

Issue

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# FLIGHT DAILY NEWS



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## Dream team

Call it a tail of four cities, but this line-up of Boeing 787 vertical fins illustrates the popularity of the twinjet in the Middle East region. The cities in question - Abu Dhabi, Doha, Jeddah and Riyadh - are respectively the hubs of Etihad Airways, Qatar Airways, Saudia and the new operator Riyadh Air. Saudia is showing off its new green-and-white colours at the show, while the striking livery of the kingdom's Riyadh Air is set to be complemented by a second purple design. All of which suggests that - for widebody aircraft paint shops - it's surely the best of times.

BillyPx

# EDGE's island getaway

Defence group opens to the world unique secure test range off Abu Dhabi coast

Murdo Morrison

UAE defence house EDGE will today unveil the Arab world's first multi-modal military test facility - occupying an entire 350sq km island off the coast of Abu Dhabi. EDGE's X Range may sound like something from James Bond, but the state-owned business believes its secure island site - which includes an area to fly unmanned air vehicles and a helicopter firing range, as well as a landing beach and urban warfare training village -

could transform how manufacturers test their products and armed forces train.

The move comes after the consolidated defence group - which is marking its fourth anniversary - announced on the eve of the show significant stakes in two European unmanned air system developers as part of a bid to broaden its capabilities in that segment.

Work on the Abu Al Abyad island development - about 1h drive south of Abu Dhabi city - has been underway since shortly after EDGE's foundation, but it is only now being promoted.

Initially used by EDGE and the UAE military, it will open to international clients by 2025.

"We realised from day one that we needed to have such a capability in the UAE," says Omar Al Zaabi, president of EDGE's trading & mission support unit.

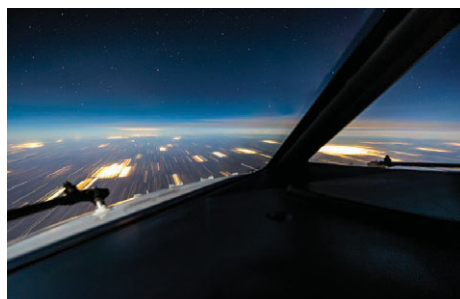
The site will comprise four zones. X Ranges East and West, for air, include 3,800m and 1,200m runways, and areas for missile firing and testing UAVs. The centrepieces of the North zone are a shoreline for amphibious landing exercises and the urban village for special forces training. X

Range South is dedicated to aerial propulsion and directed-energy weapons testing.

A unique feature, says Al Zaabi, is that each zone will have its own secure communications network and dedicated airspace to ensure that several customers can use it at once.

He says X Range will act as a technology accelerator for EDGE and other UAE defence companies in that they will be able to evaluate products immediately rather than "waiting for a slot in six or eight months" at an overseas facility.

Continued on page 4



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# C-390's 'amazing year'



Embraer is exhibiting its C/K-390 at the show as it eyes prospects in the Middle East

Craig Hoyle

Embraer is aiming to close out an already great year for its C/K-390 airlifter by securing additional orders, while it also eyes longer-term opportunities in the Middle East.

So far in 2023, the Brazilian airframer has handed over a sixth of the transport/tankers to its home nation, delivered a first export example to NATO member Portugal, won selection by Austria, and entered into negotiations with the Czech Republic.

A first example for Hun-

gary is also in the advanced stage of assembly, and the company is close to finalising a contract with the Netherlands, following a selection made in 2022.

"We were expecting an amazing year and amazing momentum for the C-390, and those two announcements [by Vienna and Prague] are a result of the effort that we are making," Embraer Defense & Security chief executive Bosco da Costa Junior tells FlightGlobal.

"The customers are recognising how capable the aircraft is, and how capable the solutions that we are

offering to them are. The C-390 is facing a completely different momentum."

The Brazilian air force recently passed 10,000 flight hours with its KC-390 fleet, which will eventually reach 19 units. Embraer cites an operational availability rate of 80% for the in-service fleet, and a mission completion rate of above 99%.

"We have many other conversations in place," da Costa Junior says of the company's sales prospects. "We expect to have an announcement coming from South Korea no later than the end of this year," he adds, refer-

ring to Seoul's LTA-2 tactical transport acquisition.

The requirement is expected to be for three aircraft, with the C-390 squaring up against Lockheed Martin's C-130J: a model already operated by the Republic of Korea Air Force.

"The Dubai air show is a very important opportunity for us to demonstrate the capabilities of Embraer, but for Defense & Security it's an amazing show, because it's so important to us to meet customers from the region – and from Asia also," da Costa Junior says.

Embraer last year part-

nered with the UK's BAE Systems to promote its military airlifter to Riyadh. "Saudi Arabia is a very important market to us, and we are investing a lot in this strategic partnership," he says.

Additionally, he also describes the United Arab Emirates – which currently flies aged C-130s – as "a very important country to us".

"We have demonstrated the C-390 to the UAE twice. They have evaluated our plane a lot. We are in touch with several stakeholders, and we are offering to them all the information regarding our plane.

"The airplane could perform a very important role in the UAE," he adds.

Several traits could appeal to operators like Saudi Arabia and the UAE, including the type's rugged design.

"The aircraft can land and take off from an unpaved runway in a completely austere environment. Those are some [operational] concerns coming from the countries in the Middle East region," da Costa Junior notes.

The Netherlands, meanwhile, appears close to cementing its deal for five C-390s, which also will include some co-operation with Austria in areas including training.

"We are in a final stage with them [the Netherlands], with no big discussions to be done," da Costa Junior says. "We are in good shape and we expect to have a signature of this contract no later than the first quarter of 2024."

Continued from page 1

However, he also expects the Gulf location to be popular with foreign clients. "We have already had multiple requests from international OEMs," he says. "It is difficult to find this sort of harsh environment for testing elsewhere, with temperatures over 50 degrees and humidity. If you can show that something works here, it will work anywhere in the world."

Elsewhere, EDGE, which was unveiled just ahead of the 2019 Dubai air show, continues its expansion. On the eve of this year's event, the business confirmed it has taken a 50% shareholding in Flaris, a Polish start-up that is developing a single-engine, short take-off and landing personal jet, the LAR1. The two companies plan to establish a joint venture to continue the programme, including an autonomously piloted version.

It follows a 6 November announcement that EDGE will take a majority stake in Anavia, a Swiss developer of uncrewed, vertical take-off and landing aircraft up to 750kg (1,650lb).



## Certification milestone beckons for 777-9

Boeing is edging towards type inspection authorisation from the US FAA for its 777-9, the point at which it will commence the formal certification testing demonstration for the twinjet.

The airframer has brought its WH001 test aircraft to the show, which carries several engineering stations as well as a dozen water ballast tanks for weight and balance simulation.

"We've paperwork to finish up and some analy-

sis we're trying to close out before we get that TIA," says 777-9 lead test pilot Capt Heather Ross. "Once we get that TIA we can actually begin the [certification] flight-testing portion." But she insists the airframer has already gone beyond the relatively narrow subset of regulatory tests during its extensive campaign.

Among the recent work have been minimum-unstick tests, earlier this year at Edwards air force base – a "big milestone", says Ross,

adding that there is a "little bit more work to clean up" on landing-performance and braking checks.

Ross says the TIA is likely to involve repeating a number of the tests – such as take-off performance – that Boeing has already conducted. "There's a couple of different ways to meet certification requirements," she says. "Some of it is to have FAA personnel on board, and demonstrate those conditions, sometimes it's a matter of getting credit

The airframer has bought its WH001 test aircraft to the show

for testing we've already completed."

Route-proving, which is typically carried out in conjunction with customers, is further down the line, along with certain function-and-reliability checks and tests for extended twin-engine operations – although Ross points out that the 15h 40min flight from Seattle to Dubai illustrates the jet's capabilities.

Cockpit touchscreens – with thumb-divots in the frames in case of turbulence – are among the visible changes from the legacy 777, but while the hydraulic, electric and pneumatic system are the same, the flight-control system is the same design as the 787's. "You don't see that and the pilot doesn't have to fly differently," says Ross.

Aside from the huge GE Aerospace GE9X engines, the most characteristic change is the folding wing-tips. Ross says the test regime will not include an in-flight folded configuration, insisting it is "impossible" for them to fold while airborne.

# EDGE

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## AI challenge for air forces

Artificial intelligence (AI) and the pace of technological change present significant challenges for air force leaders and have implications for the training of air force personnel.

AI is a major theme of the Dubai International Air Chiefs' Conference, which took place yesterday. Various air force leaders laid out a range of challenges.

