarsat says the new satellite will also support the rapid adoption by other airlines of GX Aviation, both in Europe and through the major Europe/Asia aviation traffic corridor.

# On track to revolutionise global air traffic

**Steve Nichols**  
*looks at how space-based receivers are revolutionising the global air traffic surveillance system.*

**A**ireon is currently deploying a global, space-based air traffic surveillance system for automatic dependent surveillance-broadcast (ADS-B) equipped aircraft.

ADS-B is 'automatic' because it requires neither pilot nor other inputs. It is 'dependent' because it depends on data from the aircraft's navigation system.

Pioneered originally in the USA, an ADS-B-equipped aircraft finds its own position using a global navigation satellite system (GNSS), typically GPS, and periodically broadcasts this position and other information to ground stations and other aircraft equipped with ADS-B.

In 2018, Aireon says it will provide the first global air traffic surveillance system using a satellite-based ADS-B network that makes it possible to extend visibility across the entire planet.

Aireon is working with Iridium Communications to place ADS-B receivers on 66 of its active Iridium NEXT satellites, with a further six in-orbit spares and nine ground spares.

## Successful launch

Iridium announced the successful launch of its first 10 Iridium NEXT satellites with Aireon ADS-B receivers into low-Earth orbit in January. Iridium says further deployments are planned and, at the time of writing, the second 10 satellites were targeted for launch.

Iridium NEXT is replacing the company's existing constellation of satellites with more powerful capabilities, including Aireon's space-based global real-time aircraft surveillance and tracking service.

Don Thoma, Aireon CEO, said its satellite-based ADS-B service would operate globally, even over the poles, thanks to Iridium's low-Earth orbiting satellites.

"Aireon is working with 10 air navigation service providers (ANSPs) to test and implement the new service," Thoma said.

He added that the improved routing capabilities Aireon's ADS-B service would enable, especially over the North Atlantic, means that up to \$350 million a year could be saved in fuel costs alone.

"And that doesn't take into account the savings in terms of carbon dioxide and NOX emissions."

ADS-B-equipped aircraft broadcast their precise position in space via a digital datalink (the global interoperable frequency is 1090MHz) along with other data, including ground speed, altitude, and whether the aircraft is climbing, or descending.

Receivers integrated into the air traffic control system or installed aboard other aircraft provide users with an accurate depiction of real-time aviation traffic, both in the air and on the ground – although this does require additional equipment to be installed on the aircraft.

Unlike conventional radar, ADS-B works at low altitudes and on the ground, so that it can be used to monitor traffic on the taxiways and runways of an airport.

It's also effective in remote areas or in mountainous terrain where there is no radar coverage, or where coverage is limited.

## Greatest benefits

One of the greatest benefits of ADS-B is its ability to provide the same real-time information to both pilots in aircraft cockpits and ground controllers, so that, for the first time, ADS-B-equipped aircraft can both 'see' the same data, as long as all aircraft in the vicinity are similarly equipped.

It also benefits from its relative low cost when compared to other surveillance systems, such as radar, its high accuracy, and the fact that it can also support other airborne surveillance applications, which will enable many future updates.

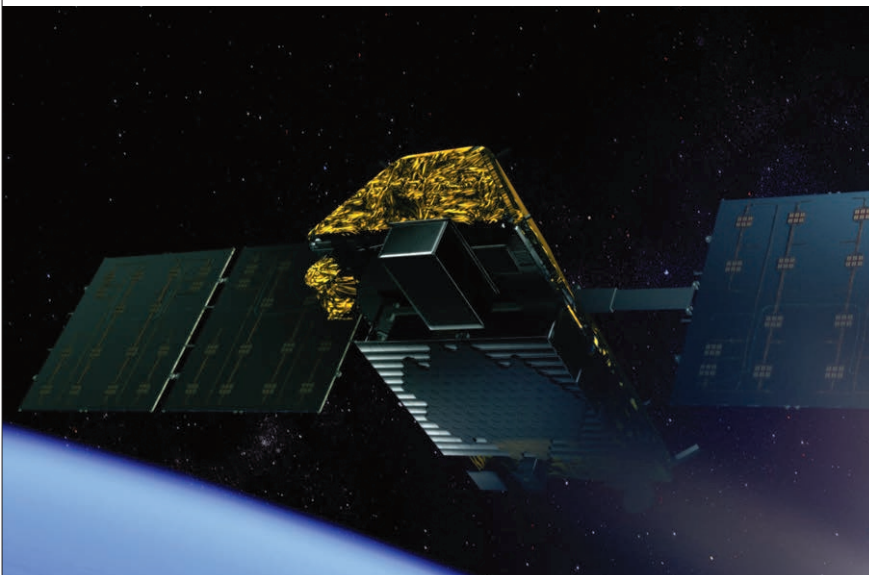
The safety benefits of ADS-B are huge and include improved visual acquisition, especially for general aviation under visual flight rules (VFR) and reduced runway incursions.

There are two commonly recognised types of automatic dependent surveillance for aircraft applications.

ADS-B Out transmits GPS-based position and other aircraft or vehicle information and implementation is now mandated in 2020. ADS-B In allows transmitted signals to be received by other aircraft as well as ground stations, but this is not part of the 2020 mandate.

There is no mandate for ADS-B In. However, this optional In capability, which receives the tracking data for display in the cockpit, should be a popular upgrade, since it can clearly enhance situational awareness by giving pilots a view of the same basic traffic data that ground controllers are monitoring on their scopes.

An artist's impression of an Iridium NEXT satellite.





The innovation hub has a multi-national student intake and promotes female equality in the workplace. Right: Cyber security for air traffic management systems is one of the areas being tackled by the Doha Innovation Hub.

European electronic systems giant, Thales, is using its innovation hub in Doha to develop subjects as varied as airliner in-flight entertainment and cyber security training. Alan Dron finds out more.

## Hub at the centre of Doha's latest thinking

**T**hales created its Doha Innovation Hub in 2013 in the Qatar Science & Technology Park (QSTP), the emirate's research and development centre.

Thales Group owns the hub, with company employees working full time on both cyber security and in-flight entertainment and connectivity (IFEC) development.

The hub is part of Thales' overall research and development programme, on which the company spends some \$2.2 billion worldwide annually.

The European technology group has close links with Qatar Airways, with the airline having, some years ago, selected the Thales TopSeries system for its large fleet of Airbus aircraft. The Thales system is also being installed on the airline's Boeing 787 fleet.

A year before the innovation hub opened, Thales and Qatar Airways jointly launched a development and training centre at the QSTP. The innovation hub grew out of this initial link.

### Speedier updates

At the opening of the development and training centre, Qatar Airways' CEO, Akbar Al Baker, noted that the facility would ensure the development and implementation requirements of the airline could be met more quickly and allow speedier updates for IFEC content on its aircraft.

