



SHOW BUSINESS

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THE AI MENACE

AIR FORCE ROLE IN FIGHTING TECHNOLOGY TERROR THREAT

Artificial Intelligence will change the way we fight – that was the message from yesterday's 11th Dubai International Air Chiefs' Conference (DIACC) on the sidelines of the show.

In his opening speech, the UAE minister of defence, Mohammed Ahmed Al Bowardi said: "Air force commanders today face many challenges in trying to keep pace with the many military and political developments: navigating the geo-political environment, connectivity in coalition operations, and to an ever-changing political environment.

"These challenges have to adapt to the strategic conditions, and the commanders must display that their air forces are effective and able to cope with that."

The UAE Air Force and Air Defence has undoubtedly one of the stiffest challenges in the world, facing the threat of attack by cyber, sea, space and air on a daily basis he said, and needing to combat them by producing results in real time. It has done this by modernising its military with sensors and intelligence-gathering systems.

The UAE AF&AD commander, Major General Staff Pilot Ibrahim Naser M Al Alawi said: "We know AI will bring weaponisation by terrorists, who will use


it in destructive ways. We have to be aware of this."

The UAE has faced several attacks in recent years from Iranian-backed Houthis based in Yemen, and undoubtedly, they will be masterminding different ways of using AI to attack the UAE and its allies.

"Correlating, fusing and making decisions is the name of the game," said conference moderator Jon Norman, Raytheon's vice president requirements and capabilities, defence.

The UAE Air Force and Air Defence commander, responded: "We have to use artificial intelligence to suit our operational environment. The way in which we fight and win wars will have to keep pace with AI and machine learning."

The Italian Air Force commander Lt. Gen. Luca Garetti and the RAAF's Air Commander Australia and Deputy Chief of the Air Force AVM Glen Braz, who both spoke on their experiences, agreed. Major gen Alawi continued: "AI and machine learning is a new front in information warfare and with it will come a newer generation of air power leaders. The traditional style of air power is being seen by many of the younger generation of officers as somewhat archaic and outdated. But they are the future." ▲



Air force commanders today face many challenges in trying to keep pace with the many military and political developments – UAE minister of defence, Mohammed Ahmed Al Bowardi

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▲ EV does it: CEVO
Mobility's new range of electric vehicles

UAE's EV market set to accelerate

UAE-based Masari-Atlantis and South Korea's CEVO Mobility are displaying a range of its new electric vehicles, which can be used at airports.

The companies signed an investment contract in September to invest \$107m in a new electric vehicle factory in Dubai next year, with plans to produce 20,000 vehicles per year.

Dubai is setting its sights on having 42,000 electric cars on its roads by 2030, with the UAE's EV market expected to grow at a CAGR of around 28.5 per cent during the 2023-28 period.

'Big Twin' 777 cargo conversion makes debut

Four years after launch of the industry's first passenger-to-freighter Boeing 777-300ER conversion programme, the aircraft is making its airshow debut here at the show.

Dubbed the "Big Twin" and designated the 777-300ERSF, the 777 here at the show will be delivered to launch customer and US cargo airline Kalitta

Air in January 2024 once the certification program, being conducted in a bilateral partnership with Israel's CAA and the FAA, is concluded.

The aircraft being showcased here, which has a cargo capacity of 100 tonnes, is aimed at replacing 747 freighters. The conversion programme has been developed by lessor AerCap in partnership with

Israel Aerospace Industries (IAI). The 777 here at Dubai, in addition to the prototype currently performing certification flights, will be the first two of seven aircraft for Kalitta.

AerCap has a total of 20 firm orders for the 777-300ERSF and 10 options, while IAI has 48 firm orders for the aircraft from a variety of customers including Emirates.



The AerCap-IAI Boeing 777 cargo conversion is making its show debut ▲

Skyportz paves way for private 'vertiports'

With urban air mobility playing a key role at this year's Dubai AirShow, No wonder there is a focus on the infrastructure needed to make it a success. Skyportz is unveiling its latest vertiport design, in collaboration with Contreras Earl Architecture with input from Arup.

The Skyportz Vertistop (pictured right) will fill a gap for privately-owned vertiports for public use on compact sites. It has been designed to be placed on a rooftop, in a car park, or anywhere there is space with a minimum of 30x30

metres. Charging facilities will be available as a back-up only at some locations.

"We have in our stable of designs a large public vertiport, a smaller public waterfront vertiport and a tiny "Vertiport in a Box" for private usage. With this Skyportz Vertistop design, we are filling a gap in the market for a public vertistop that is compact and affordable for property developers wanting to bolt on a vertiport to their existing sites," explained Clem Newton-Brown, Skyportz CEO. By using a modular



Contreras Earl Architecture

design, construction costs will be kept to a minimum, with Newton-Brown adding: "Land is expensive in urban locations, and we believe that simple set down and pick up vertistops in prime locations will have a huge role to play in an advanced air mobility ecosystem."



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Doors are opening: Embraer sees opportunities with 'crossover' jets

After more than two decades of struggling to find markets in the Middle East, Embraer believes that changing circumstances in the region may be opening the door to its products.

"It has been a difficult region for us because Middle East aviation historically has been associated with mega-hub connectors," Michal Nowak, Embraer's VP marketing, EMEA said.

"But it's really clear that the energy or momentum of this model is running out and the region has got to find new pockets of growth," Nowak said, speaking on the sidelines of a symposium organised by the Brazilian manufacturer on the eve of the show.

"We believe the next stage of this growth will be intra-regional connectivity. This is why we see a chance for crossover jets."

Embraer is forecasting a market in the Middle East for 390 crossover jets – aircraft that span the gap between regional jets or turboprops and narrowbody jets – over the next 20 years.

"Royal Jordanian is an example of a mid-size hub-and-spoke carrier that's connecting the Levant to Europe," Nowak noted. "This will continue, using E2s to support that strategy."

At the Arab Air Carriers Organization annual meeting in Riyadh last month, Royal Jordanian CEO Samer Majali said that using Embraer jets – the carrier is about to replace its existing E1 models with E2s – handed the airline a significant advantage, with one reason being that operating a smaller aircraft than its narrowbodies enabled it to test new routes at the lowest possible cost.

Nowak agreed that crossover jets allowed airlines to complement its narrowbodies with smaller platforms on sectors of up to three and a half hours. This allowed Royal Jordanian, for example, to fly as far as Central Europe. Omani LCC SalamAir was another example of using E2s to complement its A320-family models, he said.

"We're particularly happy about that because it's an LCC and historically LCCs found it difficult to operate crossover jets" because of cost-seat economics, he said.

Although selling crossover jets in the Middle East was a long-term game "because it really requires a change in strategy and mindset and it takes some time, we're very happy we've made the first step," Nowak concluded.



Michal Nowak – "It has been a difficult region for us because Middle East aviation historically has been associated with mega-hub connectors"

Air Arabia to target Southern Africa, says LCC airline chief

Air Arabia will target Southern Africa in the next few years as it accepts Airbus A321XLRs into its fleet, the airline's CEO said yesterday. Speaking at an Embraer symposium on the eve of the show, Adel Ali said that Southern Africa, Southeast Asia and the whole of Europe would be within the range of the XLR. Air Arabia has ordered 20 of the longest-ranged version of the A320neo family as part of an order for 120 neos.

Africa is largely virgin territory for low-cost carriers. South Africa's Kulula collapsed in 2022 and Mango's future remains in the balance, as it tries to emerge from a lengthy period in 'business rescue', the local equivalent of Chapter 11.

FlySafair and Lift remain in business.

Ali said that Air Arabia frequently had to win over local regulators to its LCC model. It typically took a couple of years to show that the introduction of an LCC model actually increased the size of the local market, rather than taking traffic away from legacy carriers.

One of Air Arabia's latest enterprises is in Pakistan, where it has a joint venture undertaking in the shape of Fly Jinnah. Pakistan has a market of 220 million people, but is underserved by current carriers. Fly Jinnah, which follows Air Arabia's LCC model has been "extremely successful", said Ali and in the past fortnight had



received its licence to fly international flights, as well as its current domestic network.

Adel Ali – Air Arabia frequently has to win over local regulators to its LCC model



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Edge leading product charge

The UAE's Edge advanced technology and defence group is the defence technology partner for the 18th edition of the Dubai Air Show and has announced the launch of 11 new disruptive aerospace systems and solutions.

These include three new autonomous unmanned aircraft. The new Reach-M is a fixed-wing medium-altitude long-endurance (MALE) unmanned combat aerial vehicle (UCAV) designed for ISR and light ground attack operations, similar in configuration to the existing Reach-S but with longer-span, high-aspect-ratio wings.

The aircraft has a maximum take-off weight (MTOW) of 1,500kgs and can fly for a duration of 24 hours with a maximum payload of 350kgs – more than double that of the older variant. Reach-M is capable of fully-automatic take-off and landing.

Following its acquisition

of significant shareholdings in Polish-based Flaris, and Switzerland's Anavia, Edge will manufacture the Flaris Sinyar jet-powered UAV, and Anavia's innovative HT-100 unmanned helicopter system.

The Sinyar can fly at 545km/h, at an altitude of 30,000ft, while carrying a 450kg payload while the compact HT-100 can fly six-hour ISR missions at a speed of 120km/h.

The company is also introducing eight new missile, guided munition, and jammer systems at the show.

These include the NASEF-20 subsonic, low-cost global navigation satellite system-guided cruise missile (LCCM), which is designed to be launched from unmanned aircraft for the precision engagement of soft targets.

The company has also announced the NASEF-125 subsonic sea skimming cruise and



Reach for the stars! The new Reach-M is a fixed-wing MALE UCAV similar in configuration to the existing Reach-S but with longer-span, high-aspect-ratio wings

anti-ship missile which can engage ground and surface targets using infrared imaging (IIR) and active homing radar seekers.

Edge has also launched the all-weather, extended-range national surface anti-ship missile (MANSUP-ER), which has been developed to meet the defence requirements of both the Emirati and Brazilian navies, and for international export customers.

This sea-skimming 200-km range missile was co-developed with the Brazilian Navy, and SIATT, in which Edge has a 50 per

cent shareholding, and finds its targets using inertial guidance and active radar homing.

The weapon will soon undergo testing by the Brazilian Navy before being integrated onto a range of air and land systems.

Finally, Edge has promised to develop the Hunter 2-SJ system providing targeting capabilities to engage electronic warfare and command and control (C2) systems. The Hunter-N is a new variant of the Hunter SP, which has been developed for launch from naval vessels.

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Dnata helping show to run smoothly

Dnata is playing a 'crucial' role during the air show, ensuring that airside operations run efficiently throughout each day. The airport services provider will allocate a fleet of 100 pieces of ground support equipment (GSE) and more than 30 staff will support service delivery.

Its technical services team will provide 24/7 support for the GSE throughout the show. The company's

teams will work overnight on each day of the event to ensure all GSE are refuelled, recharged, washed and cleaned to support all aircraft movements.

Steve Allen, CEO of Dnata Group, said: "Our commitment to safety, sustainability and service excellence will be on full display during the event, including exciting demonstrations of our electric pushback tractors."

Tractor beam:
Dnata is happy to be providing vital on-the-ground support for the show



▲ NEWS IN BRIEF

VarnaJet flight permit business expanding

Specialists in facilitating flight permits worldwide, UK-headquartered VarnaJet, which is participating in this year's airshow, is currently making waves in the aviation sector. It recently announced the acquisition of more than 150 new customers. Catering for operators from every corner of the globe, VarnaJet offers a go-to solution for overflight and landing permit requirements for operators across the sector. According to Mazen Shbib, regional manager GCC of VarnaJet, the announcement underlines the company's track record of obtaining and delivering thousands of permits, ensuring airlines and flight operators reach their destination smoothly and efficiently.



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Archer takes aim at eVTOL market

Archer, a provider of electric vertical take-off and landing (eVTOL) aircraft, is launching and displaying its Midnight electric air taxi at the Advanced Air Mobility (AAM) pavilion.

Archer founder and CEO, Adam Goldstein said the company plans to bring electric air taxis to the United Arab Emirates (UAE) in 2026.

“The Middle Eastern debut of Midnight at the Dubai Air Show will give a wide array of key regional stakeholders from the royal family to the UAE’s

General Civil Aviation Authority and beyond, the opportunity to experience sitting in an electric air taxi, providing an unprecedented glimpse at the future of urban air mobility in the UAE,” said Goldstein.