"The traditional hierarchy-based decision making [in air forces] may no longer work," says UAE air force Brigadier General Azzan Ali A Al Nuaimi, who commands the nation's air warfare and missile defence centre.

"It is key to understand AI and how to integrate lots of data for more informed decisions, but also key to strike a balance between trusting AI and human decision making."

He stresses that while AI will be a crucial tool in future decision making, pilots and other personnel must retain the ability to think and make decisions. To attain this, realistic training is necessary.

Also speaking at the event was Lt General Luca Goretti, chief of staff of the Italian air force. He related Italy's experience with the Leonardo M-346 advanced jet trainer, which allows cadets to practise against real aircraft and in challenging simulated environments.

Simulations can include threats such as radio frequency emitters, surface-to-air missiles, electronic warfare, and cruise missiles. Rome's acquisition of the Lockheed Martin F-35 has placed a premium on new ways of training.

"We need to change our mentality to cope with this new equipment," says Goretti. "This aircraft is not a flying machine, but a data-driven machine. It's a completely different story. We need to fly a different way... with fifth-generation [aircraft], the pilot has to manage data from the beginning."

Goretti also alludes to the need for collaborative combat aircraft to work alongside manned platforms.

"We can have the best aircraft, but if it's only a few it's not sufficient," he says. "We need leading edge technology to achieve critical mass."

Royal Australian Air Force Air Vice-Marshal Glen Braz observes that the availability of data to commanders is rapidly growing, which already presents a challenge to existing intelligence processes.

## Spat's behind us: Qatar A350 makes a return

After the departure of its long-serving chief, Qatar Airways embarks on the post-Akbar Al Baker era with the arrival of an Airbus A350-1000 at the show – a presence which also signifies the restoration of harmony between the Doha-based carrier and the aircraft manufacturer, following their highly-public and, at times, surprisingly hostile and combative courtroom dispute which centred on the deterioration of skin paint on the A350 fleet. The spat was eventually resolved amicably, before a potential \$1 billion showdown, but not before Qatar had withdrawn several A350s from service and Airbus had retaliated by removing from its backlog over 70 aircraft intended for the carrier. As part of the settlement Airbus reinstated the order – comprising 23 A350-1000s and 50 A321neos – earlier this year. Al Baker's successor, Badr Mohammed Al Meer, takes up the leadership post at the airline having previously served as Doha Hamad international airport's chief operating officer.



## UltraFan powers on

Dominic Perry

Little over six months since first running its UltraFan demonstrator, Rolls-Royce has now taken the next-generation, ultra-high-bypass engine to full power – and even beyond.

Designed as an 80,000lb (355kN)-thrust engine, Rolls-Royce says the powerplant surpassed that level, achieving 84,000lb-thrust in maximum power tests completed in the first days of November.

Rolls-Royce says the new engine architecture will be capable of delivering a 10% fuel-burn improvement over its Trent XWB, and a 25% gain over the first generation Trent engines.

In addition, the propulsion specialist is eyeing the potential of the advanced technologies deployed in the engine – notably the high-temperature materials – to be inserted into its in-production engines to boost performance.

Tufan Erginbilgic, Rolls-Royce chief executive, says: "This fantastic milestone puts us in a strong position to support the plans of our customers as they develop the next generation of super-efficient aircraft."

Since first running the UltraFan on 24 April, Rolls-Royce has progressively taken the engine to higher output levels. It has now accumulated over 70h of run time and has completed key test points including maximum acceleration.

Performance has been "in line with expectations" which "reinforces our confidence in the suite of technologies that has been developed as part of the UltraFan programme".

It now plans to conduct detailed inspections of the engine. However, it is unclear for how much longer the test phase will continue.

At an event in May to celebrate the first engine run, Erginbilgic said tests of the demonstrator would carry on for several months before being halted as it waits for airframer interest in a new powerplant to emerge.

The UltraFan's geared-fan architecture is a major departure from Rolls-Royce's traditional three-spool widebody engine configuration and features a 14:1 bypass ratio.

Also incorporated in the UltraFan are carbon-titanium fan blades, a new low-emission combustor, and high-temperature materials and components.

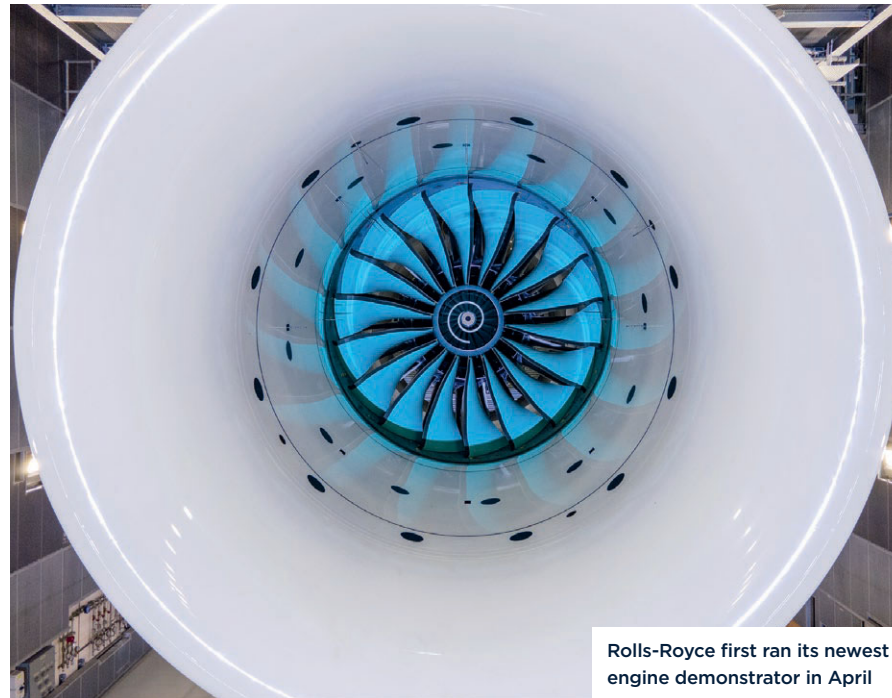
Rolls-Royce says the UltraFan's technology scales from 25,000-110,000lb thrust and also offers the potential to power the new narrow-body and widebody aircraft anticipated in the 2030s.

Meanwhile, Rolls-Royce has successfully completed compatibility testing of 100% sustainable aviation fuel (SAF) on all its in-production civil aero-engine types.

This fulfils a commitment, made in 2021, to demonstrate there are no engine technology barriers to the use of 100% SAF.

A ground test on a BR710 business jet engine at the company's facility in Canada, completed the test regime.

Other powerplants evaluated as part of the programme were: Trent 700, Trent 800, Trent 900, Trent 1000, both version of the Trent XWB, and the Trent 7000, plus the BR725, Pearl 700, Pearl 15 and Pearl 10X business jet engines.



Rolls-Royce first ran its newest engine demonstrator in April

# Airframers have eyes on the RISE

Murdo Morrison

CFM International says it is in active talks with Airbus and Boeing about its in-development open-fan RISE (Revolutionary Innovation for Sustainable Engines) programme as it continues to work on a prototype with a view to testing it in flight around "mid-decade".

Meanwhile, the GE Aerospace-Safran joint venture will next year roll out a set of improvements to its Leap engine, including high-pressure turbine (HPT) blades and nozzle, to tackle durability problems experienced by customers in the Middle East, where sand and dust particles can be a hazard.

CFM chief executive Gael Meheust says both partner companies are targeting significant resources at RISE, which was launched in June 2021, with more than 1,000 engineers dedicated to developing architectures including the open fan, a compact core, advanced combustion technology, and hybrid electric systems.

"This is no longer some kind of future concept," he says. "It's our day-to-day work. We are cutting metal with the aim of flying a demonstrator around mid-decade."

CFM is aiming to

achieve a 20% improvement in fuel efficiency and CO2 emissions compared with its current Leap engine. Meheust says a conceptual design review for the open fan is complete and more than 100 tests have been carried out as part of a technology maturation phase.

"We are learning a lot and are pleased with the results we are achieving," he says. Depending on "airframer strategies", an engine based on the RISE effort could "potentially enter commercial service in the 2030s".

GE and Safran are carrying out the improvements on the Leap after acknowledging that the current engine is not achieving time on wing levels of its CFM56 predecessor in the Middle East and North Africa.