Al Baker pointed out how important IFEC had become for airlines and passengers: "Fifteen years ago, IFE played a very small part of an airline's product offering. Today it has a crucial role in a passenger's decision-making process when deciding which airline to choose."

The importance of IFE systems continues, as anyone who has been on a long-haul flight in recent years can testify. Frequently, passengers can be seen engrossed in their seatback screens even before wheels-up, playing

games, catching up on new movies, or gorging on multiple episodes of favourite TV series.

That importance is likely to continue. It seems increasingly likely that the trend over the next few years will be for passengers [notwithstanding the latest short-term security measures] to use their individual computers or tablets to screen content streamed direct from the internet through a new generation of aerials pointing either at satellites or ground stations.

### Save money for airlines

This will potentially save money for airlines, if they can strip out hundreds of relatively heavy seatback screens and all their associated wiring, saving substantial amounts of weight and thus improving the fuel-burn of their aircraft.

Today, all the local IFE content provided by Thales to Qatar Airways is developed and produced at the QSTP.

A second major subject handled by the innovation hub is the increasingly critical area of cyber and computing security, with air traffic management (ATM) being among the areas studied.

ATM computerisation was one of many areas that developed before the threat of cyber sabotage emerged. While security can be designed into new equipment, it has to be 'back-fitted' to older systems.

Qatar being a multicultural country, Thales has been providing classes at the hub to 36 students from all over the world. Four Qatari students achieved internships in Thales' QSTP activities: two interned in the IFE head office of Thales in Irvine, California, while the other two developed cyber security tools in Qatar.

Thales Qatar makes a point of developing female equality in the workplace, with two-thirds of its students and interns being women.

It seems increasingly likely that the trend over the next few years will be for passengers to use their individual computers or tablets to screen content streamed direct from the internet.

The UAE's interest into unmanned aerial vehicles has led it to become the first export customer for the Piaggio Aero P.1HH Hammerhead.



## CAE STEERS REMOTE CONTROL TO A NEW LEVEL IN THE UAE

*A major training package is gradually being unveiled in the UAE as the nation becomes increasingly deeply involved in operating unmanned aerial vehicles.*

**Alan Dron**  
*reports.*

**T**he UAE's interest in developing the use of remote piloted aircraft (RPAs) for its armed services has taken a significant step forward following the award of a contract to Canada-based simulation and training specialist CAE.

The UAE is reported to have taken delivery of a batch of General Atomics Predator XP unarmed RPAs earlier this year – the first nation in the Gulf to do so – and is also the first export customer for the Piaggio Aero P.1HH Hammerhead unmanned air vehicle, a development of the P.180 Avanti executive turboprop aircraft. The UAE is taking eight Hammerheads.

Under the \$42 million, five-year contract announced in May, CAE will provide the UAE Air Force and Air Defence (UAEAF&AD) with an integrated training package that will include academic, simulator and live flying training for the air force's fleet of RPAs.

"Remotely piloted aircraft have been proven as an indispensable asset in modern combat operations and, like all platforms, they require skilled and proficient aircrews who are prepared for a range of missions," said Ian Bell, CAE's vice-president and general manager, Middle East/Asia-Pacific.

"We look forward to working closely with the air force as we develop and deliver a world-class turnkey training solution for these unmanned systems."

CAE will support the UAEAF&AD in establishing a training centre where all RPA type conversion and mission training will be conducted.

The Canadian company will design and develop the courseware and a curriculum for academic and classroom training, including 'fundamentals courses' for RPA pilots and sensor operators, as well as courses specific to the air force's medium-altitude long-endurance (MALE) RPA platforms such as the Predator.

To support the ground-based training system, CAE will also deliver a full suite of synthetic training equipment, including desktop trainers, sensor operator trainers, unmanned aerial system (UAS) mission trainers and high-fidelity, type-specific mission trainers. In addition to delivering the classroom and

simulator training, CAE instructors will provide live flying instruction for RPA aircrew.

CAE will also support the Khalifa Bin Zayed Air College in the development of an RPA pilot fundamentals training course, as well as training instruction to be delivered as part of the cadet curriculum at the air college.

The RPA contract follows on the heels of another announced last year for CAE to develop helicopter simulators for the NorthStar Aviation 407 multi-role helicopter (MRH) and the Sikorsky UH-60M armed Black Hawk (ABH).

Abu Dhabi-based NorthStar Aviation's 407MRH is a modified version of the Bell 407GX that is designed for light attack, close air support and intelligence, surveillance and reconnaissance missions.

### **New tailboom**

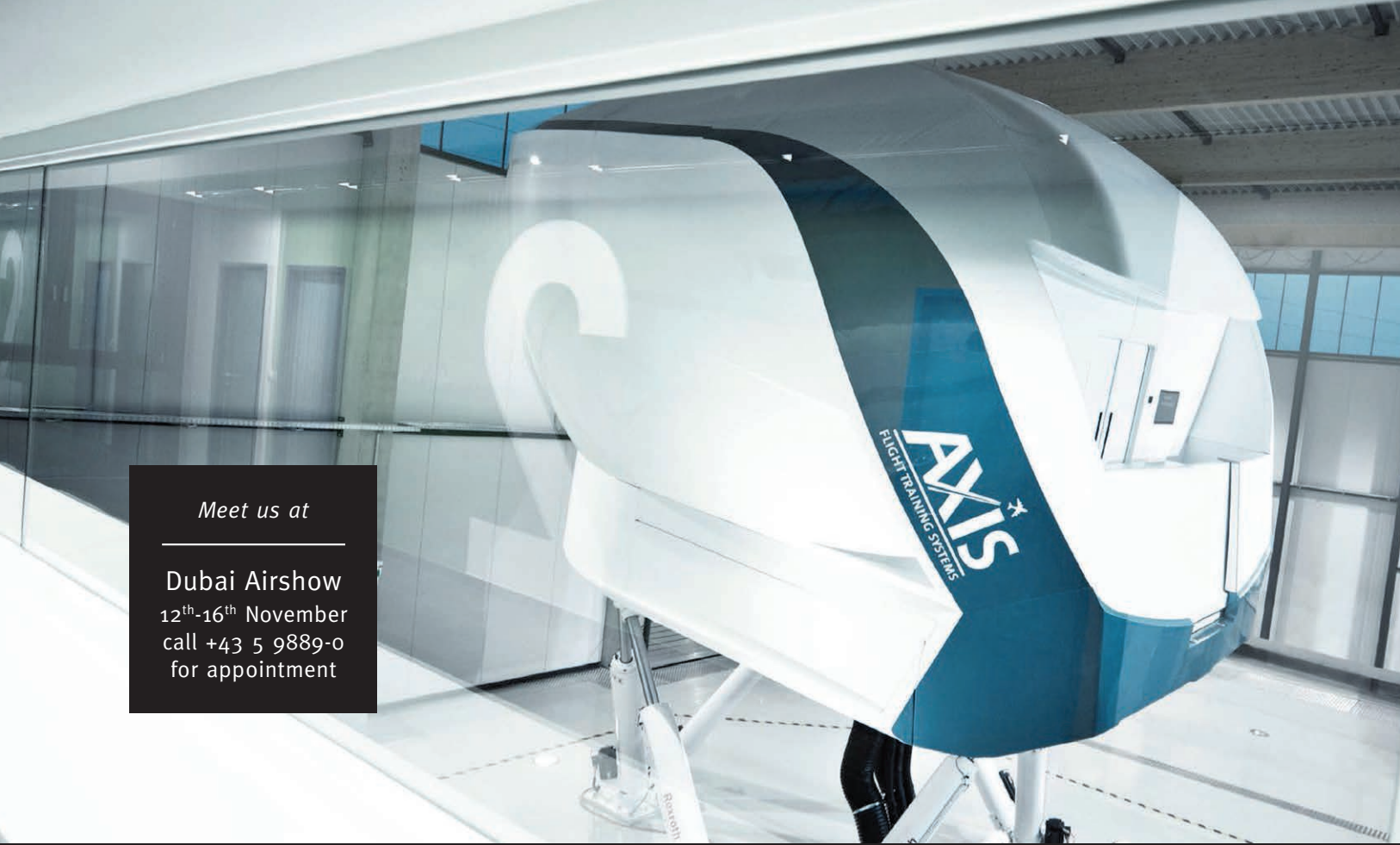
It retains the Bell 407's basic configuration, including its four-bladed rotor and hub, but with a glass cockpit, several electro-optical/infrared sensors in a pod under the nose, four weapons stations and a weapons management system. It also has a new tailboom enclosing antennae for military radios, a microwave downlink and other systems.