Recently, Archer and the Abu Dhabi Investment Office announced plans to make the UAE its first international launch partner, with plans to commence air taxi operations in both Abu Dhabi and Dubai in 2026. In addition, Archer is working with global manufacturing partner Stellantis

and regional partners Falcon Aviation and GAL-AMMROC to build out aircraft manufacturing capabilities to service regional demands in the UAE and surrounding areas.

“Our goal is to transform urban travel, replacing 60-90-minute commutes by car with estimated 10-20 minute electric air taxi flights that are safe, sustainable, low noise, and cost-competitive with ground transportation,” said Goldstein.

Archer’s Midnight is a piloted, four-passenger aircraft designed to perform rapid back-to-back



▲ Call me a taxi! ‘Midnight’ in the Air Mobility Pavilion

flights with minimal charge time between flights.

▲ NEWS IN BRIEF

Jetex and Shell to supply SAF at DWC FBO

Ahead of this year’s airshow, Jetex confirmed an agreement with Shell Aviation to supply SAF for customers using its flagship FBO at Dubai World Central (DWC). The supply marks a milestone for the executive aviation provider, as it is the first time it has offered SAF to customers in the UAE. “Bringing SAF to the UAE is a milestone achievement, and today I am pleased that we finally can offer this type of aircraft fuel to our customers in Dubai in partnership with Shell Aviation,” said Adel Mardini, founder and CEO of Jetex.



▲ Jetex and Shell Aviation collaborate on SAF delivery at DWC



It’s a fair COP – the UAE’s National Search and Rescue Centre AW139

Heli-COP-ter highlights UAE Presidency of COP 28

The Dubai Air Show static display includes several police and para-public helicopters from the region, including a Dubai Police AW139, an Abu Dhabi Police Bell 429 and an Airbus Helicopters H225 from the Kuwait Police.

But it is the AW139 of the UAE’s National Search and Rescue Centre that is emblazoned with the legend ‘COP 28 UAE’, highlighting the vital importance that the UAE attaches to its presidency of COP

(Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC)).

The UAE hopes that the COP28 UAE conference will provide the first global stocktake (GST) - providing a comprehensive assessment of progress since adopting the Paris Agreement on climate change.

The UAE plans to use its presidency to ensure the world responds to this GST with a clear action plan.

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Airbus A400M takes a break from military duties

One of the RAF's Airbus A400M Atlas tactical transport aircraft is taking a break from its duties sustaining UK military activities in the Middle East to appear in the static display at the Dubai Air Show.

Now that the UK has retired its Lockheed Martin C-130J Hercules aircraft, the A400M bears the brunt of the broader Middle East air transport schedule (BATS), providing the key logistical link between the UK and deployed UK military units in the Middle East.

Recent BATS sorties have seen the A400M deliver equipment to support the RAF participation in the Qatari-led exercise 'Ferocious Falcon V', as well as the UK's enduring commitments to operations 'Shader' and 'Kipion'.

One of the exercise 'Ferocious Falcon V' sorties saw a sudden sandstorm as the Atlas was taxiing, immediately followed by a heavy desert thunderstorm that tested the aircrew and RAF 'movers' at Al Udeid. 'Operation Shader' is the UK's element of the international coalition undertaking

a military campaign to counter Daesh in Iraq and eastern Syria, primarily carried out by Eurofighter Typhoon aircraft and General Atomics Reaper UAVs operating from Akrotiri in Cyprus.

'Operation Kipion' is primarily conducted by the Royal Navy (RN) and is the UK's contribution to international efforts to promote peace and stability in the region, not least by ensuring the safe flow of oil and trade. The RAF acts as an enabler providing an air bridge for the RN ships deployed in the region.



AT BATS

The A400M is bearing the brunt of the broader Middle East air transport schedules since the retirement of the Lockheed Martin C-130J Hercules

Hensoldt sensors 'redefining monitoring'

Hensoldt is showing its wide-ranging portfolio of sensor technologies at the Dubai Airshow 2023, which it says represent "the future of defence innovation."

This year's exhibit highlights Hensoldt's latest advancements, including the land passive radar systems and the TRML-4D, Hensoldt's robust land radar system, which have demonstrated their strategic importance in current conflict zones such as Ukraine.

The Argos series is reaching new heights with the introduction of Argos 8, specifically engineered for UAV applications, reflecting Hensoldt's agility in meeting the diverse needs of modern surveillance.

The company is showcasing its Amps and Milds block 2 protection systems, which are establishing new standards in threat detection and countermeasures. Hensoldt is also showing its EuroNav 7 system, a level C certified system for moving maps, situational awareness, and mission management, as well as the LCR (lightweight flight recorder), and new Mode 5 compatible crypto units.

Ground-based surveillance systems on show include the Spexer 600, a compact AESA X-band radar, and NightOwl M camera – two state-of-the-art technologies that Hensoldt say "redefine monitoring capabilities."

SD showcases military connectivity

Satcom Direct (SD), the global connectivity solutions provider, is showcasing new defence connectivity technologies at the show. These include its tactical removable airborne satellite communications (TRASC) R4 BLOS (beyond line of sight) solution. This integrates the SD Plane Simple Ku-band terminal within a multi-purpose hatch system (MPHS) engineered to fit in place of existing standard C-130 Hercules upper forward or centre fuselage hatches. The new housing can be fitted within less than an hour, providing the aircraft with immediate plug-and-play global broadband connectivity. The hatch design was the responsibility of R4 Integration.



The UAE Aviation Success Story in Numbers

The United Arab Emirates (UAE) has firmly positioned itself as a **global leader in the aviation sector**. As we delve into the sector's statistics, it becomes clear that the UAE's aviation industry is on an upward trajectory.

At the heart of this remarkable success story is the unwavering confidence in the UAE's aviation sector, resonating both regionally and internationally.

The country is ranked first among the **top 20 largest aviation markets** in the world in terms of scheduled seat capacity growth at its international airports.

Beyond these impressive rankings, the aviation industry plays a pivotal role in diversifying the UAE's national economy. It acts as a cornerstone, not only driving economic diversification but also connecting the nation to global markets. This is reflected in the sector's substantial contribution, accounting for **approximately 13% of the country's Gross Domestic Product (GDP)**.

With an extensive fleet and connectivity, boasting **over 504 aircraft** serving national carriers, the UAE connects to **more than 200** international destinations. This connectivity opens doors for trade, tourism, and global interactions.

The future looks even brighter, with the sector anticipated to grow by an astounding 170% by 2037.

This growth isn't just about numbers; it translates into the creation of **1.4 million** job opportunities and a significant contribution of **\$128 billion** to the nation's economy, according to the International Air Transport Association (IATA).

Additionally, The UAE's aviation infrastructure is robust, featuring **917** registered aircraft, **53** local aircraft maintenance, **151** foreign aircraft maintenance, **35** training institutions for maintenance engineers, **13** training institutions for pilots and flight crews, and **24** medical institutions specializing in civil aviation.

Safety isn't just a word; it's a practice. The UAE's dedication to passenger safety is underscored by the presence of five national carriers **featured on the list of the world's safest commercial and low-cost carriers**.

With approximately **187** agreements and memoranda of air transport signed with countries worldwide, the UAE leads the way in fostering international collaboration.

The UAE's airports have witnessed a significant increase in the number of passengers, reaching around **87 M** by August 2023, up from **62 M** during the same period in the previous year. This positive trend signifies a return to normality and sets the stage for an exciting conclusion to 2023, with expectations of up to **130 million** passengers.

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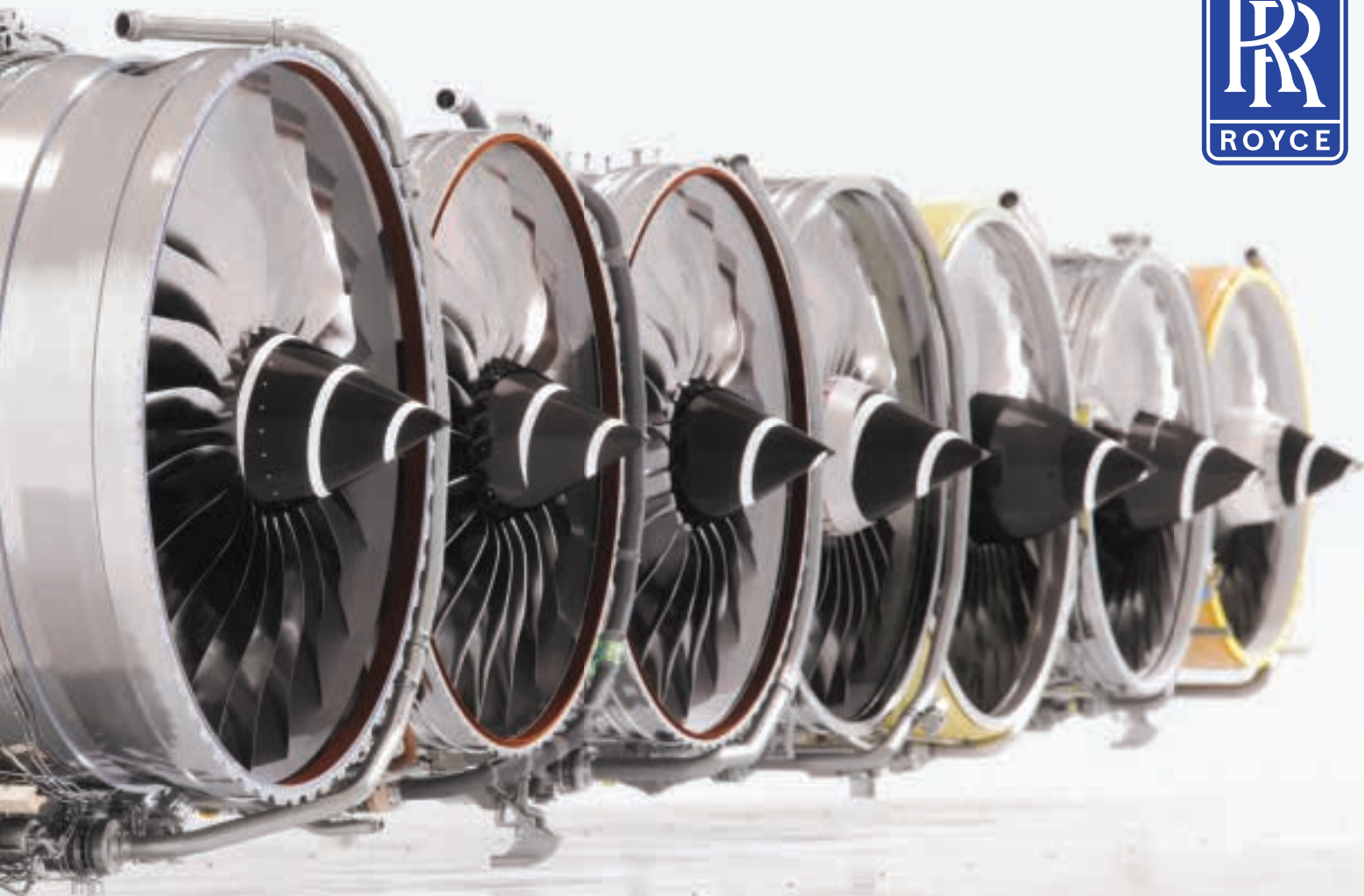
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Steve Nichols writes

Space takes an expanded role at Dubai 2023 that reflects its increasing importance as a focal point for technological innovation with impacts felt on Earth as well as around it

TAKING UP SPACE!

DAS boasts biggest ever Space Pavilion

The Space Zone at the show is the biggest yet and will feature an expanded space industry presence, new space start-up competitions, investor engagement, youth engagement and novel space technology on static display.

Exhibitors include the UAE Space Agency, Mohammed Bin Rashid Space Centre (MBRSC), Airbus, Russia's Roscosmos, the Brazilian and Italian Space Agencies, BlackSky, Boeing, Intelsat, Yahsat and many more.

The zone also aims to demonstrate how space tourism is positively impacting the space industry and how space is no longer the domain of governments, aerospace or defence companies.

The growing interest of other businesses and industries in innovative space applications has led to the creation of a new space economy, making it a key component for the future of all nations.

At the new space start-up competition, entrepreneurs are invited to present their groundbreaking solutions to space industry leaders, investors, and corporate giants on a dedicated start-up stage.