Variants of the Leap power all Boeing 737 Max aircraft and the majority of A320neo family types, where it is an option



Meheust: RISE is no longer simply a future concept

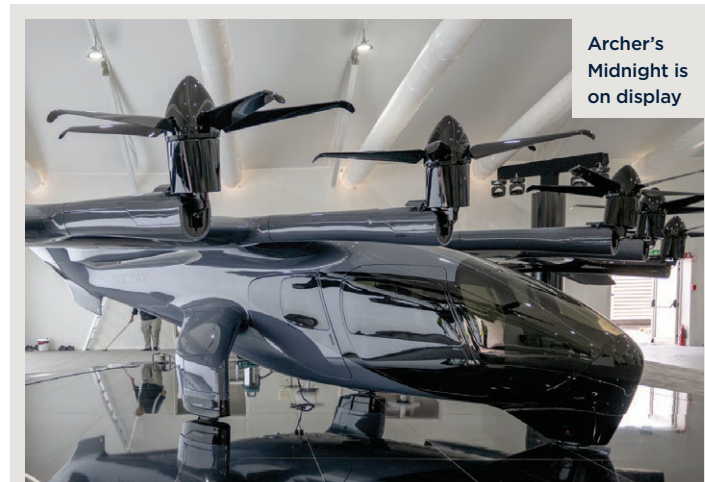
alongside the Pratt & Whitney PW1100G.

The redesigned HPT blade has been tested in a "proprietary" dust ingestion rig that has enabled CFM to "replicate the distress modes" in that region, says Meheust. This includes creating simulated dust particles similar to that found in that desert climate.

CFM will also introduce next year a retrofitable reverse bleed system that it says will mitigate carbon build up, or coking, in fuel nozzles, a phenomenon experienced with almost all engines when un-combusted fuel evaporation, after engine shutdown, causes the formation of carbon deposits. These can build up and impact engine performance.

Speaking on the eve of the show, Meheust also said that, despite ongoing supply chain challenges, CFM would deliver 45% more engines this year than in 2022 – although it had originally forecast a figure of 50%. The company has a backlog of more than 10,000 engines, representing five years of production.

CFM is aiming to



Archer's Midnight is on display

## AAM pays off for Honeywell

When it comes to advanced air mobility (AAM), you could say that Honeywell Aerospace is covering its bases. The Phoenix-based giant has announced technology tie-ups with at least half a dozen would-be disruptive start-ups since setting up its AAM business unit three years ago.

They include Archer Aviation, Lilium, Pipistrel, Supernal, Vertical Aerospace, and Volocopter. Further announcements are likely this week at the show, where Honeywell has a major presence.

In fact, the US company claims to have secured contracts worth over \$10 billion with these developers since 2020 – although that does come with a catch: the figure is based not on current revenue but Honeywell's best guess of the lifetime value of awards based on a forecast of the number of aircraft each firm expects to build.

"This milestone is not just about reaching a certain

number, it's a testament to the unwavering vision we hold for the future of aviation and AAM," says David Shilliday, vice president and general manager, AAM at Honeywell Aerospace. "We are committed to transforming travel and delivery services."

Honeywell products deployed on electric- and hybrid-electric-powered prototypes include its Anthem avionics, fly-by-wire controls, and sensors. The company is also partnered with Denso of Japan to develop an electric motor for the Lilium Jet.

For Honeywell it is about more than just gaining a foothold in an emerging sector. "A lot of the technology we are developing in that space will migrate into other areas of our business, such as airliners, business jets and defence," says Ryan Lees, president Europe, Middle East, Africa, and India. "The AAM sector is an enabler for us, driving other opportunities including our efforts in sustainability."

## The new king of cargo

With Dubai-based Emirates lined up as a customer for the Israel Aerospace Industries Boeing 777-300ER freighter conversion programme, the modification specialist has brought its test aircraft, originally an Emirates

airframe, to the show. The 'Big Twin' – formally designated the 777-300ERSF – bears the logo of US cargo carrier and launch operator Kalitta Air, which signed for three of the jets. IAI carried out the maiden flight from Tel Aviv in March this year

and has since been engaged in a certification programme. The aircraft has been developed in partnership with lessor AerCap following its acquisition of IAI's original partner, US lessor GECAS. Despite regional tensions over the Israel-Gaza conflict, the -300ERSF's pres-

ence symbolises continuing co-operation between the United Arab Emirates and Israel since the signing of the Abraham Accords. IAI is establishing several conversion facilities for the model in locations including Abu Dhabi, Seoul, and Marana in Arizona.



The 777-300ER freighter is at the show in the colours of Kalitta Air





The US Air Force accepted the first F-15EX in 2021

# Boeing eyes F-15EX exports

Airframer also seeking customers for sensors and avionics upgrade on legacy aircraft

The USAF accepted the first F-15EX in 2021, and two aircraft have been conducting test and evaluation work pending the type's service entry in 2024. A third F-15EX conducted its first flights in late October. Boeing and the USAF recently finalised terms for the next three rounds of production, bringing total commitments to 56.

Novotny says that in an upgrade scenario, legacy F-15s offer ample power to support additional electronics, specifically the APG-82(V1), a new mission computer, a new cockpit, and possibly new electronic warfare equipment. Moreover, modern avionics and the new touch-screen display save weight compared with legacy equipment.

Boeing is promoting the upgraded fighter at this week's show. The Middle Eastern market was key to the eventual development of the F-15EX, with Saudi Arabian and Qatari orders providing a crucial production bridge following the end of F-15E deliveries to the USAF. These two sales also saw significant improvements to the venerable type, setting the stage for the F-15EX.

Novotny, himself a former USAF F-15 pilot, says countries that have well-maintained F-15s with considerable lifetime remaining will look to the upgrade route.

Countries that have used their F-15s extensively over the decades will look to new aircraft.

Cirium fleets data suggests that six international

air forces operate the F-15, amounting to a total of 658 aircraft.

In the Asia-Pacific region, Japan is listed as operating 199 F-15s. It is embarking on an upgrade of about 70 F-15Js, which will see the installation of a new AESA radar and the ability to carry long-range strike weapons. South Korea also aims to upgrade its 59 F-15K Slam Eagles.

Elsewhere in the region, Singapore operates 40 F-15SGs, and Indonesia has a pending buy for 24 F-15EXs.

In the Middle East, Saudi Arabia operates 232 F-15s. Of these, 86 are relatively new F-15SAs with an average age of eight years. Riyadh's 80 F-15C/D fighters, however, are likely in need of replacement, with an average age of 40.8 years. It also has 66 F-15Ss with an average age of 25.4 years.

The other operators in the region are Qatar, with 36 brand-new F-15QAs, and Israel, with 87 F-15s, the majority of which are older F-15A/Bs and C/Ds. Israel has reportedly issued a formal request for 25 F-15EXs.

Boeing has also pitched the F-15EX to Poland, which is in the process of phasing out older Soviet-era aircraft.

Novotny adds that the biggest discriminator that sets the F-15 apart is its payload and range.

"If you look around the globe, and you see somebody flying F-15s, chances are we're having conversations about a whole new tail for them, or some kind of new kit," adds Novotny.

"It comes down the manner in which their existing fleet has been operated."

Greg Waldron

Boeing sees significant potential to upgrade legacy F-15s with new sensors and avionics, as it also eyes international potential for the new F-15EX.

Various variants, from the single-seat F-15C to the two-seat F-15E, have been

in service with both the US Air Force (USAF) and foreign allies for decades, and customers are realising that it is time to either upgrade their aircraft or replace them - potentially with the new F-15EX.

"Everybody that operates the F-15 right now and some new customers are excited about either new builds or a modernisation opportunity,"

says Rob Novotny, executive director F-15 business development at Boeing Defense, Space & Security.

The updated aircraft features several improvements over the USAF's legacy F-15s. These include the AN/APG-82(V1) active electronically scanned array (AESA) radar and a large touch-screen display in both the forward and rear cockpit.

## FLIGHT DAILY NEWS

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HOW TO CONTACT US

We are located in the show dailies area on the first floor by the exit to the static display

Editor Murdo Morrison murdo.morrison@flightglobal.com

Executive Editor, FlightGlobal Graham Dunn graham.dunn@flightglobal.com

Reporting team Craig Hoyle, David Kaminski-Morrow, Dominic Perry, Greg Waldron

Production Louise Murrell Designer Sarah Eversfield

Picture editor James Robbins Photography Tom Gordon

Distribution Stuart Burgess, Dawn Hartwell

Divisional Director, FlightGlobal Sophie Wild

Printers Emirates Printing Press, Dubai

## EFTA training for tomorrow

Emirates Flight Training Academy is showcasing its Diamond DA42 and Cirrus SR22 on the static as it reports rising demand for airline pilots.

EFTA was set up in 2017 to train UAE nationals and international students with no previous knowledge of flying. All graduates of its ab initio programme have the opportunity to go through the parent airline's recruitment process.