This year, CAE is delivering a major package of training equipment for the 407MRH, ranging from desktop trainers to a high-fidelity, fixed-base level 7 equivalent flight training device.

As a sign of the company's increasing involvement in the UAE, it moved into new facilities on Al Reem Island in Abu Dhabi in March this year.

In a 2016 deal, meanwhile, CAE was contracted to design and manufacture a Sikorsky UH-60M full-mission simulator for the UAE Joint Aviation Command. This is due to be delivered in 2018.

The UH-60M/ABH full-mission simulator representing the armed version of the ubiquitous medium transport helicopter will include the Canadian company's Medallion-6000 image generator with common database architecture, which is designed to improve networked, interoperable mission training across several platforms.



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FLIGHT TRAINING SYSTEMS



## EgyptAir climbs the EASA pyramid

*EgyptAir Training Center wants to become MENA's leader in aviation training and one of the best worldwide. Ahmed Mokhtar, GM marketing, tells Vincent Chappard that the latest European Aviation Safety Agency (EASA) 145 certification is a major milestone.*

To achieve its lofty vision of leading the region's training activities, the EgyptAir Training Center has to be seen to provide the highest quality of training products.

A wide range of training is provided at its facilities and instructors can even be sent to customer locations.

The centre also cooperates with aviation entities in Africa (Zimbabwe, Togo, Libya) and the Middle East "to build their aviation industry and develop their own training capabilities".

"Our mission is to provide the highest quality of training services to promote safety standards and exceed customer expectation," explained marketing general manager Ahmed Mokhtar.

Since its establishment in the early 70s, the EgyptAir Training Center has brought all categories of personnel to the levels of competency for the safe operation and the efficient accomplishment of supporting commercial activities.

This includes flight and cabin crew for wide-body and narrow-body, plus teaching EASA 147-approved technical courses for B1 and B2 theoretical and practical type training for the A320 family (since 2006), A330 (since 2006), A340 (since 2006) and B777, B737NG, E170 (since 2017), overhaul training and ground service training.

The centre is located at Cairo International Airport and caters for more than 50,000 trainees per year. Its main Egyptian customers are Nile Air, Nesma Airlines, PAS, Fly Egypt, AMC, Cairo Aviation, oil companies, cargo and shipping companies.

Ethiopian Airlines, Air Zimbabwe, Air Namibia, Kuwait Airways, Iraqi Airways, Saudia, Royal Jordanian, MEA, Air India, and Georgian Freighter are among its regional and international customers.



**Ahmed Mokhtar: "EgyptAir will lead the aviation industry in Egypt to move towards the EASA certification."**

The training centre strongly believes in partnerships to meet customer demand and has signed agreements with Cairo University (faculty of engineering) to prepare aviation engineers with basic training, plus the Egyptian Flight Academy and the Arab Academy, in the field of aviation cargo.

It now wants to further develop courses to enhance security, quality and crew resources management. "We find attractive opportunities to extend our cooperation with existing customers like Iraq Airways and Yemen Airways after conflicts settle down," said Mokhtar.

The centre has recently passed an EASA inspection reviewing quality standards for maintenance training programmes on Boeing B777/B737-800NG, Airbus and Embraer aircraft.

"EgyptAir will lead the aviation industry in Egypt to move towards the EASA

certification by providing the approved training facilities," said Mokhtar.

The accreditation supports the centre regionally and internationally and helps to increase customers in the African continent, Middle East, Eastern Europe and the Indian sub-continent.

A Togolese delegation, led by its minister of transport, has recently investigated the potential of pilot simulator training on different types of aircraft, and for cabin crews to increase theoretical and practical skills using cabin service trainers (CSTs) and cabin emergency evacuation trainers (CEETs), in addition to the modern and advanced classes of aircraft maintenance engineers training.

EgyptAir Training Center implemented a new programme (theory and practical training on flight simulators) for Indian pilots on B737-800 and A320 types last year. It also hopes to expand its training capabilities within the African continent after its cooperation with RwandAir.



# TEACHERS GET LOST IN SPACE

Four UAE teachers were among 200 middle school staff from 33 countries and 45 US states and territories who were welcomed by Honeywell and long-term partner, the US Space & Rocket Center (USSRC), to the Honeywell Educators at Space Academy (HESA).

Over the course of two consecutive weeks in June, the teachers were able to experience a unique opportunity to re-ignite their passion for science, technology, engineering and mathematics (STEM) education.



Honeywell Hometown Solutions, the company's corporate citizenship initiative in partnership with USSRC, created this award-winning scholarship programme in 2004. Since then, HESA has graduated 2,776 educators from 62 countries and 52 US states and territories, reaching more than three million students around the world.