Ibrahim Al Qasim, deputy director general, UAE Space Agency, said: "This year, the UAE celebrates 26 years since the beginning of its space programme. We've made huge strides in building national capabilities and Earth observation, training astronauts, sending missions to Mars, and hopefully soon to the asteroid belt.

"The most important component of our strategy over the next five to 10 years will be to build major

capabilities in the private sector."

The zone will celebrate the UAE's successful Hope Mars mission, and look forward to the Emirates mission to the asteroid belt (EMA).

The UAE Space Agency said EMA is scheduled to launch in March 2028 and fly past six asteroids in the main asteroid belt before arriving at a seventh in 2034 where it will release a lander to touch down on the surface.

Sarah Al Amiri, chair of the UAE Space Agency and minister for advanced technology, said in a statement: "EMA is a key component of the UAE national space strategy and has one overriding goal: the creation of viable and rewarding employment opportunities for young Emiratis for generations to come."

EMA will have a narrow launch period of just three weeks in March 2028. It will fly a tortuous five billion kilometres (around three billion miles) route via Venus in July 2028 and Earth in

May 2029, before going by the main belt asteroids Westerwald, Chimaera and Rockox between February 2030 and January 2031.

This year, in partnership with the UAE Space Agency, Dubai airshow will also host a dedicated two-day space conference programme on 15-16 November, the Wednesday and Thursday of show week.

A unique perspective

The conference will cover topics including space and climate change, space and security, communications and connectivity, space tourism and much more.

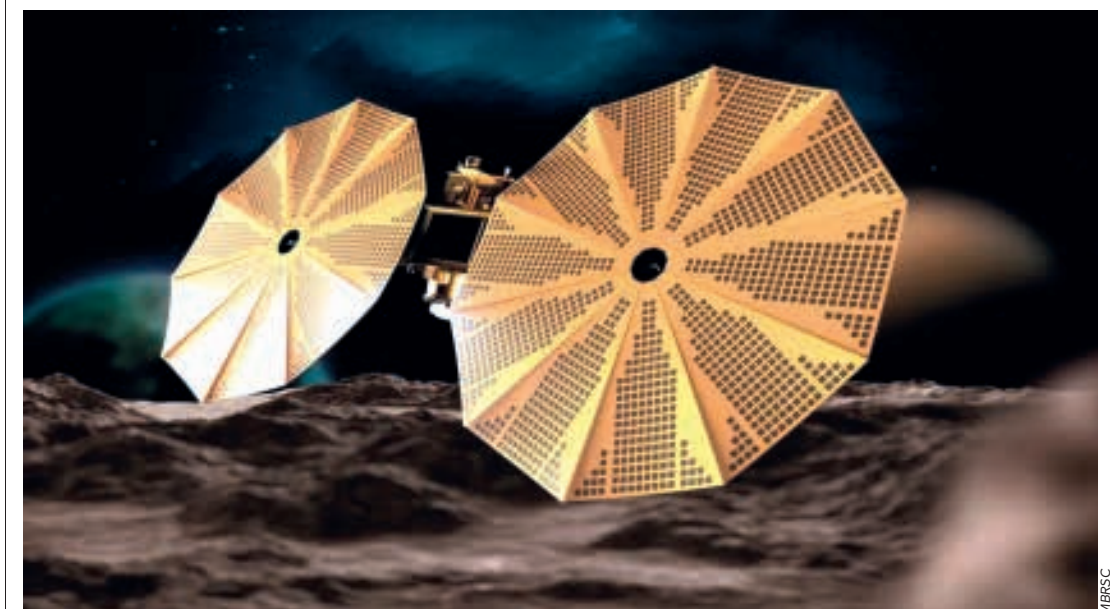
Conference attendees will be treated to a unique perspective from two astronauts at 'A Day in Space', a panel discussion led by Sara Sabry and Kellie Gerardi.

Sabry is an Egyptian-Lebanese engineer, astronaut, entrepreneur and the founder and chief executive of the non-profit organisation Deep Space Initiative.

In 2022, she was selected from 7,000 international applicants to participate in the Space for Humanity citizen astronaut programme, becoming the first Egyptian, Arab woman, and African woman to go into space. On 4 August 2022, she flew on the Blue Origin NS-22 flight, a suborbital flight that reached an altitude of 107km (66 miles).

Kellie Gerardi is an American aerospace, defence and technology professional and a popular science communicator. She also conducts bioastronautics research and has completed spacesuit evaluation in microgravity with the International Institute of Astronautical Sciences (IIAS).

This 30-minute session will highlight their experience conducting space research and missions and will delve into the world of space exploration, innovations coming out of space, how they impact life on Earth and the role of astronauts in inspiring future generations. ▲



The Emirates mission to the asteroid belt is scheduled for launch in 2028

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▲ NEWS IN BRIEF

Forecast says widebodies lead the way

As the Middle East resumes above-average growth following the pandemic, Boeing's latest long-term market forecast to 2042 shows demand for more than 3,000 new aircraft in the region with "new-technology widebodies leading the way". Boeing's Commercial Market Outlook (CMO) projects delivery of 3,025 new commercial aircraft in the Middle East by 2042, including 1,350 widebodies. It forecasts widebodies will comprise 45 per cent of deliveries to Middle East airlines over the next 20 years – the highest percentage of the 10 global regions featured in its CMO forecast.

In addition, the region's fleet of dedicated freighters is projected to more than double to 180 jets by 2042.

The Middle East single-aisle fleet is also expected to more than double as low-cost carriers and short-haul networks continue to develop and expand.

The total fleet will increase 2.4 times to 3,360 airplanes — 1,610 (48 per cent) will be single aisles, while 1,520 (45 per cent) will be widebodies.

The commercial fleet will generate demand for \$335 billion in aviation services including maintenance, repair, training and spare parts.

KEEP IN TOUCH

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◀ Flight test equipment inside the 777X here at the show

▶ The 777X on the static at the show



Boeing's test aircraft on display has the X-factor

While delivery of Boeing's 777X has been repeatedly delayed, expectations for orders are high at this year's airshow, with the 777-9 (test aircraft) and 777-8 being showcased on the static display.

The newest passenger aircraft in Boeing's best-selling widebody family, the 777X is designed to maximise efficiency and environmental performance, while providing an exceptional onboard passenger experience.

While the 777-8 competes directly with the Airbus A350-1000, the 777-9 fills a unique segment in the twin-aisle market, the company said. Its typical seat count is 426 passengers with a

range of 7,925 nautical miles and GE9X engines supplied by GE Aviation – the largest and most powerful commercial engines ever built. The typical seat count for the 777-8 is 396 passengers.

Launched in 2013, the 777X was designed as a replacement for the 777 and features advanced technologies from the 787 Dreamliner family. Measuring almost 77m long, the cabin interior for the 777-9 is almost 40cm wider inside than the Airbus A350 with larger passenger windows allowing for greater passenger comfort with a typical three-four-three seating configuration in economy.

With an extended wingspan of

71.75m, folding wing tips reduce this to 64.85m on the ground making it compatible with existing gate infrastructure. Meanwhile, the cockpit features 15-inch touch screens and the same head-up displays as featured in the 787.

Overall, the 777X is around 10 per cent more efficient in fuel use and operating costs than its closest competitor, the Airbus A350-1000. With 363 orders currently in place for the 777X family and nine announced customers, including Emirates, Etihad, Qatar, Air India, ANA Airlines, British Airways, Cathay Pacific, Lufthansa and Singapore, delivery of the first 777-9 is expected in 2025.



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Chuck Grieve reports

Abu Dhabi's biggest MRO operations, neighbours at the capital's international airport, are bullish about the future of the MRO ecosystem and taking steps to cement their position

Striding into the future...

Nobody could accuse Sanad Aerotech or Etihad Engineering of standing still: scarcely a month passes without one of the Abu Dhabi-based MROs announcing another step forward in their global ambitions.

Sanad arrives at Dubai 2023 fresh from the inauguration of its new LEAP engine MRO centre at Abu Dhabi international airport – another first for the Mubadala group company.

Meanwhile, leading the Etihad Engineering delegation at the show is the MRO's new chief executive, Daniel Hoffmann, who took up his new position only in October (pictured top right).

Sanad's LEAP centre opening comes hot on the heels of signing an 11-year deal at the Paris airshow earlier this year to expand its capacity for servicing the CFM International-manufactured LEAP-1A and LEAP-1B engines. The engines power the Airbus A320neo and Boeing 737MAX narrowbody families respectively.

It makes Sanad the first certified LEAP engine MRO centre in the subcontinent, Middle East and North Africa (SAMENA) region, supporting the global MRO supply chain for next-generation engines.

The agreement provided for LEAP engine shop visit offload from GE Aerospace and Safran Aircraft Engines, CFM's parent organisations – another first.

Mansoor Janahi (bottom right), Sanad Group managing director and chief executive, told *Arabian Aerospace* growth is in Sanad's DNA. "Our business has been around for 35 years," he said. "Business has evolved. We're proud to be the largest independent engine MRO provider in the Middle East region. We work with all the major commercial engine OEMs."

Deliberate strategy

Sanad's reputation as an early adopter of advanced technology is a deliberate strategy. "We believe it's important to look at technological changes," he said. "They cut across multiple dimensions."

One is digital, where reducing paperwork while remaining compliant is a challenge, with improved efficiency as the goal. Another is advanced tools which can increase efficiency of operations with a human aspect of less cumbersome items.

Sanad was quick off the mark with its new LEAP base. It had

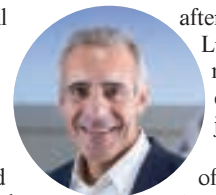
inducted three engines, all 1B variants, even before the official inauguration. Janahi expected the first 1A variants in the new year.

Earlier, Sanad accepted a supplier excellence award from Rolls-Royce at the engine prime's global civil aerospace suppliers' conference – the first time a company from the Middle East and North Africa (MENA) has been recognised with such an honour by Rolls-Royce.

Sanad's is the only independent Rolls-Royce-approved Trent 700 MRO centre worldwide, and the only one of four such centres to offer comprehensive overhaul and testing. The Emirati company now serves as a major supplier of Trent 700 services to airlines worldwide.

At Etihad Engineering, new chief executive Hoffmann arrives with more than 20 years of international experience, most recently as chief executive of Lufthansa Technik Sofia in Bulgaria. Previous roles include senior positions with Lufthansa Technik in the Philippines and his native Germany.

He said in a blogpost that



after more than 24 years at Lufthansa Technik, "it's now time to start a new chapter in my aviation journey."

"I'm particularly proud of having been a part of the initial ramp-up team at Lufthansa Technik Sofia, an unforgettable once-in-a-lifetime experience."

He joins Etihad Engineering as it starts to make its mark as part of the mobility and logistics cluster of ADQ, one of Abu

Dhabi's sovereign wealth funds.

In 2022, ADQ merged four Abu Dhabi aerospace businesses – Etihad Engineering, helicopter specialist Abu Dhabi Aviation (ADA), AMMROC military MRO centre and the logistics provider GAL – to create what it termed a "globally competitive aviation business".

Etihad Engineering's base covers a total area of 545,000 sqm at Abu Dhabi international airport. It recently added to its parking and hangar space and plans further expansion including two new hangars being built with three bays to carry out passenger-to-freighter (P2F) conversions, initially on Boeing 777s. ▲



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Mansoor & Right: Sanad. Hoffmann: Etihad Engineering



▲
An example of a LEAP 1A – which Sanad expects to start inducting this quarter



▲
Representatives from Flydubai, GE Aerospace, Strata, Sanad and Mubadala at the MRO centre launch



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When a frenzied purchase by many of the Middle East countries took place in 2016/17 it illustrated the collective concern by many of the threat from Iran and radical Islamic terrorism. Alan Warnes investigates

Middle East fighter frenzy

Many governments thought it was time to modernise its combat fleets for the time when Iran emerged from UN sanctions, in October 2020. The aerial threat from Iran hasn't been sharpened by any new purchases from the likes of Russia yet, but back in 2016/17 it was looking like they would. Bahrain, Kuwait, Qatar and Saudi Arabia all went on a spending spree, which the UAE joined in 2021, when it ordered 80 Dassault Rafales. That is 400 new multi role combat aircraft for five air forces.