"Flightdeck careers have seen a huge resurgence post pandemic and are riding another wave of popularity," says EFTA, which is based at Dubai's Al Maktoum airport. "Salaries have increased, airlines are fast tracking career paths and expanding at a phenomenal rate, aircraft are more sophisticated, demand for travel is booming - all



EFTA's single-engine and twin-engine trainers are on the static

these have made aviation a sought-after career."

EFTA highlights Oliver Wyman research which forecasts that the gap between num-

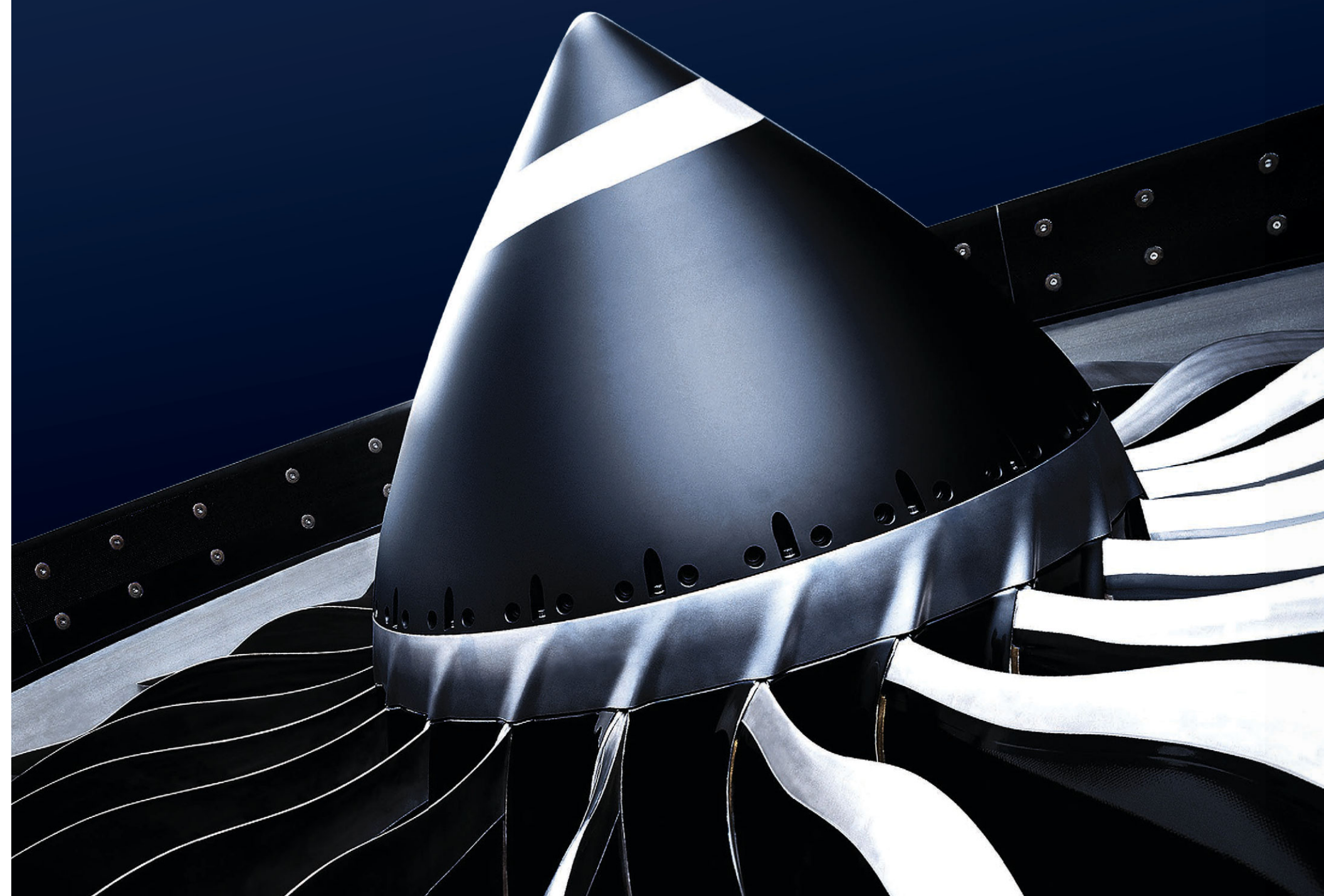
bers of pilot positions available and the supply of new recruits will increase from about 17,000 today to 24,000 by 2026. The school says that

290 students, representing 23 nationalities, are currently training at EFTA. Some 120 graduates are flying full-time for Emirates.



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The UAE surprised many with its \$17 billion deal for 80 Rafale fighters, but its potential interest in acquiring Chinese or Russian aircraft has put the brakes firmly on a suggested F-35 buy



## Power shift

Craig Hoyle

As is sometimes the way, the biggest defence-sector story of the last Dubai air show did not break cover until several weeks after the event had concluded.

On 3 December 2021, it was announced that the United Arab Emirates was to buy 80 Rafales from Dassault Aviation, in the largest-ever export deal for the French-built type. Deliveries of the enhanced F4-standard fighters are due to run between 2027 and 2031, says Dassault, whose contract came into effect in April 2022, on the receipt of initial payments.

The French government has valued the deal as worth €16 billion (\$17 billion), including a €2 billion package of air-launched weapons, primarily from European manufacturer MBDA. Artist's renderings prepared by Dassault depict the type carrying Mica and Meteor air-to-air and SCALP-EG cruise missiles.

An existing user of the Dassault Mirage 2000-9, the

UAE will become the second Gulf Cooperation Council (GCC) member to field the Rafale, after Qatar, which has 36 examples in use.

Its order will see it become the first international customer to take Rafales in the F4 operating standard, following the French air force and navy. Key updates include improvements to the fighter's radar, electronic warfare and communications systems.

Much of the anticipation in the run-up to the 2021 Dubai air show had been around the UAE's planned acquisition of 50 Lockheed Martin F-35As, which had received backing from the administration of departing US President Donald Trump late the previous year. Washington DC valued the proposed Foreign Military Sales (FMS) deal at around \$10.4 billion.

But the prospects for an F-35 deal rapidly appeared to dim, as the show hosted an international unveiling of the Sukhoi-designed Su-75 Checkmate. Washington had previously made its position clear that customers for its stealth fighter could not also do business with Moscow. This stance had been

underscored when it ejected Turkey from the F-35 programme in 2019 after Ankara took delivery of Almaz-Antey S-300 long-range air defence system equipment from Russia.

In a further muddying of the geopolitical waters, China's AVIC also exhibited its Hongdu L-15 jet trainer at the last Dubai show. In February 2022 it emerged that the UAE planned to buy 12 of the twin-engine type, plus 36 options. Reports from the IDEX show in Abu Dhabi in February 2023 indicated that a 48-aircraft deal had been finalised, but the exact status of the acquisition remains uncertain.

The UAE's air force and Joint Air Command currently have no manned Chinese- or Russian-built aircraft in their inventories, and its interest in potentially adjusting this situation looks to have put the brakes firmly on any F-35 buy. Meanwhile, this year marks the 25th anniversary of the UAE's selection of the Lockheed F-16, with 78 of its original 80 fighters still in service.

If an L-15 order has yet to be finalised, Boeing may be keen to capitalise on the UAE's need to

modernise its pilot training system, which currently employs aged BAE Systems Hawk 102s. Boeing in September 2023 delivered a first engineering, manufacturing and development-phase example of its T-7A Red Hawk advanced jet trainer to the US Air Force (USAF), which expects to introduce the type to service in 2026 via a 351-unit acquisition.

An industry source indicates to FlightGlobal that now is the time for potential future T-7A operators to be offered the type, since the first export slots could become available late this decade.

The UAE has a years-old requirement to acquire a new advanced jet trainer fleet, with other past projects of interest having included Leonardo's M-346 and the EADS-promoted Mako; a concept which never advanced beyond the drawing board.

Other developments concerning the UAE's procurement activities have since the last show included Saab in April 2023 conducting the first flight of its customer's fourth of five GlobalEye surveillance aircraft. The heavily adapted Bombardier





## THE GULFSTREAM DIFFERENCE

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Global 6000 features a new antenna fairing on either side of its forward fuselage, to accommodate undisclosed additional equipment.

Three GlobalEye aircraft are already in use with the UAE, with the platform capable of simultaneous airborne, maritime and land surveillance. Deliveries of its remaining assets will be made during 2024.