"Technology is changing exponentially. Things we once held as impossibilities are reality – we are on our journey to Mars," said Dr Deborah Barnhart, CEO and executive director of the USSRC.

"Educating the next generation of leaders and



UAE teachers Galeb Wahbi, Siji Sudhakaran, Buthaina Abandah and Lara Chouman.

learners is key to global success. Exploration improves quality of life for all humanity through discoveries in science and engineering. The HESA programme unites teachers with exciting tools and methods to change the lives of students around the globe."

The programme includes 45 hours of classroom and laboratory instruction focused on science, space exploration and leadership skills development. Teachers participate in astronaut-style exercises, such as high-performance jet simulation, scenario-based space missions, coding challenges, land and

water survival training and interactive flight dynamics programmes. Through these exercises, teachers learn how to reinvigorate their classroom with ideas, lessons and other materials.

"Attending HESA was truly the most incredible experience of my teaching career," said 2016 alumni Jodie Guillen, from New Mexico. "I was so excited to get back into my classroom and use everything I learned to inspire the future scientists and engineers sitting right in my classroom. Who knows, maybe one of my students will actually make it to Mars one day."



## أكاديمية الطيران الملكية الأردنية Royal Jordanian Air Academy

### Who is RJAA?

The Royal Jordanian Air Academy (RJAA) is considered as a regional leader in the Middle East. It is the first aviation training academy in the region.

### RJAA Aim

RJAA seeks to remain the leader in training on all aviation fields to provide local, regional and international airways with highly skilled and efficient pilots in addition to training and qualifying students in the field of aircraft maintenance technicians in both civil and military fields according to best international standard.

### RJAA Trainees

60 percent of the students all the academy are non-Jordanians, adding that RJAA fleet includes 23 planes from different models, RJAA after strong competition with international institutions, the academy has won several contracts to offer training for pilots, aircraft technicians and several customized aviation training courses in the region.

### RJAA Expansion

The academy is expanding locally and regionally to meet rising demand on aviation training in the MENA.

The academy has recently opened a branch in Morocco due to the good reputation RJAA enjoys in the field. The branch in Morocco is part of RJAA'S strategy to expand to other markets in the region to provide local, regional and international airways with highly skilled staff.

### RJAA Courses



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*The harsh climate and environment of the Middle East and North Africa imposes unique challenges for military aviators – and particularly for the operators of rotary wing and vertical lift aircraft. Jon Lake reports.*

# DANGER OF THE DEADLY DUST

**F**lying through a dust- and sand-laden atmosphere at low level may be unavoidable, but it can wreak havoc on a helicopter.

Sand will strip and abrade the leading edges of rotor blades and, since today's advanced, lightweight rotor blades are constructed from fibreglass composite material, they are particularly vulnerable to abrasion and damage.

To counter this, most helicopter rotor blades are fitted with a hard metallic abrasion strip, which prevents the leading edge of the rotor from being worn down too quickly.

Sand and dust also affect a helicopter's powerplant, with a high risk of rapid engine wear and subsequent power deterioration, and with some chance of glass build-up in high temperature sections of the engine.

There are some solutions to the problems caused by ingestion of sand and dust, but these, themselves, tend to lead to an inherent loss in inlet pressure and, sometimes, auxiliary power.

To combat the ingestion of particles, there are three basic types of inlet protection system. These include integrated inlet particle separators, as well as after-market inlet barrier filters and vortex tube separators, which tend to be offered as a retrofit option.

Typical inlet barrier filters comprise a pleated filter element (pleated to increase surface area), which need to be changed every few flights. It has been calculated that the filter for one helicopter would remain effective for little more

than eight minutes in a cloud with 0.5 grams of dust per cubic metre, equal to about 22 dust landings.

Vortex tube separators use a helical vane to spin particles to the periphery, where they are removed via a scavenge flow using a high-speed blower fan. There are no filters to change and minimal inhibition of airflow into the engine air intake.

The typical inlet particle separator creates the least drag, whereas inlet barrier filters provide the highest particle removal rate (at the expense of some loss of power) and vortex tube separators achieve the lowest pressure drop.

## **Biggest obstacle**

But, probably the biggest obstacle to rotary wing operations in sandy and dusty environments, lies in the tendency of helicopters to kick up clouds of dust or sand when hovering close to the ground – especially landing or taking off, when a dense cloud of particulates will be thrown into a vortex by the rotor wash of the hovering helicopter.

This forces aircrew to operate in what is known as 'brownout', with the dust cloud obscuring the external visual references that a pilot requires to hover or manoeuvre accurately, to judge his position over the ground or his rate of movement fore and aft or laterally, and even to judge his height or rate of descent.

But brownout is also disorientating – since in the huge swirling mass of particles some will be

moving in different directions, which can confuse the pilot as to where the ground is, whether the aircraft is level and even whether it is stationary or drifting toward an obstacle.

Undetected lateral movement when trying to land is particularly dangerous. If the vertical rate of descent is higher than intended, a hard landing will result. However, most helicopters have a strong landing gear that will absorb this.

Similarly, the landing gear will normally cope with unexpected fore and aft movement, since it is already designed to allow rolling landings.

But most helicopters have a high centre of gravity, and any sideways movement can result in a dynamic rollover.

Operating in a degraded visual environment (DVE), whether as a result of environmental conditions (sandstorm or snowstorm) or a brownout, is inherently dangerous. Some experts maintain that operating in a DVE has claimed more military aircraft and lives than enemy fire since 2001, accounting for 400 aircraft losses and 152 lives, at a cost of \$1 billion.

Michael Hirschberg, executive director of the American Helicopter Society International, calculated that brownout has been a "significant contributor" in the loss of 400 vertical flight (and 600 personnel) aircraft, while Colonel Matthew Hannah, of the US Army's aviation systems project office, has said that 25% of the 383 Class A and B US military flight accidents between 2002 and 2015 related to operations in degraded visual environments.



According to Hannah, 56% of these accidents occurred in brownout conditions, costing “approximately nine to ten people per year because of DVE brownout-related accidents”.

The use of prepared landing surfaces at forward operating bases and other regular helicopter stops can reduce brownout landing losses by reducing the amount of loose sand or dust that can be displaced by rotor downdraft.

Alternatively, pilots can keep their aircraft moving forward until its wheels touch the ground, making what resembles a roll-on landing and keeping dust cloud behind the helicopter until it lands. This requires a long flat/smooth landing zone (LZ) without surface hazards and is dependant on surface winds, while also being better suited to aircraft that can land in a more nose-up attitude, like the H-60 and Chinook.

Sometimes, the best option will be to abandon the landing attempt, or to hover high enough to be able to blow the dust out of the way before attempting to land, but this may not be an option, especially in critical military operations.