UAE opts for 80 Rafales

The deal to buy 80 Rafales, worth 16 billion Euros, was in the words of French defence minister, Florence Parly, a 'historic contract'. In financial value, it was the largest contract Dassault had ever signed.

In the mid-80s the UAEAF&AD acquired 36 Dassault Mirage 2000EAD/DAD/RAD fighters, later followed in 2003 by 32 more capable Mirage 2000-9s and comprehensive upgrades to the earlier Mirage 2000s. It was no surprise the UAE opted to go French again, although BAE Systems thought it had a great chance of selling big numbers of Typhoons to the UAE in 2013. The UAE will join Egypt and Qatar in operating the Rafale in the Middle East.

The purchase of 55 Rafale EU single-seaters and 25 Rafale DU



dual seaters to the Standard F4 variant, will bring the UAE the most advanced evolution of the jet, which the French Air and Space Force and French Naval Aviation has ordered. The Rafale F4 is set to improve the Rafale's connectivity into today's net-centric operations with new satellite communications equipment and new intra-patrol datalinks, new communications servers, and software-enabled radios. It will also boast new weapons (like the MBDA Mica NG air-to-air missile and 1,000kg Safran AASM Hammer air-to-ground modular weapon), RBE2 radar and data link as well as increased artificial intelligence. The first F4 was delivered to the FASF in March 2023, and deliveries are expected to commence to the UAE in 2026.

The UAE still has aspirations to buy the fifth generation Lockheed Martin F-35A Lightning, with its extremely sophisticated suppression of enemy air defence role, to replace the existing fleet

Will Saudi Arabia ever receive the batch of 48 Eurofighter Typhoons, it agreed to purchase from BAE Systems? Not if Germany gets its way. The RSAF has already taken delivery of 72

Will Saudis get their 40 Typhoons?

The Royal Saudi Air Force (RSAF) boasts the best equipped and funded armed forces in the Gulf Region, operating a mix of Boeing F-15S Strike Eagles, Eurofighter Typhoons and Panavia Tornados, now supplemented by 84 new F-15SAs. All of the 68 F-15S have now been upgraded to a similar F-15SA standard by Riyadh-based Alsalam.

The RSAF completed the delivery of its 72 Eurofighter Typhoons in June 2017, and subsequently signed a memorandum of intent (MoI) with Saudi Arabia for an additional

purchase of 48 more Typhoons from BAE Systems. However, with Germany – one of the four Eurofighter partners – restricting the export of arms to Saudi Arabia, the deal has been continuously delayed despite lobbying from the UK government. Germany placed restrictions on Saudi in the wake of the Saudi-led coalition fighting the Iranian-backed Houthis in Yemen, which was tightened when Saudi writer Jamal Khoshoggi was killed in Istanbul in 2018. This has delayed any sale and despite the British government's best efforts the impasse has remained.

The Royal Bahrain Air Force is the first customer of the new Lockheed Martin F-16C/D Block 70. A \$1.2 billion deal for 10 single-seat F-16Cs and six F-16Ds was announced on June 25, 2018, adding to the 20 surviving F-16C/Ds already operational. The Block 70 incorporates a new AN/APG-83 active electronically scanned array (AESA) radar, upgraded displays, new avionics suite and



Lockheed Martin F-16E/Fs have been serving the UAE since 2004 and longer term the leadership has aspirations to replace them with Lockheed Martin F-35A Lightnings. This dual-seat F-16F taxis out for departure

advanced weapons. The life of the new-build jets has also been extended to 12,000 hours instead of 8,000.

The first example, F-16D 1611, made its first flight on January 24, 2023 from Lockheed Martin's new Greenville plant in South Carolina. After officially being rolled out on March 23, the aircraft was flown to Edwards AFB, California for flight testing, and will be delivered to Bahrain in 2024. Bahrain has opted not to upgrade its existing 20 F-16C/Ds, largely because its budget did not allow for that as well as other modernisation plans like the new Bell AH-1Z Cobras.

The Kuwait Air Force has 28 Eurofighter Typhoons and 28 Boeing F/A-18E/F Super Hornets on order. The eight billion Euro (\$9 billion) deal for Typhoons was signed on April 5, 2016, for 22

single-seat and six twin-seat aircraft.

They are being built to the latest Tranche 3 (P3EB) standard, and the first operator of the new Captor E-Scan active electronically scanned array (AESA) radar. The P3EB standard includes the integration of MBDA's Brimstone 2 air-to-ground weapon, Meteor beyond-visual-range air-to-air missile (BVRAAM), Storm Shadow cruise missile and Marte ER anti-shiping missile. The latest four to be delivered to Ali Al Salem in late October, means 13 Typhoons have been delivered.

The KAF also purchased 22 single-seat Boeing F/A-18Es and six F/A-18Fs in the US Navy's Block 3 standard, during 2017, with Boeing awarded a \$1.16bn contract in June 2018. The Block 3 variant will include upgrades to the Raytheon AN/APG-79

active electronically scanned array (AESA) radar; an infrared search and track (IRST); 'shoulder-mounted' conformal fuel tanks (CFTs) and new enhanced General Electric F-414-400 engines. There are still 33 legacy Hornets flying with the KAF – comprising 27 single-seat F/A-18Cs and six dual-seat F/A-18Ds, but the 28 Block III Super Hornets still remain in the US. Their delivery to Kuwait has been held back due to the delay in necessary infrastructure work at Ahmed Al Jaber AB caused by the COVID-19 pandemic.

On July 10, a KAF F/A-18C was used to support the certification testing of the new Mobile Aircraft Arresting System (MAAS) at Ali Al Salem Air Base. Certification testing of the MAAS came after F/A-18C (421) made an arrested landing at the facility while flying a full-throttle approach and carrying a centreline fuel tank. The MAAS is designed to aid in stopping an aircraft when there is only a minimal landing distance available, or if there is a malfunction with an aircraft's brakes.

Major Qatar expansion

Qatar Emiri Air Force (QEAF) ordered an incredible 96 new fighters, involving three different

cutting-edge jets between 2015 and 2017. In April, 2015, the QEAF ordered 24 Dassault Rafale EQs, boosted in December 2017 by an additional 12, which were previously on option. The first was delivered in June 2019. Qatari Rafales are equipped with the Sniper targeting pod, the first time a foreign system has been adopted for the French jet.

On June 14, 2017, Boeing announced the QEAF was set to purchase 36 Boeing F-15QA (Qatar Advanced) Strike Eagles, a variant of the F-15E tailored to Qatari requirements with most now delivered. The \$12 billion deal also includes US-based lead-in-fighter-training for the F-15QAs. Finally, in December 2017, BAE Systems announced a sale of 28 Eurofighter Typhoon Tranche 3s to Qatar worth approximately £5 billion (\$6.8 billion) leading to the first aircraft being delivered to Tamin Air Base on August 27, 2022.

The aircrews and ground personnel have been training with the joint RAF-QEAF unit, 12 Squadron at RAF Coningsby and were deployed to Qatar for the World Cup last November. During UK Foreign Secretary James Cleverly's visit to Tamim Air Base on July 26, he was photographed with a Typhoon displayed with 500lb Paveway IV laser-guided bombs, as well as AIM-12 advanced medium-range air-to-air missiles (AMRAAMs) and AIM-132 advanced short range air-to-air missiles (ASRAAMs). An MBDA-developed Meteor beyond-visual-range air-to-air missile (BVRAAM) was also displayed. Qatar is also known to have ordered Meteor BVRAAMs and Brimstone A2G missiles.

Earlier this year the Qatar government agreed to sell its 12 surplus Mirage 2000-5DDA/EDAs in operation since 1997 to the Indonesian Air Force. ▲



The QEAF has 28 Eurofighter Typhoon Tranche 3s on order. Deliveries commenced in August 2022

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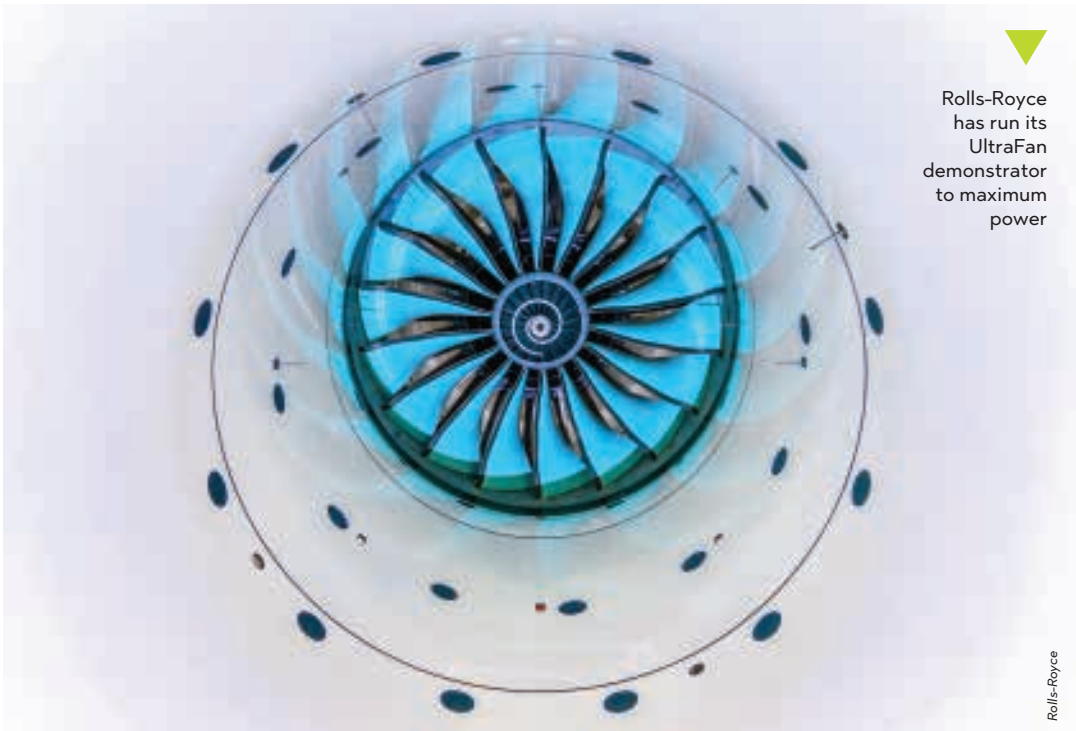
Jet Aviation's FBO at DWC is 'very busy' during the air show taking care of visitors to the event arriving on business jets.

"We are also looking forward to meeting old and new customers here as nothing replaces a face-to-face meeting," said Stefan Buschle, head of maintenance sales, EMEA.

"Jet Aviation has been in the Middle East for more than 40 years and we will continue to invest and grow in the region as a key strategic hub in our network. We have many long-term customers in the region across all lines of business, and our local and customer on-site presence allows us to foster and prioritise personal and long-lasting relationships, sometimes over generations.

"We offer a comprehensive portfolio of services to our customers in and visiting the region, with FBO, aircraft management and charter, and fixed and rotary-wing maintenance and refurbishment." The company has a strong FBO network with five locations in Dubai and Saudi Arabia, it also has one of its global maintenance hubs in Dubai with a 600m² facility based at Dubai DXB.

"In 2023 we have seen more requests for larger cabin refurbishment, structural repair projects, avionics modifications, and upgrades at our fixed-wing maintenance site in Dubai and have adapted and expanded our capabilities to match. There's also a growing demand to support local line maintenance at our client's home bases," said Buschle.



Rolls-Royce has run its UltraFan demonstrator to maximum power

Rolls-Royce

To the max! Rolls-Royce reveals test milestones

Rolls-Royce announced it has successfully run its UltraFan technology demonstrator to maximum power at its facility in Derby, UK, and revealed it has completed compatibility testing of 100 per cent sustainable aviation fuel (SAF) on all its in-production civil aero engine types.

The initial stage of the UltraFan test was conducted using 100 per cent SAF and is an important milestone for the demonstrator, which was successfully tested for the first time earlier this year.

Tufan Erginbilgic, CEO, Rolls-Royce, said: "Hitting full power with our UltraFan demonstrator sends a strong message that Rolls-

Royce is at the cutting-edge of innovation and technology, leading the way in the transition to more efficient and sustainable aviation."

Confirming this capability is a big step towards improving the efficiency of current and future aero engines as UltraFan delivers a 10 per cent efficiency improvement over its Trent XWB, said Rolls-Royce.