One of the deals confirmed at the last show will see the UAE bolster its current fleet of three A330 multi-role tanker transports (MRTTs), with Airbus Defence & Space to deliver two more of the adapted widebodies. Announced during the event's opening day, the deal was valued by the UAE as worth approximately AED2.5 billion (\$680 million).

**Latest standard**

Deliveries are due to start next year, while the nation's existing tankers will also be upgraded to the MRTT's latest equipment standard.

The UAE has been quiet on the FMS front since November 2021, with the only aviation-related item to have been detailed by the US Defense Cooperation Agency - in July 2022 - a potentially \$980 million follow-on sustainment deal linked to its fleet of eight Boeing C-17 strategic transports.

Airlift remains an area in need of further attention in the UAE, due to the increasing age of its Lockheed C-130H/L-100 tactical transports: it has eight in-use examples, aged up to 47 years, but previous interest in the J-model Hercules failed to progress.

Candidates for any replacement requirement would include the Airbus A400M and Embraer C/KC-390.

The A400M programme continues to await its first large-scale export success, with Airbus having so far secured deals for two each with Indonesia and Kazakhstan, and already completed a four-aircraft deal with Malaysia.

Embraer has teamed with the UK's BAE to pursue sales of its twinjet transport in the Middle East region, with Saudi Arabia as their primary focus. Since the last Dubai show, the Brazilian airframer has secured the Netherlands (5) and Austria (4) as buyers for its C-390, with the

Calidus unveiled its two-seat B-350 concept at 2021 show



nations following Brazil, the Czech Republic, Hungary and Portugal in selecting the type.

Separately, work to further develop the UAE's domestic defence industry continues at a rapid pace, with its fast-growing EDGE at the forefront.

Visitors to this year's show will be keen to find out more about the progress being made on a pair of projects undertaken by Abu Dhabi-based Calidus.

Designed for light-strike and surveillance tasks, the company's B-250 single-engined turboprop was unveiled at the 2017 show, and the UAE ordered 24 examples at the event two years later.

Deliveries under this deal have yet to start, but Calidus in January 2023 reported that it had made "further progress in the development of the B-250".

"Flight tests of the aircraft are now being conducted in Al Ain," the company said. The first aircraft of its kind to be manufactured in the UAE, the type is "designed to undertake multi-role missions in asymmetric warfare, including close air support,

counter-terrorism, intelligence, surveillance and reconnaissance", and can "also be used for training of pilots", it says.

Key equipment suppliers include: PT6A-68 engine maker Pratt & Whitney Canada; Pro Line Fusion avionics producer Collins Aerospace; Martin-Baker, with its AE16Z ejection seat; and EDGE subsidiary Halcon Systems (guided weapons).

Cirium information indicates that two B-250s have been flown to date, originally via a project between Calidus and Brazil's Novaer. The pair - now registered 980 and 981 - were built in 2017 and first flown in Brazil. Cirium expects production deliveries to the UAE air force to run between mid-2024 and March 2026.

At the 2021 show, Calidus also unveiled its larger B-350 concept: a two-seat, long-endurance platform with 12 under-wing hardpoints for weapons. The company provided few further details, with elements including its engine selection - understood to be the P&WC PW127 turboprop - not revealed at the time.

Meanwhile, Cirium fleets data shows that the six GCC nations now have a total of 2,072 active military aircraft between them: an increase of 121 since our last review prior to the 2021 Dubai show.

Saudi Arabia's 916-strong inventory accounts for a 44% share of the total, followed by the UAE (557/27%) and Qatar (226/11%). The other three nations each account for 6% of the overall figure, with their individual fleets being: Bahrain (122); Kuwait (122); and Oman (129).

The largest fleet increase has been in Qatar, which boosted its inventory by 65 aircraft over the two-year period, followed by net increases in Kuwait (20), Saudi Arabia (19), Bahrain (12), the UAE (4), and Oman (1).

Cirium indicates that five of the nations have a combined 374 military aircraft on order currently, while Oman has none.

Saudi Arabia has the largest share: 193 aircraft, or 52%. These are largely rotorcraft: 155 Sikorsky UH-60 Black Hawks, 25 Boeing AH-64Es, six Boeing CH-47Ds and three Airbus

Helicopters H215s. It also has four Beechcraft King Air 350 surveillance assets on order.

The UAE's 31% share totals 116 aircraft: its 80 Rafales, 24 B-250s and two GlobalEyes, plus 10 AH-64Es, for its Joint Air Command.

Now nearing the end of a spending spree that has seen it field a trio of multirole fighter types, Qatar's commitments currently stand at 19 NH Industries NH90s, 10 Eurofighter Typhoons and a lone Pilatus PC-24: for a combined 30 aircraft, or 8% of the GCC total.

Kuwait (20/5%) is still to receive 19 of its Typhoons and one H225; the latter for naval use. Bahrain's 4% stake is due to 15 Block 70 F-16s, not yet delivered.

**Sales opportunities**

Regional sales opportunities could exist for Boeing's F-15EX Eagle II, two test examples of which are currently being evaluated by the USAF. Qatar - which earlier this year took its last of 36 QA-model Advanced F-15s - has an option to double that total, and Israel is understood to be seeking a batch of EX-equivalent jets to bolster its inventory of the type.

Additional in-flight refuelling demands could open an opportunity for further sales of the A330 MRTT - six of which are also in service in Saudi Arabia - or Boeing's 767-based KC-46A. The UAE has previously indicated a potential need to increase its tanker capacity, while the Qatar Emiri Air Force conspicuously lacks any such capability currently to support its almost 100-strong and growing fleet of F-15, Mirage 2000, Rafale and Typhoon fighters.

Increased surveillance requirements could also present an opportunity, with Boeing keen to pitch its 737NG-based E-7A airborne early warning and control system. Saudi Arabia is the only operator of aged Boeing E-3 airborne warning and control system aircraft among the GCC states, with the UAE's GlobalEyes representing the only other such operational capability among the grouping. ▀

Fourth GlobalEye for the UAE got airborne in April, with new sensors



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We are unlikely to see a repeat of 2013's order bonanza, but this year's show will nevertheless signal industry confidence in the Middle East

# To Dubai to buy?



The Dubai show has seen monumental orders in the past

Murdo Morrison

"Dubai, buy, buy" proclaimed the front-page headline of the second edition of *Flight Daily News* at the 2013 Dubai air show with photographs of beaming airline and aircraft manufacturer executives. It followed a remarkable opening day that saw record orders placed for 623 aircraft, including 269 for Boeing's new flagship widebody, the 777X. Emirates - which committed to 150 777Xs and 50 Airbus A380s - was the biggest spender, but its fellow Gulf carriers Etihad, Flydubai, and Qatar Airways all placed significant orders, predominantly for Boeing products. Coming not long after the global financial crisis, it was a sure sign that airline confidence was back, particularly in this part of the world.

It is unlikely that blockbuster level of purchasing activity from 10 years ago will be matched at the 18th show - or at any time in the foreseeable future. However, the biennial event remains one of the most significant fixtures in the industry calendar, and retains the capacity to surprise.

Dubai was arguably the only air show that survived the pandemic unscathed. Unlike its counterpart in Singapore, whose 2020 iteration took place just as Covid-19 restrictions were tightening, and Farnborough and Paris, which cancelled their respective 2020 and 2021 events, the previous Dubai show benefitted from the post-pandemic bounce-back.

The emirate had been early among international destinations to re-open

to foreign visitors, and - while masks and health certificates remained mandatory in November 2021 - the show was the first opportunity many in aviation and aerospace had in more than 18 months to reconnect with industry colleagues face to face.

Dubai 2021 saw orders pass the 500 mark, just as at previous shows. However, it was lesser-known, predominantly low-cost airlines from outside the Middle East, rather than the Gulf powerhouses, doing the bulk of the buying. The inactive Emirates A380s parked at Al Maktoum airport, within sight of the air show static display, were a sign that full recovery in the long-haul market was still some time away.

Air cargo - which saw a boom during the pandemic thanks to soaring e-commerce at a time when belly capacity on passenger airlines was scarce - was a major theme of the 2021 show, with Airbus securing lessor Air Lease as a launch customer for its A350F, and Boeing announcing new conversion lines for its 737 passenger-to-freighter.

So what might the 2023 show bring in terms of orders? Emirates has made no secret of the fact that it is planning a major new widebody order - "to take us through the 2030s" - after taking delivery just after the 2021 show of its 123rd and final A380. "We are in the market for buying quite a few more aircraft," declared the airline's president Sir Tim Clark at IATA's annual general meeting in June.

The Dubai airline is sitting on orders



fast was its almost its downfall before, so do not expect major re-fleeting just yet.