Technology can help. Workload reduction and improved situational awareness can help in brownout conditions, and improved military helicopter handling qualities and reduced pilot workload are seen by many as forming an important part of any solution. Improved head-up, head-down and helmet-mounted displays, now being developed by the Army Aeroflight Dynamics Directorate in California, will also play an important role.

Some have suggested using commercially available helicopter terrain awareness warning systems (HTAWS), which provide visual and audio warnings if an aircraft is in danger of striking terrain. However, these rely on digital map databases, while military helicopters often fly in unmapped combat zones, and also routinely fly so close to the ground that the system would be issuing near constant warnings.

To properly solve the problem, a pilot needs to be able to see the outside world, or a reasonable approximation of it, to land safely.

#### Visual picture

Obtaining a visual picture in such conditions requires some kind of sensor – either two-dimensional like infrared video, image intensified video, passive millimeter wave (MMW), or synthetic aperture radar (SAR); or three dimensional as with 3D active MMW, laser detection and ranging (LADAR), sparsely populated radar array, active acoustics or stereo imaging.

Preloaded data may also play a part, including digital maps, terrain and vertical obstruction databases, while station-keeping equipment can provide range/bearing from other aircraft, which may not be in visual contact.

Various solutions have been trialled in recent years, mostly using active sensors, and most notably by the various US service branches – particularly the Army and the special operations community.

In 2013, Sierra Nevada Corp’s helicopter autonomous landing system (HALS), was tested in five US Army UH-60L Black Hawk helicopters in Afghanistan in a year-long trial.

HALS was based on a 94 GHz radar using a frequency whose range is claimed to be “basically unaffected” by smoke, fog, dust, sand or dry snow, and which was reportedly judged to represent the most mature “bang for the buck”. The radar picture is fused with US Department of Defense-sourced digital terrain maps, producing a 60-degree by 60-degree 3D colour image of the outside world, including hazards down to one foot in size.

HALS will eventually be coupled with a brownout symbology system (BOSS) still being developed by the Army, which will overlay speed, altitude, wind direction and even flight control command cues on the picture.

The US Special Operations Command’s Sierra Nevada-supplied DVE pilotage system (DVEPS) was successfully flight tested at Yuma in June 2015.

This combines information from millimetre wave, laser scanner and forward-looking infrared sensors to create an accurate, real-time terrain image.

The system has since been selected by the Army to meet its Brownout rotorcraft enhancement system (BORES) requirement for fielding on approximately 300 Sikorsky UH-60M/V Black Hawk and Boeing CH-47F Chinook cargo, utility and medevac helicopters.

A Royal Air Force Merlin helicopter creates a large dust cloud known as a brownout as it lands.

PICTURE: SERGEANT STEVE BLAKE RLC/UK ARMY.

# Avionics advances help reduce the risk of disaster

**Steve Nichols** looks at the technology now being employed to combat so-called brownouts.

**H**elicopter accidents caused by reduced visibility due to sand and dust are a big problem. So-called “brownouts” can occur during helicopter landing and take-off operations in arid desert terrains.

Ground obstacle collisions or rollover due to landing on uneven slopes can be caused by the intense, disorienting dust clouds stirred up by the helicopter rotor downwash.

A NASA report blamed brownout for being behind more military helicopter accidents than any other cause, calling it a \$100 million per year problem for the US military in Afghanistan and Iraq.

So it is no surprise that avionics companies have been trying to solve the problem.

While simple radar is one potential solution, synthetic vision systems (SVS) are proving to be another tool. SVS is able to provide a computer-generated depiction of the area around a helicopter, helping to improve a pilot’s situational awareness.

For example, Garmin’s helicopter synthetic vision technology (HSVT) is available as an optional upgrade to the G500H. Using sophisticated computer modelling to recreate a virtual topographic landscape from the system’s terrain alerting database, HSVT gives pilots a clear depiction of ground and water features, airports, obstacles, traffic and more.

## Rising terrain

When flying in areas where rising terrain may pose a hazard, Garmin’s HSVT uses its database to ‘paint’ the landscape with amber or red overlays, showing where potential controlled flight into terrain (CFIT) risks exist. Towers or obstacles are also colour-highlighted with hazard-appropriate symbology.

Honeywell Aerospace completed successful testing of a newly designed synthetic vision avionics backbone (SVAB) for helicopter operators in 2013. It integrated multiple types of sensors with its SVS to provide a 3-D view of the outside world in degraded visual environments (DVE).

Testing was conducted on a Blackhawk helicopter as part of the Defense Advanced Research Projects Agency (DARPA) multifunction radio frequency (MFRF) programme.

In 2015, Rockwell Collins led test activities at the Army’s Yuma Proving Grounds (YPG) to show how its products could help reduce brownout problems.

The company successfully demonstrated its sensor-agnostic

synthetic vision avionics backbone (SVAB) solution, which fuses, in real time, multiple DVE sensor types with its high-resolution tactical synthetic vision system (TSVS).

Ryan Olson, senior systems engineer from Rockwell Collins’ Airborne Solutions Engineering, said: “Our testing at the YPG validated a number of advancements in our sensor fusion algorithms that, when combined with our earlier work in radar data fusion, allows us to deliver higher performance solutions to our military customers, while balancing affordability.

“This testing showed that we could efficiently fuse 2D imaging sensors and laser imaging detection and ranging (LIDAR), two prevalent sensing technologies being considered today, into our TSVS.

## Obscurant penetration

“This was important because both systems offer advantages and disadvantages in terms of obscurant penetration and enhanced situational awareness information for the pilot.”

Rockwell Collins now offers a flight situational awareness solution called the HeliSure helicopter synthetic vision system (HSVS).

Guillaume Zini, principal business development manager for Rockwell Collins, EuMEA, said: “HeliSure combines integrated visualisation, advanced displays, and industry-leading high resolution database components to provide pilots with a real-world view of terrain and obstacles along their flight path. It is designed to easily integrate active or passive terrain and hazard sensors to provide a comprehensive situational awareness solution for flight in degraded visual environments.”

This minimises the risk of controlled flight into terrain (CFIT) accidents.

“Currently HeliSure is offered on the AW169, AW189, and AW101 from Leonardo’s helicopters division, and will also be available on the AW609 when delivered,” said Zini.

“Looking ahead, Rockwell Collins is now developing advanced cockpit avionics systems for retrofit applications that will incorporate our HSVS product, as well as our HeliSure helicopter terrain awareness and warning system (HTAWS).

“Together, these products, coupled with our multi-function display systems, will provide legacy helicopter operators with increased situational awareness and safety, while delivering higher performance and reliability in harsh conditions.”