The completion of the SAF test programme fulfils a commitment, made in 2021, to demonstrate there are no engine technology barriers to the use of 100 per cent SAF. A ground test on a BR710 business jet engine at the company's facility in Canada, completed the test regime.

Other engines tested as part of the programme were the whole Trent family, the BR725 and the Pearl engine family.

"Becoming the first jet engine manufacturer to publicly confirm all our in-production engines for long-haul aircraft and business jets are compatible with 100 per cent SAF, is an important milestone for both Rolls-Royce and the wider aviation industry," said Erginbilgic.

Testing has involved a variety of ground and flight tests to replicate in-service conditions. All the tests confirmed the use of 100 per cent SAF does not affect engine performance.

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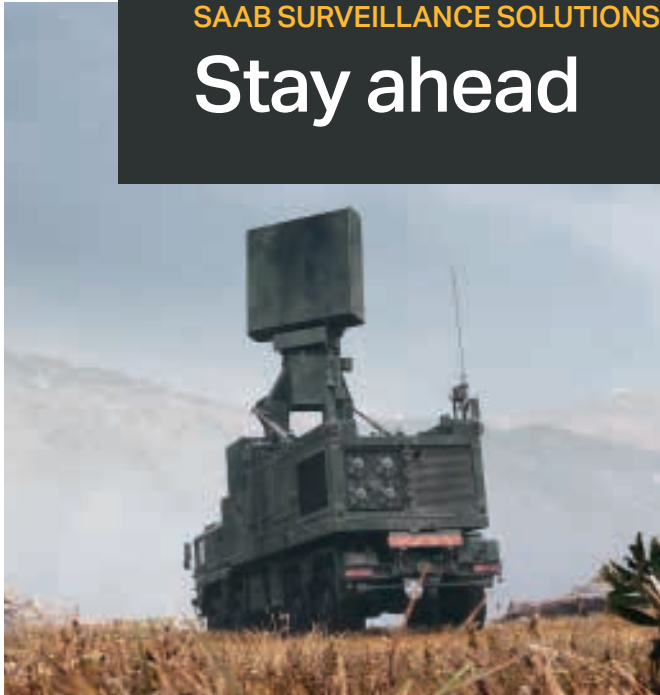
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Boeing focus

Boeing optimistic about show orders

The booming Middle East region – particularly Saudi Arabia – gives Boeing optimism for near-term sales. Boeing Commercial Aircraft expects the show will usher in a batch of orders for its products. Alan Dron delves deeper

“The last Dubai show was a kind of ‘Welcome back’ party after Covid,” reflected Omar Arekat, vice-president, commercial sales and marketing, Middle East and Africa. Boeing had been surprised by the high level of interest it attracted in 2021, he said, and is anticipating a similar level this year. “I think, given the pent-up demand for aircraft, given the recovery has been in full swing and has exceeded the pace that we anticipated, I think that a lot of airlines are going back to the drawing board and dusting off their fleet plans for growth.” Order backlogs at both Boeing and Airbus mean that airlines placing orders – particularly for narrowbodies – face waits of several years before receiving their new aircraft. This is forcing airlines to think longer-term than previously, “perhaps a little more long-term than some airlines would like, but I think that’s a discipline that’s been kind of decided upon”. Like many organisations in the

aviation sector, Boeing has been battling with severe supply chain problems, a lingering problem from the pandemic, when many companies in the pyramid of suppliers lost personnel and have struggled to replace them. “The supply chain situation has definitely introduced a lot of challenges,” Arekat accepted. Speaking on the sidelines of the Arab Air Carriers Organization annual meeting in Riyadh two weeks ago, he said he believed that many of those challenges are now being dealt with. “We’re not out of the woods yet, but we do see an end in sight. I believe it’s going to get better soon, but we’re still going to have to get through a lot of challenges before we get to that point.” One major expansion scenario in the region is unfolding in Saudi Arabia, where the government’s Vision 2030 policy foresees aviation as a major plank in the country’s plans to diversify its economy away from hydrocarbons. As well as new flag-carrier Riyadh

Air, which earlier this year ordered 39 Boeing 787-9s as the initial component of its fleet (and which is expected imminently to announce a narrowbody order), existing national carrier Saudia also signed up for the same number of 787s, in both -9 and -10 variants. The two airlines took a further 43 options for the twinjet widebodies. Additionally, low-cost carriers flynas and flyadeal are continuing to expand rapidly – Jeddah-based flynas has no fewer than 250 Airbus A320-family aircraft on order – and new airline Neom Air is being created specifically to bring future tourists to the vast new holiday resorts now starting to open their doors on the country’s Red Sea coast. The country’s regulator, GACA, has also asked for expressions of interest for a new low-cost carrier based in Dammam, on the Kingdom’s east coast, and four airlines are understood to have registered bids. “Over at Boeing, we definitely believe in the great potential of the

industry over here,” Arekat said in Riyadh. “If you look at the plans for Vision 2030, this requires a very robust aviation infrastructure in place to support demand for air travel.” He made the point that, unlike the Gulf’s other connecting mega-hubs such as Dubai International and Hamad International in Doha, Saudi Arabia had the added benefit of catering for a significant domestic market. “All the business travel that’s going to be required to support Vision 2030... I think between replacement [of existing aircraft] and the necessary growth to keep pace with demand, I believe that the orders we’ve seen so far have been understated.” In Dubai meanwhile “We’ve seen Emirates talk about surging traffic. They’re catching up to pre-Covid levels at a fast pace. The same can be said about Qatar.” Smaller carriers are also growing, he noted: “We’ve delivered our first 787 to Iraqi Airways, followed by the 737 MAX,” he said. ▲



Far left: New Saudi flag-carrier Riyadh Air is about to place a major order for narrowbodies, with the Boeing 737 MAX up against the Airbus A320neo family
Left: Iraqi Airways is one of the smaller airlines in the region that has recently taken the Boeing 787 into service

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The General Authority of Civil Aviation (GACA) is implementing comprehensive aviation reforms in Saudi Arabia to help fuel the Kingdom's air transport growth, innovation and passenger service levels. Mark Pilling takes a closer look

GACA reforms to unleash aviation

On October 30, following an extensive consultation process with aviation sector stakeholders, GACA announced sweeping new rules that will "unleash" the Kingdom's aviation sector.

"GACA's transformation of Saudi Arabia's aviation economic regulations will drive further investment, growth, and performance across the aviation sector," said His Excellency Abdulaziz Al-Duailej, GACA president.

"The regulations will enable the realisation of the Saudi Aviation Strategy, which is mobilising \$100bn in investment from public and private sector sources by 2030."

"The regulations create an open, dynamic and competitive market, setting a level playing field for global operators and investors in the Kingdom. These changes will create

more competition, choice and value for passengers and consumers," explained Al-Duailej.

GACA serves two main functions that shape the air transport market in the Kingdom, providing strategic oversight of the Saudi Aviation Strategy and through GACA's core role as an aviation regulator, which was aided in 2020 with the separation of its mandate from airport system operator to strategic regulator.

"These changes will reduce the cost of doing business in the air transport sector," said Awad Al Sulami, executive vice president for economic policies and logistics services at GACA.

"The regulations will benefit the airline industry, achieving greater transparency and predictability in licensing processes and in economic conditions such as through a new airport pricing regime.

"The aim of GACA's reforms on air transport more broadly are

to encourage more market entrants who can meet the unprecedented demand in the Kingdom, by relaxing certain economic policy requirements and

"The Saudi Aviation Strategy is enabling the Kingdom to grow its transit air cargo share of the regional market to 25 per cent, capitalising on Saudi Arabia's strategic location connecting three continents and its position as a major cargo market"

HIS EXCELLENCY ABDULAZIZ AL-DUAILEJ
GACA PRESIDENT

processes to reduce the operational costs of airlines," he explained.

GACA has also reformed the rules on market entrant requirements for airports, said Al Sulami. "Qualifying rules for airport operators have been expanded to support the privatisation of the Kingdom's airports," he explained.

Airports will be enabled to propose charges in line with the new economic regulations and will have more flexibility to diversify revenues by growing non-aeronautical revenues.

These changes provide the regulatory building blocks to enables the Kingdom's broader airport privatisation agenda, which is being led by the National Center for Privatisation.

There are changes in the air cargo sector too. "The Saudi Aviation Strategy is enabling the Kingdom to grow its transit air cargo share of the regional market to 25 per cent, capitalising on Saudi Arabia's strategic location connecting three continents and its position as a major cargo market," said Al Sulami.

Currently, Saudi Arabia only captures 33 per cent of its total demand for air cargo goods and

only seven per cent of the total Middle East air cargo transit market. Air freight will grow more than five-fold from 0.8 million tons today to 4.5 million tons by 2030.

Freight capacity is being supported by an increase in warehouse capacity to six million tons, and the launch of free zones with globally-competitive incentives, including the launch of Riyadh Integrated in 2022. The strategy is bringing leading international logistics providers and multinational corporations to the Kingdom.

The rule changes "will provide a robust and comprehensive regulatory infrastructure for commercial relationships that support ground handling and cargo services, by introducing service level agreements between airports and service providers, including minimum operational performance and quality KPIs," said Al Sulami.

GACA has adopted a 'general freedom of access' principle on airport operators for regulated ground handling and air cargo services. This means all of the Kingdom's airports are open for licensed service providers.

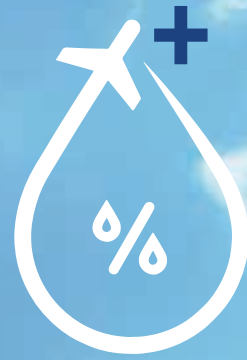
"We are already seeing significant interest from international operators and investors, and we expect a significant increase in competition within air cargo and ground services as the regulations are adopted that will support further growth in this sector," noted Al Sulami.

Finally, this year the regulator introduced a reform strengthening passenger rights, elevating the Kingdom's regulatory regime to be the most comprehensive in the region, said GACA.

The raft of reforms will be phased in over 18 months, and the regulations will be supported by an implementation plan communicated by GACA to sector operators, said Al Sulami. ▲



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RTX will be unveiling its new branding for the region at the Dubai Airshow. Alan Warnes reports

RTX to show the way with new technologies

It comes after the RTX portfolio was restructured into three segments, Collins Aerospace, Pratt & Whitney and Raytheon on July 1. According to Amal Osman, managing director, MENA, Collins Aerospace: “Working together will allow us to bring new technologies and capabilities into the region and by using our collective experiences on product knowledge and our strengths, will create some new localised activities.”

There will also be a lot of RTX ‘firsts’ at Dubai according to Osman. “We will for example be revealing our new Zero-G helmet-mounted display systems (HMDS) in the region for the first time, after its unveiling in September ahead of DSEI,” Osman said.

With peer adversaries rapidly advancing their fighter technology and scale, Collins believes that allied pilots need a new helmet solution with flexibility and growth capabilities to keep them and their platform relevant in the next-generation fleet.

Osman continued: “It’s the lightest, most advanced helmet out there. It’s got some great features that not only provide enhanced battle management, but introduces our new ergonomic technology to ensure its comfortable.”

Collins will also be showcasing its new space suit, which with the recent UAE space successes is certainly timely. “Designed for astronauts by astronauts, and it’s a good example of Raytheon, Pratt & Whitney and Collins working together,” he said.

Raytheon has built a huge reputation in the UAE, and the wider Middle East with its air and missile defence systems that counter attack drones, ballistic missiles and rockets. With such a proven track record it is no surprise the UAE first acquired the Hawk medium-range surface-to-air missile system nearly



The Coyote block 2 counter-UAS system will be showcased at Dubai Show

40 years ago and more recently the Patriot missile defence systems.

During IDEX earlier this year, Raytheon Emirates announced that the Coyote block 2 counter-UAS system would be co-produced in the United Arab Emirates. Fahad Al Mheiri, managing director, Raytheon Emirates, spoke about it being showcased in Dubai.

“The Coyote co-production project has advanced since the announcements at IDEX in January”, he said, adding: “Coyote is an agile, highly-capable counter to a range of drone threats; local

The seeker-equipped Coyote works with the Raytheon KuRFS (Ku-band radio frequency system) – a 360-degree radar that senses incoming drones, rockets, artillery and mortars

manufacturing will support growth in the UAE’s defence industry and expand its contribution to Raytheon’s global supply chain.”