Qatar Airways - which missed two Dubai air shows because of the diplomatic spat between Doha and its Gulf neighbours - will be back this year. The airline could be a contender for a major order after earlier this year reaching a settlement over its own long-running dispute with Airbus.

However, its enigmatic and often controversial former chief executive Akbar Al Baker will not be representing the airline at the show, having surprisingly stepped down on 5 November after 27 years to be replaced by the relatively unknown Badr Mohammed Al-Meer.

One order that might emerge at Dubai is a single-aisle order from Saudi Arabian start-up Riyadh Air. Chief executive Tony Douglas, said in late September that the carrier would follow up its commitment for up to 72 787s - including a firm order for 39 examples - with "a second, sizeable narrowbody order in the coming months, and it will be sooner rather than later".

As for the show itself, the organisers are promising 1,400 exhibitors and an 180-aircraft display this week, together with nine conference tracks featuring 300 speakers and covering topics from advanced air mobility to diversity and inclusion, and space exploration to the path to net-zero. The latter is particularly pertinent as just two weeks after the show, Dubai will host the United Nations' annual global climate change summit, COP 28. ▶



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With a new narrowbody aircraft order on the near horizon and its latest livery set to be unveiled, chief executive Tony Douglas continues to plot the launch path of the Gulf's newest airline brand

# Riyadh, steady, go!

Graham Dunn

One airline hoping to make a splash at this year's Dubai air show is an operator still more than a year away from launching flights, but which has the ambition to be a major player in the Gulf.

It is just over six months since Riyadh Air announced itself with a commitment for up to 72 Boeing 787s – including 39 Dreamliners on firm order – shortly after its official launch by the Saudi Arabian Public Investment Fund in March.

Riyadh Air chief executive Tony Douglas subsequently said the airline is set to follow this with a major narrowbody order, an order that could come at this week's air show.

It forms part of a steady drumbeat of announcements aimed at maximising interest in and engagement with the carrier in the lead up to its operational launch in 2025.

"I'm delighted and surprised in some respects," Douglas said of the response to the carrier since the plans for the airline were unveiled. Speaking to FlightGlobal in a late September interview, he said: "Six months ago you hadn't heard of our brand, and here we are, six months in, and I think we have made more progress in getting out there than perhaps we thought."

He sees the interest level in Saudi Arabia as a destination further boosted by projects, including the high-profile development and signings of footballers by Saudi Pro League clubs – notably Riyadh-based Al Nassr's recruitment of Cristiano Ronaldo.



Riyadh Air displayed its first livery on a Boeing 787 at the Paris air show

"It has gathered a level of curiosity and interest because people who probably, two years ago would never have expected Cristiano Ronaldo to be a resident of Riyadh, are getting curious and wanting to find out more," Douglas says. "At the moment, everybody wants to be part of this story."

Since then, the kingdom has enjoyed further sporting headlines after in late October being announced by FIFA as the host nation of the 2034 football World Cup.

Development of Riyadh Air, and specifically aims to increase air connectivity into the Saudi capital, forms part of the Saudi Arabia Vision 2030 economic diversification strategy. Under the development, existing national

carrier Saudia will over time focus its operations more on Jeddah, while Riyadh Air will build connectivity into the capital – a city Douglas says is under-served.

"If I use the eastern network as an example, currently Riyadh, the capital city of the world's fastest growing economy, doesn't connect directly to Beijing, to Shanghai, to Chengdu, to Guangzhou, to Tokyo, Seoul, Sydney. The list just goes on and on," he says.

Riyadh Air, which will operate domestic, regional and long-haul flights, has a mission to be serving a network over 100 destinations by the end of the decade.

Analysis of Cirium schedules data of departing flights from Riyadh to European destinations in October illustrates the relatively limited capacity from the city. Carriers are serving 24 points out of the Saudi city, with getting on for half the flights accounted for by Turkey alone. Existing Saudi carriers Flyadeal, Flynas and Saudia operate just over half these flights, while European budget carrier Wizz Air serves 10 points having entered the market a year ago.

A large narrowbody aircraft order is just one of a number of announcements the airline has planned. "We will reveal our second livery, which we think is even more beautiful than the first one," he says. The airline's first livery was showcased on a 787 at June's Paris air show, and the second is likely to be debuted here at Dubai.

"We will during the course of Q2 [2024] reveal the interior," he adds. That, on the airline's widebody fleet, will be a three-class configuration.

"The front of it will be business-plus but will not be [a] first class, because that in our opinion would be sub-economic," he adds.

Douglas, citing the young demographic of the Saudi Arabian population, has since launch also been stressing the digital credentials of the new airline. "During the course of next year, there will probably be two, maybe three, reveals of what 'digital native' actually looks like, and [the] demonstrations of how it works," he adds.

"We've got a roadmap because we know when we are going to go live in 25. We don't want to turn all the cards face up now, because then you have played your whole hand, [but] what we are trying to do is build engagement, build excitement," he says.

Riyadh Air, which is still to disclose its start-up network, expects to take delivery of its first Dreamliners in 2025 with a view to launching widebody services in the second quarter of that year. As a start-up, with no existing fleet to fall back on, the launch of these services is at the mercy of aircraft being delivered on time. That is a particular worry given the continued supply chain and production challenges manufacturers have battled since the pandemic.

"We went into it with our eyes wide open," says Douglas. "We are working very closely with the first order, Boeing – as we will when we place the next order – to make sure we have clear line of sight on all the latest movements in terms of delivery and the many other factors to consider. At the moment we don't have a red risk in that regard."



Douglas: 'We went into it with our eyes wide open'

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Dubai International has rebounded fast from the pandemic and will retain its role as the emirate's main hub for at least 10 more years. Meanwhile, Abu Dhabi's spectacular new terminal has finally opened for business

Murdo Morrison

“We didn't waste a good crisis,” reflects Dubai Airports chief executive Paul Griffiths on the decision to use global aviation's enforced near-shutdown in the pandemic to “reset the business” for what turned out to be a rapid recovery. The government company – which runs Dubai International and Al Maktoum airports – set about investing in technology, including passport e-gates, to create capacity at what was already the world's number one international hub.

“Sometimes when you're focused on survival, it's hard to imagine a future state. But I don't think we lost sight of the fact that after a crisis there will always be a recovery,” says the former London Gatwick boss, who has headed Dubai Airports since 2007. “We knew there would be a rebound and our instinct was that, after a two-year period of denying people movement, it would be quick and strong.”

Griffiths' prediction, of course, proved accurate. In the first half of this year, Dubai International's passenger traffic, at 41.6 million, eclipsed the corresponding period in 2019. In the second quarter, it surged by almost 43% year-on-year. In April, its position as the world's busiest international airport in 2022 was confirmed by Airports Council International, the ninth consecutive year it has held the honour.

Dubai International's status as a global crossroads – the airport operates 24h daily – worked both for and against it during the pandemic. While the emirate was one of the first places to open its borders and relax health measures in mid-2020, many destinations the airport served remained closed or restricted – and with traditionally more than half its traffic connecting through Dubai, and no domestic routes, this affected the airport's main selling point as a convenient transit hub.

However, point to point traffic



Dubai International currently copes with about 90 million passengers a year

# Global gateways

benefited as holidaymakers opted for Dubai as one of the few destinations open to tourism throughout most of the period. While Dubai Airports reduced direct headcount through outsourcing, it also avoided the problems suffered by some airports who struggled to bring back staff when travel demand returned in 2022. “We took the gamble that recovery would be quick enough to retain everyone on the payroll,” says Griffiths.

Installing passport e-gates in the first half of 2021 “achieved a much quicker throughput”, says Griffiths. “We identified that there would be a huge passenger service benefit.” Other extensions and tweaks to the three terminals – which occupy a relatively small footprint near

the original city centre – have also created more space. “Squeezing more capacity out of the [Dubai International] estate is something we have been quite good at,” he says.

Griffiths believes further infrastructure improvements could add 25% capacity to its current 90 million. However, before that point is reached – he thinks in about a decade – a decision will have to be taken on “DWC phase two”. That will involve creating a super-hub at Al Maktoum – opened in 2010 and largely serving cargo and private aviation traffic – and relocating Emirates and other airlines. “We are at the early stages of considering what that project might look like,” he says.

Just 50min drive from AI

Maktoum, another massive airport development has finally come to fruition. Abu Dhabi International's giant Terminal A – previously known as the Midfield Terminal – received its first passengers on 31 October, six years after it was due to open. Conceived early last decade to accommodate an ambitious growth strategy by home carrier Etihad, involving equity partnerships with several airlines, it has increased the airport's capacity to 45 million.