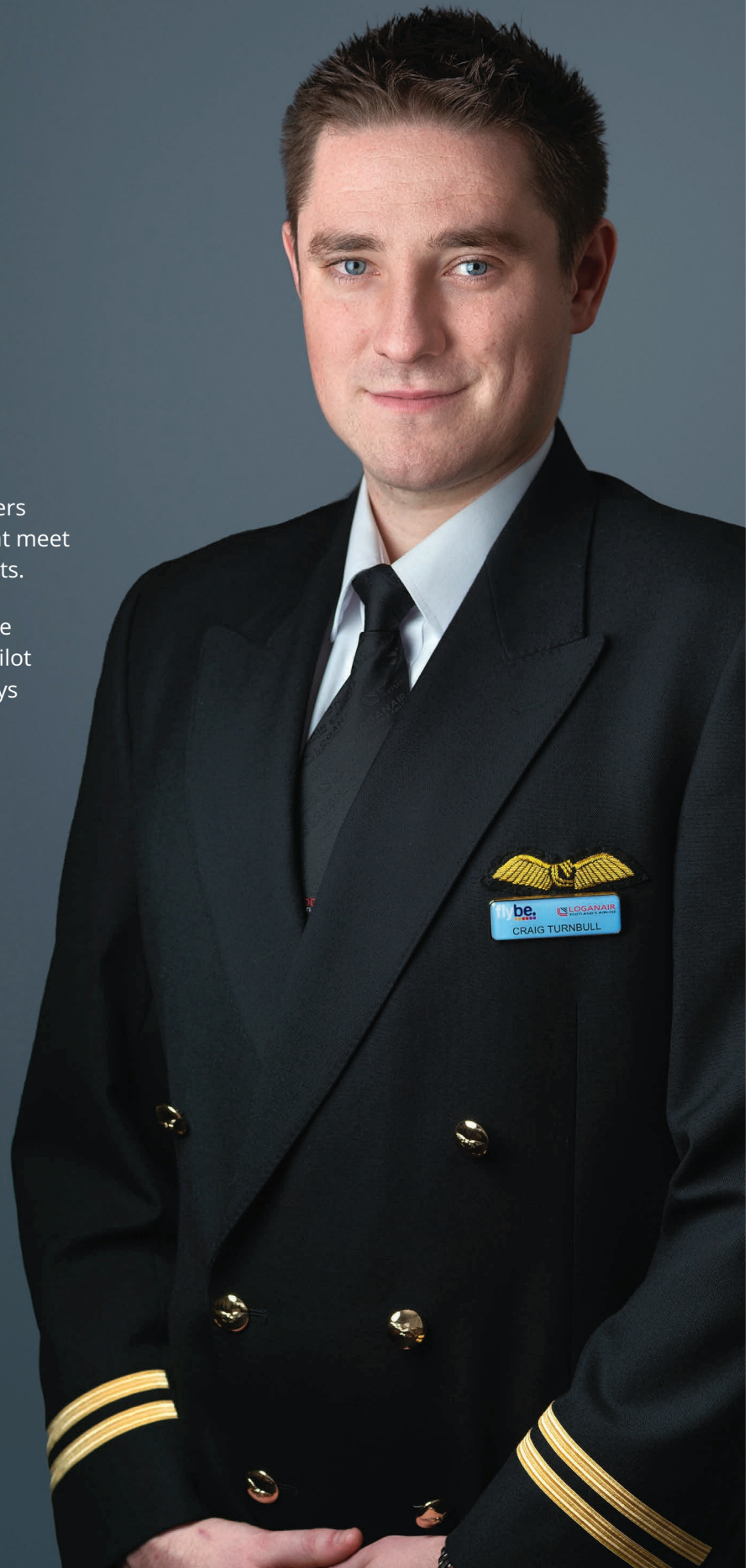
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Craig Turnbull (right) completed the Elite Pathways Programme, our Integrated Course, in 2015. He joined Loganair in 2016 and now flies the Saab 2000 from their base in Scotland.



*Satcom Direct (SD), which is celebrating its 20th anniversary this year, now has its connectivity and avionics products flying on more than 7,000 business aircraft around the world, making it the world's largest business aviation service provider, according to Michael Skov Christensen, managing director, EMEA. Steve Nichols reports.*

# THE DIRECT APPROACH...

**S**D specialises in providing connectivity services to VVIP and head-of-state aircraft. It is also a direct contractor to the US Department of Defense (DoD).

With its headquarters in Florida, USA, and its international HQ at Farnborough Airport in the UK, SD also has a hub in Geneva for its wide-body applications and an office in Dubai to service Middle Eastern clients.

"We now have more than 400 employees in 16 locations with account managers around the world," said Skov Christensen. "Our aim is to be within three hours flying time of all our customers."

In 2016, the company added two networks to its portfolio – Inmarsat's Ka-band Jet ConneX and Panasonic Avionics's Ku-band solution for business aviation and government customers.

## Next step

"We also took the next step to bring multimedia content into the business aircraft including video, audio and conferencing, as connectivity speeds grew from kilobits to megabits per second," Skov Christensen said.

"For example, Inmarsat Jet ConneX offers up to 50Mbps to the aircraft and six Mbps off it. And the data costs have come down too – it is now cents per megabyte rather than dollars.

"The entry level package for a high-speed satellite in-flight connectivity system is now 25Gb for less than \$10,000 a month.

"We are seeing a lot of interest in the Middle East and Russia for fuselage-mounted Jet ConneX systems," he added.

"In many cases, early adoption may have been seen as risky, but now that GX Aviation is rolling out commercially, especially as Qatar Airways has adopted the system, we expect the Jet ConneX take-up to increase."

SD is also a distributor for Panasonic Avionics's new Ku-band system for business aircraft. This uses an Astronics AeroSat tail-mount antenna



**Skov Christensen: "We are seeing a lot of interest in the Middle East and Russia for fuselage-mounted Jet ConneX systems."**

and offers up to 4Mbps peak data speeds, with prioritised traffic for business aviation.

The antenna can also handle both IP and TV connections at the same time, with three channels of Panasonic eXTV available with unlimited use and no extra cost on the data plan.

In 2016, the company also launched its SD PRO integrated flight management system and introduced SD Flightlogs, which do away with the need for manual flight logs.

And, in another move, SD also acquired TrueNorth Avionics, gaining that company's cabin communications solutions and advanced comms systems for VIP and VVIP aircraft, including routers, telephony and handsets.

"By having TrueNorth on board, and our Satcom Direct router (SDR), we now have an interface with everything else on the aircraft.

Adding TrueNorth to our family allows us to cover everything from the smallest aircraft to the largest head-of-state jet," Skov Christensen said.