The seeker-equipped Coyote works with the Raytheon KuRFS (Ku-band radio frequency system – a 360-degree radar that senses incoming drones, rockets, artillery and mortars.

“The KuRFS radar will communicate constantly with Coyote and track the target to bring them both together. The Coyote is not tracking ballistic missiles, but the smaller class 1-3 drone that could change height, alter course etc, which is specifically what the system is designed for.

“During the US Army’s 2023 summer test period the persistent, 360-degree KuRFS radar excelled in a stress test successfully detecting and tracking a complex swarm of more than 30 unmanned aircraft,” Al Mheiri said.

It is no surprise the UAE is keen to acquire the system. Raytheon Emirates will have its own assembly,

integration and testing facilities in the UAE, and is working with a range of UAE suppliers to build key components of the effector, with support from Tawazun. After assembly the Coyotes can either be used for the UAE’s own needs or exported worldwide as part of Raytheon’s global supply chain. Al Mheiri’s aim one day is to have the ‘Made in UAE’ label on the product.

A small-scale model of the lower tier air and missile defence sensor (LTAMDS) radar will also be on show, according to Al Mheiri. Raytheon is referring to this first in a family of radars as GhostEye, which is leveraging commonality from the LTAMDS. The system has been designed to defeat advanced and next-generation threats, including hypersonic weapons, or those that fly faster than a mile a second.

The primary array is about the same size as the Patriot’s array, with more than twice the power. Current military customers of the Patriot system could acquire the system too. ▲

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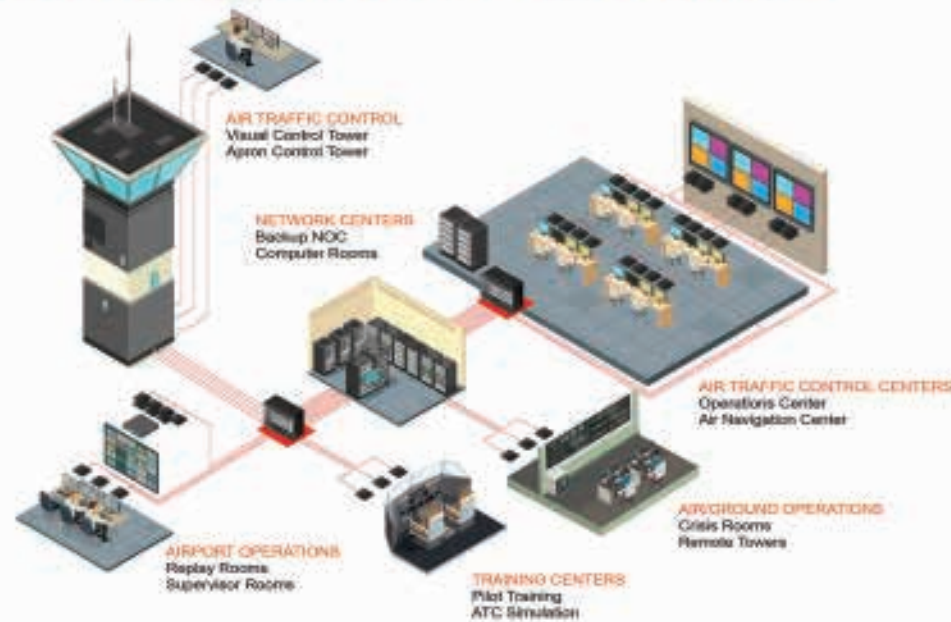
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Rolls-Royce focus

It has been a busy year for Rob Watson since his appointment as president civil aerospace at Rolls-Royce in March. He talked to Mark Pilling about the pace of recovery and outlined his firm's technological achievements

Rolls-Royce: Strength in numbers

“It has been an incredibly strong year for civil aerospace, and I would say it is on track to be one of the strongest we have seen outside of a new aircraft launch year,” said Rob Watson, president civil aerospace at Rolls-Royce.

“The widebody market is extremely buoyant and we have seen a huge amount of sales activity,” he added, with big orders from Avolon, Philippine Airlines and Air India.”

While the recovery has been strong, airframe and engine OEMs have been hit hard by engine durability issues.

“These have been challenging issues right across our industry and we are continually working to address them,” stated Watson.

“We have recently introduced a new Trent 7000 durability enhancement package, which includes a re-engineered high pressure turbine blade (HPTB), improving durability and therefore more than doubling time on wing,” he explained.

“More than 20 per cent of the fleet now has the new package, most from new delivery, but we have recently started upgrades on the early engines that are now starting to come in for their first full refurbishments. The package will also be available on the Trent 1000 TEN from 2025.”

On the MRO front, Rolls-Royce is looking at how it develops its Trent Care Network to match its capacity with fleet growth and shop visits.

“We are continuing to look at how we develop that network and this year I had the pleasure of taking part in a ground-breaking ceremony to mark the start of work on a new joint venture MRO facility we are setting up with Air China,” said Watson.

“BAESL – Beijing Aero Engine Services Company Limited – is due to start operations in 2026, and it will help us deliver MRO for the Trent 700, Trent XWB-84 and

Trent 1000. We will be ramping up operations and by the mid-2030s we anticipate it will be at its full capacity of 250 shop visits per year,” he said.

UltraFan testbed

In May, Rolls-Royce conducted the first tests of its advanced UltraFan technology demonstrator where the technology is scalable – with a thrust range from 25,000-110,000lb – offering the potential to power new narrowbody and widebody aircraft anticipated in the next decade.

“The first run of UltraFan was a major milestone, not just for all of us at Rolls-Royce, but also for wider civil aerospace industry as the programme aims to deliver new standards in efficiency and sustainability, and the first run was conducted using SAF,” said Watson.

“We have now concluded our testing – we ran the demonstrator to full power just last week – and the next step will be to review the data we have,” he said.

On the sustainability front, Watson explained that 2023 “has been a really big year for us in terms of advancing our civil aerospace sustainability strategy which is made up of three elements – improving the gas turbine, promoting the uptake of sustainable aviation fuels, and leading the way in new power solutions such as hydrogen.”

On SAF, he said: “We are really pleased to be announcing at Dubai that we have completed

our programme to confirm the compatibility of our in-production engines with 100 per cent SAF – a pledge Rolls-Royce made in 2021.”

“In addition, we are proud to be powering the world’s first 100% SAF transatlantic flight this month when a Trent 1000-powered Virgin Atlantic Boeing 787 will fly from London to New York,” said Watson.

“In terms of new propulsion systems, if I turn to hydrogen, we have made some tremendous steps forward working in our partnership with EasyJet,” said Watson.

“The overall ambition we share is to be at the forefront of developing hydrogen combustion engine technology capable of powering a range of aircraft, including narrowbodies, from the mid-2030s onwards.”

“In September we announced another industry first, relating to the combustion challenge, when we confirmed a successful full annular combustor test on a Pearl 700 engine, running on 100 per cent hydrogen, that proved it can be combusted at maximum take-off thrust conditions,” said Watson.

“That was some achievement, involving the development of new nozzles to better control the fuel burn, and I want to thank both DLR and Loughborough

he added.

The Middle East is a fertile market for Rolls-Royce and the emergence of Saudi Arabia as an air transport powerhouse only reinforces that view.

“We see Saudi Arabia’s emergence as an exciting development for the region and for Rolls-Royce as we have a long history and relationship with the Kingdom from the RB211s on

Saudia’s Lockheed Tristars of the eighties, to the classic Trent 700 engines currently powering its fleet of Airbus A330s, offering a reliable and fuel-efficient combination for both domestic and international routes, including the growing Umra and Hajj traffic,” said Watson.

“We are also very optimistic about the commercial opportunity in the Kingdom with both the existing airlines such as

Saudia, Flyadeal and Flynas, as well as new airlines such as Neom Riyadh Air,” he concluded. ▲



“We are also very optimistic about the commercial opportunity in the Kingdom with both the existing airlines such as Saudia, Flyadeal and Flynas, as well as new airlines such as Neom and Riyadh Air”

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PRESIDENT CIVIL AEROSPACE, ROLLS-ROYCE

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ExecuJet is using the Dubai Airshow as an opportunity to promote its newly-built MRO facility at Al Maktoum International Airport. Ella Nethersole investigates

ExecuJet to showcase new MRO facility at DWC

The new MRO facility is 15,350m² and includes a large hangar, workshops, back offices, training rooms and expanded spare parts storage areas. "The new hangar has 8,300m² of floor space and can accommodate 12-15 mid to large size business jets simultaneously, including Dassault's larger aircraft, the Falcon 6X and Falcon 10X," explained Nick Weber, regional VP Middle East.

The MRO facility's workshop area amounts to 3100m², which will be utilised for overhaul and repair of wheels, batteries, and ground service equipment (GSE) along with supporting non-destructive testing (NDT) and structural repair capabilities. The office space available within the facility also includes a large classroom for training purposes."

Weber says having a heavy maintenance capability will support the increased business aviation in the region. "Business aviation in this region is stronger than ever."

"The vast majority of those who migrated to business aviation during the COVID pandemic continue to fly on business jets today – it provides travellers with greater convenience and flexibility, and this was instrumental in revival of the sector. This uptick resulted in large orders for business jets, which manufacturers will continue to deliver over the coming years and has also driven strong demand for pre-owned aircraft," he said.

"Prior to the Dassault Aviation

acquisition of ExecuJet MRO Services in 2019, we had never worked on heavy maintenance type aircraft here in Dubai, but now as a factory-owned Dassault MRO, we have gained approval to undertake heavy maintenance work on various Falcon aircraft. With this ramp up, Falcons now account for more than 30 per cent of our business.

"As we grow the business, this will necessitate recruiting around an additional 50 technically-skilled personnel, the majority being from within the region."

The company recently received EASA certification of the Dassault Falcon 6X. The 6X is about to commence its entry into service and some of the first 6X operators plan to operate their aircraft out of Dubai or within region.

Weber said the company is also looking forward to meeting 'customers and various original equipment manufacturers (OEMs)' during the Dubai Airshow.

"Dubai has become the third largest airshow in the world after the Paris Airshow and Farnborough," he said. "The Dubai Airshow is important to us because it is a platform to showcase our company to customers in the Middle East and around the world. We were one of first business aviation MRO companies to start in Dubai. We started here more than two decades ago, so it is important to reinforce our presence by attending the show.

"It's also important to promote



"As a factory-owned Dassault MRO, we have gained approval to undertake heavy maintenance work on various Falcon aircraft"

NICK WEBER
REGIONAL VP MIDDLE EAST

business aviation at airshows generally, so that people looking to enter the industry can learn of career opportunities within the sector."

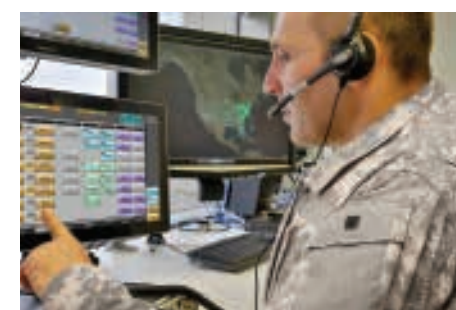
He added that the company will also be highlighting its expanded MRO capabilities, such as managing its interior cabin refurbishments. "We work with interior aircraft specialist F/List in Dubai on cabin refurbishments. For instance, we are in the process of finalising a heavy maintenance check on a Global 6000 that also included cabin refurbishment

and installation of a new satcom system," said Weber.

"We partnered with F/List Dubai on the Global 6000 interior work that included new leather upholstery for the cockpit and cabin seats, new carpet, and new dado panel material.

"Besides the airframe heavy maintenance check, we also completed a service bulletin for the aircraft, which required removing the upper skin and doing a rib replacement. So far, ExecuJet has performed more than 38 such flap repairs and owns the specialised tooling required to perform this service bulletin. The MRO's engineers and technicians are also very experienced at sheet-metal and composite structural repairs."