While it will give Abu Dhabi bragging rights over Dubai in terms of having the most modern and appealing airport, and a timely unveiling for the show, it remains to be seen whether Abu Dhabi – with its flag-carrier in consolidation mode long before the pandemic hit – will ever need those numbers. However, after a sharp fall in traffic, passenger numbers hit 10.2 million in the first half of 2022, up two thirds on the previous year, and a slimmed back Etihad too has outlined a strategy to return to growth.

The failure of the carrier's ambitious multi-airline expansion strategy in the previous decade means Terminal A might be some way from surpassing Dubai International and Qatar's Doha International to become the UAE's busiest air crossroads. However, the architecturally stunning, 742,000sq m (8 million sq ft) edifice – visible as a completed structure from the Dubai-Abu Dhabi highway for the past six years or so – is unlikely to face the white elephant fate some might have feared a few years ago.

Terminal A: Finally opened after a six-year delay



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After a flurry of new partnerships with eVTOL developers, will the UAE's urban air mobility ambitions finally take off – almost a decade after originally promised?

# Vertical promise



Lilium sees Dubai and the surrounding region as a significant market

**Murdo Morrison**

From initiatives for driverless cars to unmanned delivery drones and hydrogen-powered buses, Dubai has long seen itself as being in the vanguard of disruptive transport. So too with urban air mobility (UAM), where the emirate has made several announcements over the years that would establish it – along with its UAE neighbours – as one of the earliest adopters of an electric air taxi network.

Dubai's UAM journey began as long ago as 2017, when German electric vertical take-off and landing (eVTOL) aircraft developer Volocopter and EHang of China conducted flight trials over the city. Dubai's Road and Transport Authority (RTA) even declared a plan to launch air taxi services in July that year using EHang's single-passenger 184 design.

While the rather inevitable funding and certification schedule delays for eVTOL platforms – not to mention a global pandemic – put paid to such early promise, the would-be pioneers have kept coming. Just ahead of this year's show, German start-up Lilium announced a partnership with a local company to sell its eVTOL jet in the UAE and the surrounding region.

Meanwhile, on 16 October, the

Abu Dhabi Investment Office (ADIO) signed a memorandum of understanding (MoU) with eVTOL developer Archer which would see the UAE becoming the US firm's "first international launch partner". Archer plans to launch an air taxi service across the UAE in 2026, partnering with Abu Dhabi charter operator and rotorcraft specialist Falcon Aviation Services.

It is not Falcon's first foray into the sector. Last year the company said it intends to launch tourist flights from the Atlantis hotel on The Palm in 2026, using up to 35 eVTOL aircraft from Eve Air Mobility, with Falcon's chief operating officer Capt Ramandeep Oberoi saying the move would help position Dubai "as

a global leader in sustainable urban air mobility".

Eve, a spin-off from Brazilian airframer Embraer, and a committed participant at air shows over the past several years, is displaying its cabin mock-up and hinting at further customer announcements this week. The Melbourne, Florida-based business will also have a "simulated in-flight virtual reality experience" on its booth.

Two weeks after Archer's announcement, Lilium unveiled Dubai-based brokerage ArcosJet as its exclusive authorised dealer in the UAE, Israel and Cyprus. The companies are jointly showcasing the four-passenger Lilium Jet here at the show. Lilium, based in

Oberpfaffenhofen, near Munich, is unusual among eVTOL developers in that it sees high-net-worth retail buyers as a significant market.

Sebastien Borel, chief commercial officer at Lilium cites the "tremendous opportunity" for eVTOL platforms in the Middle East and ArcosJet's "huge network of industry connections".

ArcosJet founder and chief executive Mikhail Alenkin, meanwhile, says the socio-demographic characteristics of the region could make it "a leader in the sales and operation of the Lilium Jet".

As part of its commitment to Abu Dhabi, Archer says it will help build an engineering "centre of excellence to support the growing advanced air mobility industry in the UAE and across the Middle East" and "collaborate with local manufacturing companies and MRO providers". The emirate's sovereign wealth fund, Mubadala, is already an investor in the Santa Clara, California-based firm.

Archer's Midnight aircraft is making its Dubai debut, and the company – which has a manufacturing partnership with auto giant Stellantis, behind brands such as Chrysler, Fiat and Peugeot – suggests it will sign further MoUs with local companies during the show this week. Stellantis also holds a financial stake in Archer, alongside United Airlines and Boeing.



Archer's Midnight eVTOL prototype

Archer Aviation



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■ Saif Mohammed Al Swaidi, director general of the UAE's General Civil Aviation Authority, who recently visited Archer's facility in California as part of a national delegation, says the GCAA plans to approve Midnight to fly in the country as soon as it is certificated by the US Federal Aviation Administration.

Meanwhile, Badr Al-Olama, acting director general of the ADIO, says the venture with Archer will have financial, environmental, and mobility benefits. "Bringing electric aviation to the UAE will help unlock congestion with zero emissions and, in turn, bring millions in foreign direct investment and thousands of jobs to the region over the next decade," he says.

Six years after its demonstrations in Dubai, Volocopter has been turning its attention to Saudi Arabia, conducting a week-long series of test flights with its prototype in the planned new city of Neom. It is part of the authorities' plan to create an "innovative, sustainable, multimodal" transport system for the futuristic project, which is due to be completed by 2040.

This year has seen the focus also turn to vertiports, the landing areas and passenger facilities needed for eVTOL air taxis to operate. In April, Skyports, partnered with architect practice Foster & Partners, unveiled proposals for a vertiport at Dubai International airport - one of four locations around the city the RTA is considering. The design would allow passengers to connect to the airport's terminals.

Meanwhile, rival VPorts is behind plans for "the world's first AAM [advanced air mobility] integrator centre" next to Dubai's second airport, Al Maktoum International,



An impression of Skyports' proposed vertiport at Dubai International



Volocopter was one of the first to conduct eVTOL trials in Dubai

which it hopes to begin building in 2024. Montreal-based VPorts also this year signed an agreement with the emirate of Ras Al-Khaimah to build a vertiport at the airport there and plans a vertiport in Dubai's neighbour Sharjah.

After a 25-year career in airport development, Fethi Chebil founded VPorts in 2021. He says setting up a vertiport is about more than simply building a landing pad. "There have to be charging facilities, probably a hangar and a technical room, firefighting, and integration with air traffic control," he notes. "If people are flying international, there has to be police and immigration."

In contrast to many UAM evangelists, Chebil does not believe passenger air taxi services are imminent. Instead, he thinks the initial business case for eVTOL platforms will be for light, urgent cargo, including parts used in just-in-time manufacturing or repairs. "Although payloads will only be a maximum 500kg, they will be faster and more reliable than trucks," he says.

Chebil believes "a lot of money is going into eVTOL development and not so much into ATM and airport integration. We are positioning ourselves to be ready for that." The company plans vertiports in Sao Paulo - one of the few cities with a thriving VIP helicopter scene - as well as Montreal and Syracuse, New York, where VPorts hopes to establish a cross-border air freight corridor.

However, he believes Dubai will remain a prime mover in the emerging sector, and that is why VPorts is focusing its attention there. "The government is very progressive when it comes to technology, and pushing AAM," he says. We are leveraging that." ▶

## Can the UAE clean up with SAF?

Tony Harrington

News that Emirates has struck a major agreement with Neste for the supply of sustainable aviation fuel (SAF), alongside announcements from Archer and Eve about the launch of electric air taxi services from 2026, underlines the extent to which the UAE is ramping up its clean aviation activities.

The timing of these announcements is unlikely to be accidental.

The Dubai air show is not the only global event being held in the city at which sustainable aviation will be a major point of discussion. No sooner does the aviation gathering finish this Friday than the UN's flagship COP28 Climate Change Summit in the same emirate begins, kicking off on 30 November for two weeks.

The events come as both the wider aerospace industry and the UAE have work to do to convince their critics that they are decarbonising fast enough.

Some eyebrows were raised in response to the decision for the UAE, a major oil producer, to host the world's premier conference on the climate crisis, to which fossil fuel emissions are a major contributor.

While the UAE is actively diversifying into 'non-oil' sectors, including renewable energy, sceptics question whether the country's expansion into SAF and other renewables such as hydrogen is not a shift away from fossil fuels, but an opportunistic broadening of its energy product base.

What is clear from the raft of announcements and initiatives over the past year, is that the UAE plans to be a big player in this area, particularly in SAF. Furthermore, it has the funds, infrastructure, and skills to do so.