At the European Business Aviation Convention & Exhibition (EBACE), TrueNorth also introduced its new future air navigation systems (FANS-1/A) over Iridium data link unit (DLU) with voice.

The data and voice solution (DLU-vox) provides data link capabilities (ACARS, ADS-C, and CPDLC) plus flightdeck safety voice capabilities in a small, lightweight, stand-alone form factor.

The new DLU-vox has the same dimensions and footprint as TrueNorth's existing FAA TSO-C139a data link unit (DLU).

## Manage workload

Mark van Berkel, general manager, TrueNorth, said: "Our new DLU-vox will allow operators to better manage their workload. Text-based contact with air traffic control reduces communication errors, and a channel of enhanced quality voice provides added flexibility. Both will help foster smooth flight operations."

Based on TrueNorth's Iridium-based FANS-1/A solution, the company says the DLU-vox is a lightweight, stand-alone device for the flightdeck. It is designed to fully comply with current and foreseeable technical standard order (TSO) specifications and will be compatible with a variety of multipurpose control and display units (MCDUs) and flight management systems (FMS).

Chris Moore, SD's chief commercial officer said: "The DLU-vox is an important addition to our product portfolio. FANS-1/A capabilities offer clear operational and business benefits. Pairing DLU-vox with SD services, like our FlightDeck Freedom application, gives operators the ability to work more effectively, fly more efficient routes and reduce fuel costs; significant



**SD powers the Smartbox to bring premium entertainment to the executive cabin. Inset: SD Pro lets you view and manage flight logs, performance data, scheduling, trip planning, maintenance information, operating history, and more.**

considerations that are important to both pilots and aircraft owners.”

SD says the new system offers enhanced voice quality, which contributes to safer flight operations by providing clearer voice than traditional high frequency radio.

Supporting simultaneous data and voice transmissions through a dual-element Iridium antenna, the DLU-vox enables operational efficiencies, allowing pilots to talk and use the text-based interface at the same time.

Van Berkel added: “Part of our mission is to provide flight crews with the most effective means of communicating with air traffic control, ground operations and other aircraft without disrupting cabin communications.

“Through the direct connection into the flightdeck voice system, DLU-vox gives pilots the ability to communicate in a manner that best dovetails with their own working routines.”

At EBACE, SD also announced it was extending its nicemedia in-flight entertainment service to all platforms.

The nicemedia premium-content service was launched by SD at the Middle East Business Aviation Association (MEBAA) show in 2016 for aircraft equipped with niceHD cabin systems.

Together with Lufthansa Technik, SD has now expanded the types of aircraft that can benefit from the nicemedia SmartBox system, which delivers Hollywood blockbuster movies and contemporary TV shows to the cabin.

The wide selection of movies and TV shows,

available via the portable system, can be viewed on cabin monitors or can be streamed to personal electronic devices (PEDs) including iPhones, iPads, Android smartphones and tablets.

Multiple devices and users are supported, allowing passengers to watch different content on PEDs and cabin monitors at the same time.

To keep the content current, automated monthly updates can be downloaded to the SmartBox while on the ground, avoiding additional data usage on board. Up to 450 movies and TV shows per year will be made available.

**Demand is rising**

Ken Bantoft, SD’s chief technology officer, said: “The demand for in-flight entertainment is rising as passengers increasingly expect a similar entertainment experience in the air, as on the ground.

“Our partnership with Lufthansa Technik allows us to provide great entertainment in a convenient format. The option to preload the data, carry on the box, and plug and play, is a real bonus for any operator or owner.”

Movies are guaranteed to be shown in English, German, Spanish and French across a variety of genres, including action, adventure, comedy, family and science fiction.

The content is digital rights management (DRM)-secured and licenced, and includes new releases in high-definition.

SD’s training division also offers four courses

covering satcom fundamentals (two courses for foundation and troubleshooting), crewmember networking and connectivity, and IT certification (AeroCNCT).

AeroCNCT was launched at this year’s Asian Business Aviation Conference & Exhibition (ABACE) event. Designed for crew members who need to become more familiar with all aspects of cabin connectivity, SD said this is the aviation industry’s first crew member connectivity certification.

It said AeroCNCT provides flight departments and crew with knowledge and understanding of on-board connectivity, how hand-held devices affect flight operations, and how to troubleshoot basic cabin networking issues.

The company also takes cyber security very seriously and has its own state-of-the-art data centre in Florida.

“A lot of the information being sent over satellite link is highly delicate. So the risk of having no control of the data over that link to the aircraft is a no go,” explained Skov Christensen. “We can offer full data security and peace of mind right the way through the chain.

“We also offer cyber security training and consultancy. This is bespoke and tailored to a specific company’s requirements.

“For a very long time, corporate flight departments would have IT-compliance regulations in their organisation. The only place that didn’t extend to was the aircraft. But that’s all changed now,” Skov Christensen concluded.

## Iran Air appoints first female CEO

Iran Air has appointed its first female CEO to succeed Farhad Parvaresh who moves to Montreal as the country's representative at ICAO.

She was named by the official FARS news agency as Farzaneh Sharafbafi. She is currently director-general of Iran Air's research department and is the first Iranian woman with a PhD in aerospace.

## Pichler is RJ CEO

Stefan Pichler has been appointed president and chief executive officer of Royal Jordanian Airlines, succeeding Captain Suleiman Obeidat. He took up the post on June 1.

Pichler has extensive experience with more than 30 years in the aviation industry, including as CEO at Kuwait's Jazeera airline, Thomas Cook and Air Berlin.

He was chairman and managing director of Fiji Airways and chief commercial officer and deputy CEO of Virgin Australia. He started his career in sales at Lufthansa, eventually becoming chief commercial officer there.

## Emirates changes

Emirates has made three key management changes within its commercial and

cargo operations team in the Middle East.

In the UAE, it has appointed Abbas Haji as vice president hub operations for SkyCargo; Mohamed Khoory will be taking over as manager Iran; Sultan Alriyami is the new manager for Jordan and the West Bank.

## Sudan role for Hadi

Ethihad Airways has appointed Ali Ghanim Hadi as its new country manager for Sudan.

Based at the airline's Khartoum office, Hadi will be responsible for leading Ethihad Airways' commercial operations in Sudan, one of the airline's longest-established markets.

Daniel Barranger, Ethihad Airways vice president global sales, said: "We are delighted to have Ali lead the team in the Khartoum office. His promotion is recognition of his hard work and commitment to develop and nurture Emirati talent to take up leadership roles, both in Abu Dhabi and overseas."

## Avtrade goes for Sreekumar

Avtrade has appointed Sheeba Sreekumar as business services manager.

Sreekumar will be responsible for the day-to-day management of office-

## NEW BOARD FOR GULF AIR



Gulf Air has a new chairman and board of directors.