Weber concluded: "ExecuJet is an 'MRO of choice' for Global aircraft, because it is certified by the US FAA, EASA, and other international regulators." ▲

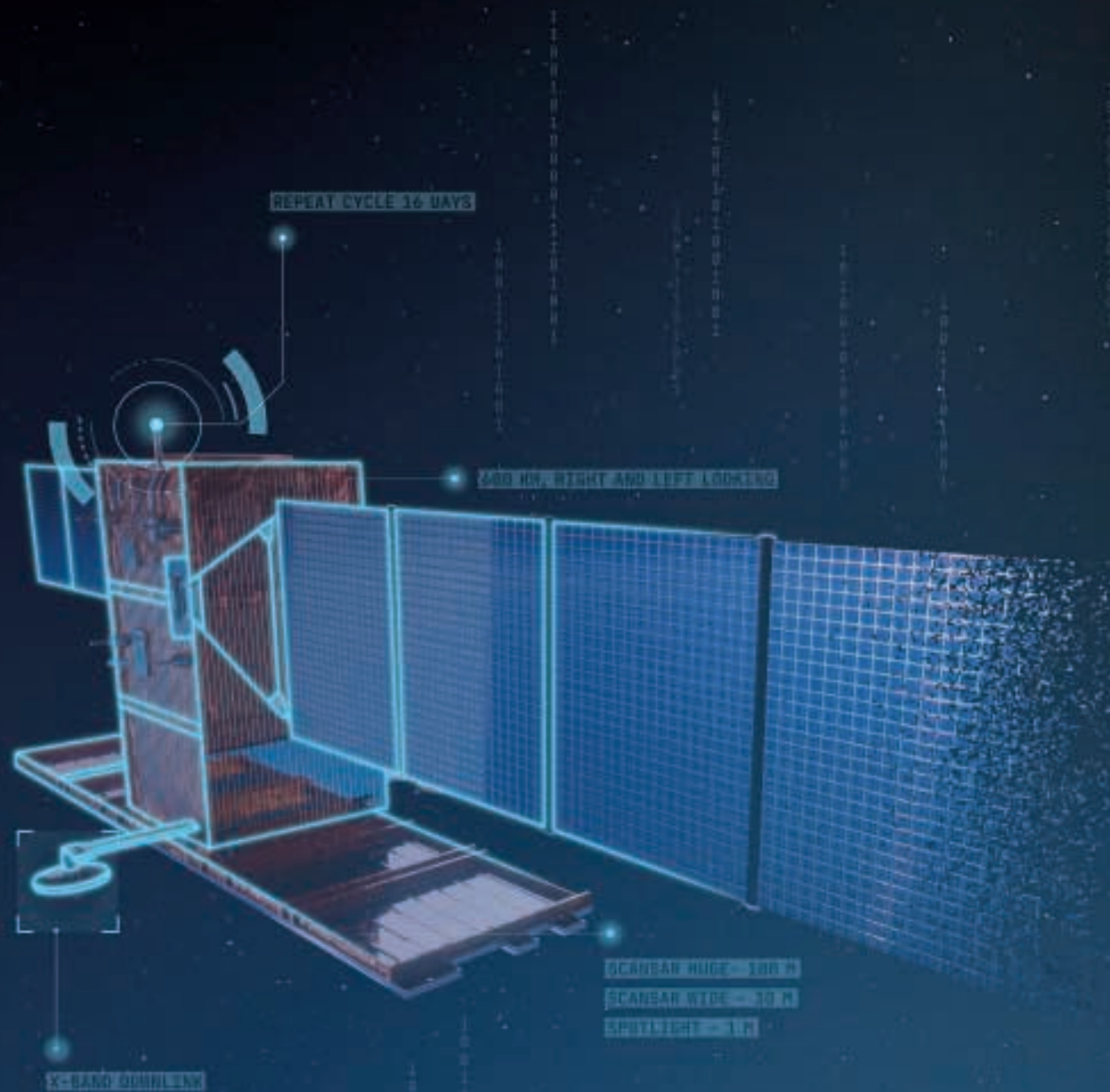


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Alan Warnes reports

The story behind UAE's purchase of 12 Hongdu L-15 Falcons

Chinese Falcons to fly with Fursan Al Emarat

In February 2022, much to everyone's surprise, the UAE announced the purchase of 12 Hongdu L-15 Falcons. It came barely three months after the 2021 Dubai International Air Show, when one performed in the flying display and another sat in the static surrounded by weapons.

This batch of 12 will replace the Italian-built Leonardo MB 339NATs, currently flying with the UAEAF&AD's Fursan Al Emarat aerobatic team. However, a further 36 are on option to be split equally between advanced flying training and light attack.

This has annoyed both France and the USA, because any further purchase of the Chinese aircraft will need to lead into both the Dassault Mirage 2000 and eventually Rafale, and the Lockheed Martin F-16. Both are concerned over security implications. In the past, the UAE

has purchased the Wing Loong II unmanned combat air vehicle from CATIC (China National Aero-Technology Import & Export Corporation), but never gone so far as buy an actual aircraft.

So why now? The reason appears to be that there were no other options. The Leonardo T346 was side-tracked because a deal fell through in 2009 amid controversy even though the aircraft was selected.

As a result the competition was between the Aero L-39NG and L-15, but the NG wasn't yet ready for a full evaluation. The L-15 was and participated in trials during the lead up to the 2021 Dubai Airshow, when UAE pilots flew the aircraft 'about 30 times' according to one source. Discussions involving UAEAF&AD commander Major General Ibrahim Nasser Mohammed al-Alawi continued on the type's possible acquisition that led to the selection three months later and contract signature.

Initial plans were to have the L-15s in country for this year's

Dubai Air Show, but this is not expected to happen now, and the Fursan Al Emarat aerobatic team will fly with their old MB339NAT mounts, which are now running low on spares. As a result, the seven aircraft that usually make up the team was reduced to five at the Bahrain Show in November 2022.

The team made up of flying instructors from the Al Ain Academy first appeared at a graduation ceremony on January 21, 2010, although their flying routine was restricted. A week later, it made the first official appearance at the annual Al Ain airshow. Over the intervening years, they have attended the Dubai air show and other important displays in the Middle East, and are now venturing to Europe, to fly the UAE flag.

At IDEX in February, a large model of an L-15 was found at the CATIC stand, and upon close scrutiny you could see there were a couple of major changes to the actual aircraft, obviously requested by the UAE.

An air-to-air refuelling probe

had been fitted, while there were wide area displays in both cockpits. The latter had been displayed at the CATIC stand at the November 2021 Dubai Air Show, when a CATIC insider spoke about some of the improvements of the L-15 in the training role since the jet appeared at Dubai Airshow in 2017.

"There is now an embedded tactical training system, a mission planning system – where the pilots can load the mission profiles onto the aircraft and then debrief afterwards." He continued: "There is a datalink added so that instructors on the ground can work scenarios with the students while flying the jet in the air, as well as a much improved head-up display with a wider screen."

The jet's Motor Sich engine has suffered support issues in the past, but CATIC thought it had resolved them by looking to Ukraine to replace some parts of the engine supplied by the Russians. It's unclear if the Russia-Ukraine War would have affected that new process, but it is likely. ▲



Two Hongdu L-15s appeared at Dubai Airshow 2021, and two are also expected to appear this year

Alan Warnes

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THE ROLE OF AEROSPACE AND DEFENSE IN EMIRATISATION

As Emiratisation continues to be a major priority for the UAE leadership, the aerospace and defense sector has a vital role to play. It is a growing industry regionally that offers stable career prospects to local talent as well huge economic potential for direct foreign investment and GDP contribution.

The UAE Government has set some ambitious Emiratisation targets. The Emirati Human Resources Competitiveness Council plans to move 75,000 Emirati citizens into the private sector over the next five years, and aims to achieve an overall rate of annual Emiratisation increase by 10 per cent by 2026. However, these targets are supported by a number of initiatives to empower Emirati cadres and motivate private companies to attract Emirati talent.

In addition, UAE Government initiatives and investment in the aerospace industry have driven robust demand for business partnerships and joint ventures and have assisted the development of the sector in the UAE, outpacing other regional markets and supporting the country's long-term strategy for transformation into a knowledge-based economy.

One enterprise supporting the development of local aerospace talent is Thales Emarat Technologies (TET). Part of the Government's Tawazun Economic Program, TET is a 100% home-grown UAE company established in 2019 and owned by Thales.

Created to support innovation, digital transformation, industrialisation, and local partnerships by nurturing local talent and fostering diversity, TET aims to assist sustainable technology transfer and support the creation of local jobs and careers. In support of this aim, and the country's ambitions to develop local skills,

TET has launched the Radar Centre of Excellence, Radio Centre of Excellence, the Defence Service Centre and the Digital Centres of Excellence.

The mandate for the Defence Service Centre as well as the Radar, Radio and Digital Centres of Excellence includes the development, building, maintenance and support of radars and radio communication systems. The specific focus of the Radar Centre of Excellence is on the development of

high potential, new generation radars, with the long-term intention to become a trade and export hub, exporting from the UAE to all parts of the world.

In partnership with Tawazun, TET's latest project is building a world class Radar Facility in Tawazun Industrial Park (TIP), with the aim of increasing the UAE's sovereignty and autonomy over its defence assets. Scheduled to be operational in 2025, the new facility will enable testing, qualification, production and integration of state-of-the-art air surveillance radars. An accompanying "Radar Academy" will also be established to strengthen the technical skills and capabilities of the local youth.

In these ways, the aerospace and defense sector has made substantial progress in supporting Emiratisation, but some obstacles remain. Encouraging Emiratis to choose careers in this sector and retaining talent can be challenging due to the demanding nature of the work and the need for specialized skills, and the ongoing war for talent makes long-term commitment unattractive to some young locals.

However, the future appears promising. The UAE government's unwavering commitment to Emiratisation, coupled with

the sector's dedication to fostering Emirati talent, is expected to yield significant benefits. As the sector continues to expand and evolve, it offers Emiratis a unique opportunity to contribute to the country's development and security.

Today, as we're at the cusp of a digital revolution, human capital is the world's most prized resource. Countries and businesses around the world seek to attract and retain those who have the highest potential in the fields of artificial intelligence, big data, connectivity and cybersecurity among others. The UAE leadership, through incentives, initiatives and international partnership, is ensuring that Emirati talent will be prized across the industry.

The aerospace and defense sector offers Emiratis the chance to be active participants in the growth and protection of their nation – a chance to build a future we can all trust.

By providing training, career opportunities, and the chance to shape the sector's future, Emiratisation is creating a symbiotic relationship between the aerospace and defense sector and the aspirations of the Emirati workforce, contributing to the UAE's vision for a prosperous and diversified economy. ●



TET has launched the Radar Centre of Excellence, Radio Centre of Excellence, the Defence Service Centre and the Digital Centres of Excellence...

Airbus A220 spotlight

Headquartered in Mirabel, Québec, Airbus Canada Limited Partnership is responsible for the development and manufacturing of the Airbus A220 family of single-aisle passenger aircraft, reports Kaleyesus Bekele

Airbus sees rise of its A220 in the single-aisle market

Airbus Canada Limited Partnership is owned by Airbus, and its partner Investissement Québec (acting for the government of Québec). It employs approximately 3,000 staff at its headquarters and manufacturing facilities in Mirabel.

Mobile, Alabama, is home to the second A220 manufacturing facility serving US customers. The Mirabel facility has two parallel production lines while the Mobile plant has one production line. With a total of three lines Airbus is currently producing six A220s every month. By the middle of the decade it anticipates boosting monthly production to 14 aircraft.

With two variants - 100 and -300 the A220 aircraft is designed to serve the 100-150-seat market segment.

Francisco Lopez, head of A220 customer engineering, says the A220 is the most fuel-efficient single-aisle jetliner. "It uses 25 per cent less fuel than previous generations and has 254 per cent lower carbon emissions," Lopez

"Because of the efficiency and performance, the aircraft attracted interest from around the world. Our customers are diversified – lessors, startups, low-cost and legacy airlines"

FRANCISCO LOPEZ
HEAD OF A220 CUSTOMER
ENGINEERING

said. "Sustainability is at the heart of the A220 aircraft design."

The A220 programme was created in 2018 after Airbus acquired the CSeries programme from Bombardier. Airbus is now celebrating the fifth anniversary of the A220 programme as the aircraft is celebrating the 10th anniversary of its first flight (C Series) this Autumn.

Large orders

First delivery of the A220 aircraft was made to Delta Airlines in October 2020. But CSeries SWISS, the launch customer, took first delivery of the aircraft back in June 2016.

The A220 has attracted 806 orders from 30 customers, of which Delta Airlines is the largest. As of July 2023, a total of 276 aircraft have been delivered with

a backlog of 530. Lessors have placed large orders while legacy carriers, such as Air Canada, Air France, Qantas, airBaltic and SWISS, are among the long list of customers for the A220.

Air Senegal, Air Tanzania, Egypt Air and Nigerian Ibom Air are operating the A220 aircraft in Africa. "Because of the efficiency and performance, the aircraft attracted interest from around the world. Our customers are diversified – lessors, startups, low-cost and legacy airlines," Lopez said.

The A220 programme has more than 100 suppliers around the world. From Africa, Morocco supplies part of the fuselage, while China supplies the main fuselage. Belfast supplies the composite wings, while the landing gears are imported from Germany.



"The A220 is the most fuel-efficient single-aisle jetliner" says Francisco Lopez, head of A220 customer engineering

CONTINUED ON 57



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Airbus A220 spotlight

CONTINUED FROM 55

Leonardo of Italy supplies the aircraft's vertical and horizontal stabilisers, while the cockpit is manufactured in Mirabel.

According to Lopez, the A220 has the most efficient aerodynamics due to its optimised cross section and optimised aerodynamics of the nose, wing and tail.

"With efficient aerodynamics and fly-by-wire system we are able to have an aircraft with an extraordinary performance and lower fuel consumption," he said.

The A220 is powered by the Pratt & Whitney PW1500 geared turbofan (GTF) engine, which has lower noise and carbon emissions. The PW1500 was originally designed for the A320 NEO family.

According to Lopez, extensive use of composite materials and advanced metal alloys allows for a lightweight design.

The fly-by-wire system is developed by Parker Aerospace, while the avionics are supplied by Collins Aerospace. Panasonic delivers the cabin management system.

"With a five-abreast cross

"It is still a young programme and we are proud of the success we have achieved in a very short period of time. We see a great future for this programme that will translate to customer airlines"

FRANCISCO LOPEZ
HEAD OF A220 CUSTOMER
ENGINEERING

section, the A220 offers widebody comfort in a single-aisle aircraft," Lopez remarked. "In terms of comfort, A220 has large windows that are 28 by 40.6cm (11 by 16 inches) wide – equivalent to the windows of the Boeing B777 aircraft.

"This allows a lot of natural light to come into the cabin. We also have an ambient lighting system where the customer can select up to 16 million types of colour combinations," he said.

The A220 variants -100 and -300 have more than 99 per cent parts commonality. "In terms of flight crew training, pilots can switch from one aircraft to another

and fly the same day. The main difference in size is the -300 has a 3.7-metre longer fuselage. The commonality gives airlines great flexibility in their operations," Lopez said.

The A220 has dominated the global single-aisle market. Though the A220 is a new programme, the aircraft has claimed a 56 per cent market share in the single-aisle market as of July 2023.

The aircraft has accumulated close to 1.5 million flight hours as of July 2023 and airlines are serving 1,100 routes (375 destinations) with their A220s.

Huge potential

With a range of 3,450nm in the 100-150 seat market segment, the A220 is relevant to the African market. Lopez said an African airline operating from Addis Ababa could cover most of the destinations in Africa and the Middle East. "From Johannesburg, you can cover most of the destinations in Africa. African and other airlines can tap into this huge potential," Lopez said.

Several African carriers including Ethiopian Airlines are evaluating the A220.

Like any newly-developed aircraft, the A220 has faced some technical challenges mainly with the PW1500 GTF engine. Lopez said Airbus has been working with Pratt & Whitney as a team to support customers. "We are trying to offer the best option to our customers. We are striving to make sure that at the end of the day, our customers operate the A220 smoothly."

In a written response to Arabian Aerospace, Pratt & Whitney said current time on wing for GTF engines varies significantly depending on mission and operating environment, with operators in hotter, sandier environments experiencing reduced intervals between maintenance visits. "At the same time, industry-wide supply chain pressures have reduced the availability of spare parts and engines required to carry out required maintenance."

Pratt & Whitney said it was working to increase supply chain output and introduce solutions to improve GTF durability and time-on-wing, including modifications to the engine's combustor and turbine airfoils to improve cooling. "We are growing GTF engine after-market output by expanding global capacity across the GTF MRO network, which now has 13 active locations around the world with an additional six expected to be online by 2025," the company said.

"We are working with our customers to minimise current operational disruption," it added.

Apart from that, the A220 programme has been a remarkable success.

"It is still a young programme and we are proud of the success we have achieved in a very short period of time. We see a great future for this programme that will translate to customer airlines," Francisco Lopez concluded. ▲



Aircraft, assemble... Mobile, Alabama, is home to the second A220 manufacturing facility serving US customers

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Honeywell's focus at DAS will be innovation and sustainable aviation. It's putting a lot into advanced air mobility, sustainable fuels and efficiency, writes Steve Nichols

Innovation is key to the future

Honeywell Aerospace's focus at the show will be on innovation and sustainable aviation. The two go hand in hand, says Ryan Lees, Honeywell's president for commercial aerospace, Europe, Middle East, Africa and India.

"We recently released a high-efficiency mode upgrade for our 131-9A/131-9B auxiliary power units (APU) for single-aisle Airbus and Boeing aircraft," Lees said.

"This gives up to 2% improvement in fuel efficiency, which can save as much as \$9,000 per year, per aircraft, depending on operating conditions. They also offer improved environmental performance, reducing carbon dioxide emissions by up to 22 tonnes per APU per year."

Lees said Honeywell hopes to announce at the show an expansion of its APU support and a partnership with a local operator. The company has had a presence in the Middle East for 70 years and the UAE specifically for 50 and now has around 2,000 employees in the region.

"We have facilities in Abu Dhabi and Dubai, and are also in Dahrn, Saudi Arabia. We are also opening a new office in Riyadh," Lees said.

Business was going well post-Covid, he said, but there are still some sticking points with the supply chain.

"Commercial flight hours are up 25% this year and to cope we are now dual-sourcing components to avoid disruption," he said. "We are making our supply chain more robust, adding more labour and

driving more automation in the business."

Staying on the innovation theme, Lees said Honeywell is putting a lot of effort into advanced air mobility (AAM). "Our AAM team was only formed in 2020, but has already secured \$10bn worth of business. Developments in urban air mobility (UAM) and AAM over the last several years have brought air taxis and air ambulances of the future closer to becoming an everyday reality," he said.

"With newly-developed aircraft that are battery-powered and much smaller in size, many solutions will still be needed, but there will be extra emphasis on reducing size and weight. Hence the importance of SWaP to this sector – size, weight and power."

"Components must be miniaturised to fit into these new aircraft. This might mean integrating multiple requirements into a single package to reduce the overall size – this is where we excel," he said.

Honeywell is also busy working on sustainable aviation fuels (SAF). It recently announced that

"SAF can reduce greenhouse gas emissions by up to 80 per cent on a life-cycle emissions basis"

RYAN LEES

PRESIDENT FOR COMMERCIAL AEROSPACE, EUROPE, MIDDLE EAST, AFRICA AND INDIA, HONEYWELL

Embraer has successfully tested Honeywell's HTF7500 turbofan engine on its Praetor 600 aircraft using 100% sustainable aviation fuel (SAF). This was the first time 100% SAF had been flown in Honeywell's business jet engines.

It successfully demonstrated that the HTF7500 engine running on 100% SAF performed just as flawlessly as when running on traditional jet fuel.

"SAF can reduce greenhouse gas emissions by up to 80 per cent on a life-cycle emissions basis," said Lees. "We have to certify our APUs for every blend of SAF available – we really need an industry standard."

Honeywell is developing a new process to meet the growing demand for SAF. Its ethanol-to-jet technology will convert ethanol (from corn, sugarcane, sorghum or other crops) into additional renewable jet fuel that is energy-dense, stable, and compatible with existing fuelling infrastructure at airports.

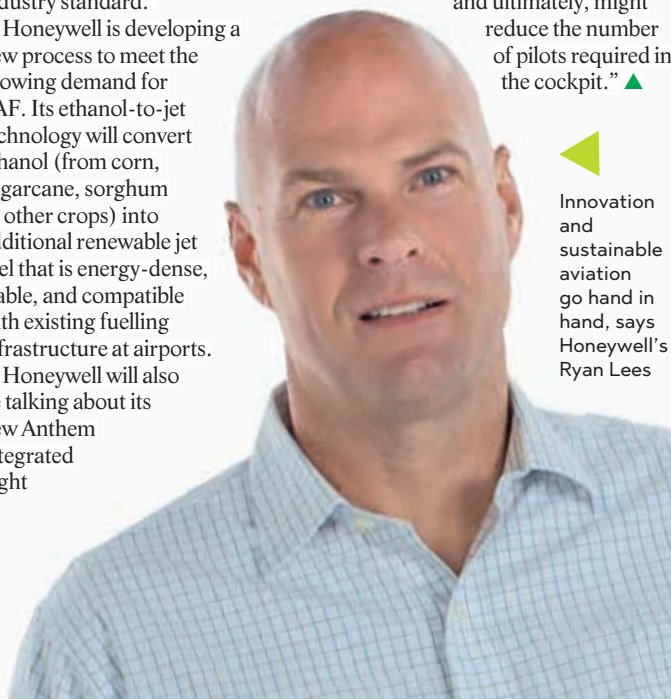
Honeywell will also be talking about its new Anthem integrated flight

deck. Its core architectural system offers a 50% reduction in size, weight and power, and greater installation flexibility when compared with its Primus Epic integrated avionics system.

"Anthem is an always-connected solution that will work across many platforms, from UAMs to airliners," he said. "Its cool features allow a pilot to plan a route in their hotel room and upload it directly to their aircraft."

"It will also know when you are going to land and can automatically contact the airport to arrange catering, maintenance etc."

"It takes the workload off pilots and ultimately, might reduce the number of pilots required in the cockpit." ▲



Innovation and sustainable aviation go hand in hand, says Honeywell's Ryan Lees

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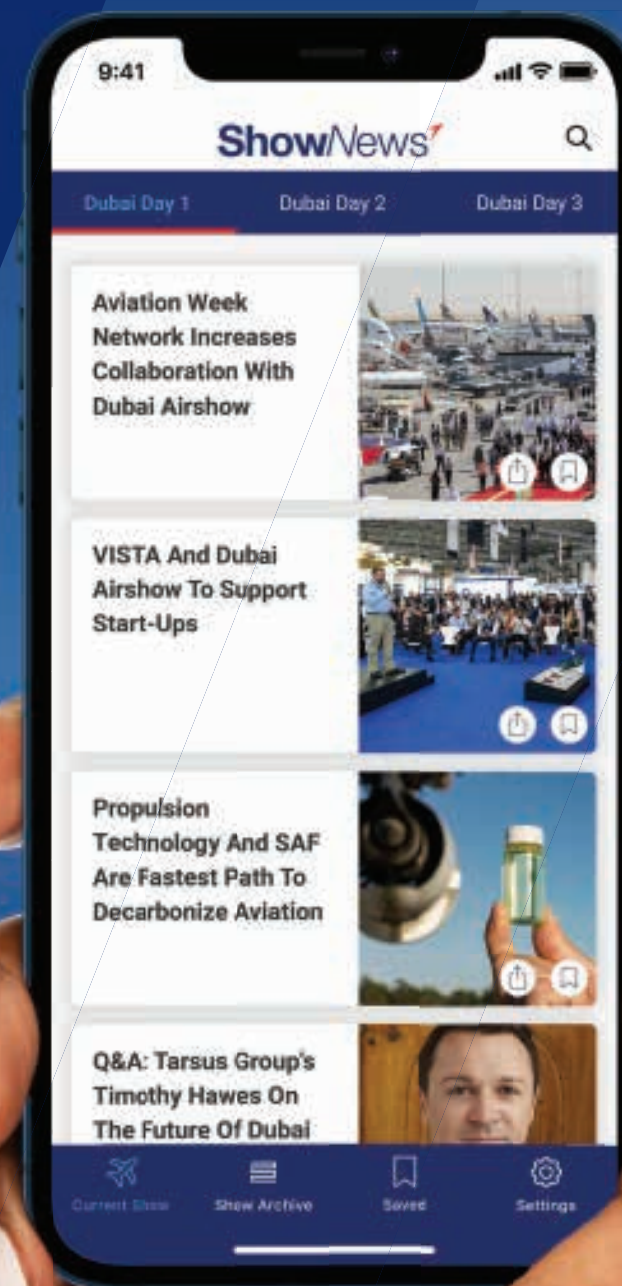
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