Zayed bin Rashid Al Zayani (left), Bahrain's Minister of Industry, Commerce and Tourism, will chair the new board, which was named as Sheikh Mohammed bin Essa Al Khalifa, Dr Dawood Nassif Dawood, Jameel Ali Al Matrook, Essa Mohamed Najibi, Jean-Christophe Durand and Jassim Hassan Abdelaal.

"Gulf Air's new board, which collectively represents Bahraini professionals and highly experienced business leaders will, I am sure, contribute much to realising our national carrier's key goals. Their dedication and efforts will help us directly support and strengthen Gulf Air, a key national infrastructure asset that serves the kingdom's aviation industry and economic interests," Al Zayani said.

related activities for the Dubai, Singapore and new Guangzhou office.

She will also be responsible for HR-related tasks for the Middle East and African regions and assist the director of contract management with employment contracts.

## Egypt country manager named

Gulf Air has appointed Wael Mattar as its new country manager for Egypt.

Ahmed Janahi, Gulf Air chief commercial officer said: "It is a pleasure to welcome Wael to his newest role with Bahrain's

national carrier. As a long-standing member of the Gulf Air family, he has amassed extensive industry experience and skills, making him the perfect candidate to further strengthen our presence in the Egyptian market and continue representing our airline in the Arab Republic of Egypt, a country we have proudly served since 1974."

## Oman role for Al Yousuf

Ethihad Airways has named Hassan Al Yousuf as its new general manager for Oman.

Based at the airline's offices in Muscat, Al Yousuf is responsible for leading Ethihad Airways' commercial operations in Oman as it continues to grow its presence and operations across the region.

Al Yousuf was previously based in Perth, Australia, as an assistant general manager, leading the team in achieving its revenue targets for 2016 and driving collaboration with Ethihad Airways' equity partner, Virgin Australia.

## DAE chief Fattaleh quits

Dubai Aerospace Enterprise (DAE) confirmed in July that CEO Osama Fattaleh had submitted his resignation to pursue his interests outside the industry. Amjad Korshlow, chief financial officer of Joramco, is serving as acting chief executive officer.

## Kuwait names CEO

Ibrahim Al-Khuzam has been named as the new CEO of Kuwait Airways.

The flag-carrier formally disclosed the appointment in May as part of a revised management line-up.

The airline has also named Sami Fahad Al-Rushaid as its chairman, succeeding Rasha Al-Roumi.

## IATA chairman

Goh Choon Phong, CEO of Singapore Airlines, has assumed his duties as chairman of the IATA board of governors for a one-year term. Goh succeeds Willie Walsh, CEO of International Airlines Group, who will continue to serve on the board.

## THALES MAKES NEW ME APPOINTMENTS



Roger Daix (left) is the new VP Middle East for Thales.

Bernard Roux, previously the company's country director of Bahrain, has been appointed as UAE country director.

Alain Correia takes over from Roux as country director for Bahrain, Kuwait and Pakistan.

Other country director changes include Frederic Sallet's appointment in Qatar and Eric Delannoy in Oman.

Daix said: "At Thales, we have always combined global expertise with local knowledge through a team of talented professionals and our new team in the region is reflective of that."



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## Nick Weber

Marcelle Nethersole speaks to ExecuJet Middle East's maintenance director.



1

■ What does ExecuJet Middle East offer?

ExecuJet Middle East provides its clients with a comprehensive array of outstanding base and line MRO services. Aircraft operators can also gain assistance with customs and immigration, ground transportation, hotel bookings and flight plan support through our FBO and aviation services departments.

ExecuJet has MRO centres in several continents; in the Middle East we are located at Dubai International Airport, where we have our main facilities, and Al Maktoum International Airport, where we currently offer line maintenance support. Both these locations offer 24-hour aircraft-on-ground (AOG) support, with the aim of ensuring customer aircraft are maintained to the highest level of serviceability.

All maintenance operations performed within the global ExecuJet network comply with the world's most stringent regulatory and safety requirements.

In the region, we also have centres in Riyadh and Istanbul.

2

■ What type of jets do you provide services for?

In terms of ExecuJet's Middle Eastern fleet, we have more than 20 aircraft available for charter, including Bombardier, Boeing and Embraer jets. We can satisfy customers' needs to fly all over the world using our ultra-long-range Global and Gulfstream aircraft.

We can provide maintenance on a wide range of Bombardier, Embraer, and Hawker business aircraft, along with supporting their associated engines/APUs and avionics, as the Middle East MRO is also an appointed service facility/centre for Rolls-Royce, GE, Honeywell engines/avionics and the Rockwell Collins avionics dealership.

Another recent milestone is that we are closely cooperating with Austrian interior completions company, F/List, which is enabling us to offer interior repairs and refurbishments within our facility to European standards. This further enhances our MRO total offering, enabling us to attract the larger base maintenance events, which have historically gone to European facilities.

5

■ What does a typical day hold for you?

My typical day consists of an array of activities, from attending the daily planning and other meetings, through to engaging with the MRO workforce and customers alike.

Every day is different as we are maintaining anywhere between 15-25 aircraft daily, which bring their own unique challenges to the MRO managers and staff.

Decision-making is one of my priorities as we work in an extremely fluid environment that requires decisive action, along with direction to ensure we meet our customers' expectations.

6

■ What challenges do you face in the region?

The Middle East region certainly has its challenges. The hot climate is extremely hard on aircraft, especially those that are not based in a hangar. This leads to a sizable amount of corrosion, which can mainly be attributed to high humidity and general air quality—especially along coastal locations such as Dubai.

Regional customers also have high expectations and, due to the nature of most of their operations, are unable to plan their maintenance far in advance. This can prove challenging during seasonal periods of high demand.

3

■ What sets you apart from your competitors?

As part of the Luxaviation Group, at ExecuJet we believe it is fundamental to continue to drive improvements and efficiencies, as it maintains the group's focus towards the highest quality, which ultimately results in the overall premium services that our clients expect and, more importantly, experience.

As an example, our MRO and FBO cleanliness, lounges and meeting rooms

are designed to provide the utmost comfort, in order for our clients to feel relaxed and welcome during their stay at our facilities.

This year, we are extremely proud to be celebrating the 12th anniversary of our Dubai International Airport MRO, which is testament to the outstanding service we provide, not only at this MRO, but also across the ExecuJet global network of facilities.

4

■ Is there anything new for ExecuJet Middle East?

We are busy with the final phase of approvals for our new facility at Al Maktoum International Airport, which will house both MRO, FBO and their associated support services.

We are looking to build over three plots, which will provide around 13,500sqm of hangar floor area—just over double the capacity of our current facilities at Dubai International Airport.

# Gulfstream

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