It has been ramping up its activity and a detailed strategy has been announced for local production of SAF. The UAE National SAF Roadmap flags annual output of 700 million litres by 2030, from up to five facilities. Using its ample solar exposure to generate renewable electricity, the UAE plans to create green hydrogen needed for power-to-liquid and waste-to-fuel programmes.

Also progressing is a long-running project in Abu Dhabi to develop SAF from saltwater-tolerant plants.

Global collaboration has flourished, including

new SAF partnerships between the Abu Dhabi Renewable Energy Company, Masdar, and both Airbus and Boeing.

The Abu Dhabi National Oil Company has just secured International Sustainability Carbon Certification, enabling it to produce and supply SAF.

And together with private equity group Carlyle, the Abu Dhabi government's Mubadala investment arm owns the Spanish oil and gas company CEPESA, which, by 2030, aims to produce 800,000t of SAF each year.

Dubai-based Emirates - whose president Sir Tim Clark has questioned the ability of the airline industry to achieve net-zero emissions by 2050 - has notably ramped up its green activity.

In January, with Boeing and GE Aerospace, it test-flew a 777 with one engine 100% fuelled by SAF, and in May announced a \$200 million fund to support innovation in renewable fuels and technologies. Last month it announced a 300,000 gal, 10-year commitment to buy SAF from Shell, now followed by plans to take a 3,000,000 gal of blended SAF across 2024-25 from Neste.

The UAE SAF Roadmap says that by 2030, up to half of the nation's production of the fuel could be absorbed just in the EU, generating a cumulative \$1.7 billion in export revenue.

"Net-zero, for us, is about new industries, new skills and new jobs," explains Sultan Ahmed Al Jaber, UAE special envoy for climate change, in comments within the SAF report. "For us, the business of tackling climate change is simply good business."



Emirates flew a 777 earlier this year with one engine 100% fuelled by SAF



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Boeing Commercial Airplanes' boss insists progress is being made on all three of its big programmes – the 737 Max, 787, and 777X – as he looks ahead to what promises to be a crucial week for the airframer

Jon Hemmerdinger

Boeing arrives at the Dubai air show riding a wave of recent sales for its widebody jets while aiming to land new 737 Max customers – with one particular sales opportunity at the top of its mind.

Boeing Commercial Airplanes chief executive Stan Deal says demand for widebody jets is on an upswing as airlines continue building up following Covid-19, and he has another message for the industry: Boeing's recovery remains on track despite a recent quality setback.

"It should be an all-around strong showing for the Boeing Company," Deal says. "We are going to have a great widebody presence at the show... I am very confident you will see a few orders come out of the show as well."

Boeing's 777-9 will be performing in the show's flying display and highlighting the jet's efficiency and "the quietness of the product in and around the airport", says Deal.

Other Boeing jets on display at the show include an Emirates 777-300ER, four 787s (one each from Etihad Airways, Qatar Airways and Saudia, and one Boeing-owned 787 in the colours of Riyadh Air) and an Flydubai 737 Max.

Though international air travel has been slow to recover from the pandemic, many airlines are now focused on building back their fleets with more efficient widebody jets, leading to notable recent sales for Airbus and Boeing. In 2022 and 2023 through September, Boeing has landed net orders (accounting for cancellations) for 74 777s and 339 787s, according to its data. United Airlines alone accounted for 140 of the 787 orders (and signed a new partnership with Emirates).



# Deals in Dubai

The 777-9 is taking part in the flying display

Saudia and Riyadh Air also each ordered 39 787s, Air India ordered 20 787s and 10 777X, and Qatar Airways became launch customer for Boeing's 777-8 Freighter.

"I expect you'll continue to see an extension of that," Deal says of potential new orders, while declining to specify possible customers. "The

widebody demand continues to be quite strong as people recover from the impacts of Covid. We've seen that resurgence. It started on the narrowbodies and the flurry of activity on the widebodies has continued."

Based on such demand, Boeing is now working to boost 787 production from four to five jets monthly this year, and to 10 monthly in 2025 or 2026.

Sales success aside, the 787 programme in recent years has been hamstrung by several quality problems – issues Deal insists his team is fully addressing. Boeing halted 787 deliveries for most of the time between October 2020 and August 2022 because gaps between jets' carbonfibre fuselage components did not meet specifications. It spent much of those 22 months plodding through a time-consuming investigation of the problem and development of a fix, which the Federal Aviation Administration (FAA) ultimately approved.

Deal says Boeing fully understands the problem and is now completing rework on its undelivered 787s. That inventory included 75 aircraft at end-September.

"There's no more variability relative to investigating further areas of the airplane," says Deal, adding Boeing learned from the experience. "It has honed our mechanics' skills, having to assemble and disassemble, [and] taught us something relative to the design-production-system marry-up for future designs. So, two valuable residual benefits that we'll take with us."

Boeing is also eager for more customers to sign for its in-development 777X, a programme the company launched at the Dubai show in 2013. It has delayed the 777-9's service entry several times amid heightened FAA scrutiny, prompting sharp rebuke from some buyers, notably Emirates boss Tim Clark.

Deal says Boeing is tracking to have the 777-9 certificated in mid-2025. The manufacturer is also developing the 777-8 Freighter, for 2027 deliveries, and still has the 777-8 passenger variant in its plans. "We're at 1,100 flights and about 3,200 flight hours on the product, which is more than any other airplane we've ever flown in the test regimen," Deal says. "We are into type-inspection-authorisation approval, [which] requires what's called design assurance reviews to

the Middle East, including a "service-ready validation in the region", says Deal, noting Boeing completed a similar validation in Japan for 787s prior to delivering the first of that type in 2011, to All Nippon Airways (ANA). "It's actually simulating an airline operation", Deal says. "We will do it in conjunction with an operator. We tend to run it with their maintenance crews and their pilots... We really attempt to accomplish a day in the life of an airline."

Boeing holds 318 firm 777X orders. Top customers include ANA (20), British Airways (18), Cathay Pacific Airways (21), Etihad (25), Emirates (115), Lufthansa (27), Qatar (74) and Singapore Airlines (31).

Deal thinks interest will rise soon. "The bulk of the ordering spree... will really start to unleash as we get closer to [certification], and after," he says, adding that Boeing has demonstrated that the aircraft meets performance and fuel-burn targets. "People are waiting to see the final product."

Which airline will be first to operate the 777-9 remains unclear, though Boeing has called both Emirates and Lufthansa launch customers. Deal says Boeing has a "lead customer" and "several [airlines] in the very front end of the launch of the product line" but declines to name them.

Boeing of course seeks more 737 Max customers, having landed 478 net new orders for the type this year, including a whopping 190-strong deal from Air India.

Another big opportunity is up for grabs: an expected order by Riyadh Air for narrowbody jets to supplement its 787s. Saudi Arabia's government in March revealed Riyadh Air as its new national airline, and with big plans, saying the carrier will eventually connect the country to more than 100 destinations.

"There's a narrowbody campaign going on," says Deal without naming customers. "We think we have a preferred offering, but our competition's fierce."

Deal thinks 737s can do for Riyadh Air what they did for another Middle East airline – Flydubai, which expanded rapidly with the Boeing narrowbodies.

"I think it's a story that plays over again very well in the Kingdom of Saudi Arabia," he says. "It's maybe even a little stronger thesis than the opportunity Flydubai has."

Deal insists Boeing is addressing 737 Max issues, the most-recent involving defective drill holes in aft-pressure bulkheads supplied by Wichita's Spirit AeroSystems. That issue primarily affects Max 7s, Max 8s and Max 8-200s and has required Boeing to inspect hundreds of holes



Deal: expecting an 'all-round strong showing' for Boeing over the coming days

on each of more than 150 737s in its inventory, leading to slower 737 production and deliveries. On 25 October, Boeing said it now anticipates delivering 375-400 737s this year, down from its previous 400-450 estimate.

Near-term slowing aside, Boeing says it is broadly working to accelerate the entire 737 production system from 31-aircraft monthly to 38 monthly before year-end, and to 50 monthly by 2025 or 2026.

Boeing staff are working closely with suppliers – including second- and third-tier companies – to ensure they have enough workers and material to meet planned rate bumps. "We've opened up our inventory of raw material to our suppliers to make up where there may have been capacity shortfalls," Deal says.

Few suppliers are as critical to the 737 programme as Spirit, which has struggled financially and operationally in recent years. But Deal thinks new leadership and a revised supply agreement have put Spirit on an upward path.

The company recently replaced longtime chief Tom Gentile with interim CEO Patrick Shanahan, who previously worked three decades at Boeing, including as senior vice-president of supply chain and operations, senior vice-president of commercial airplane programmes and vice-president of the 787 programme.

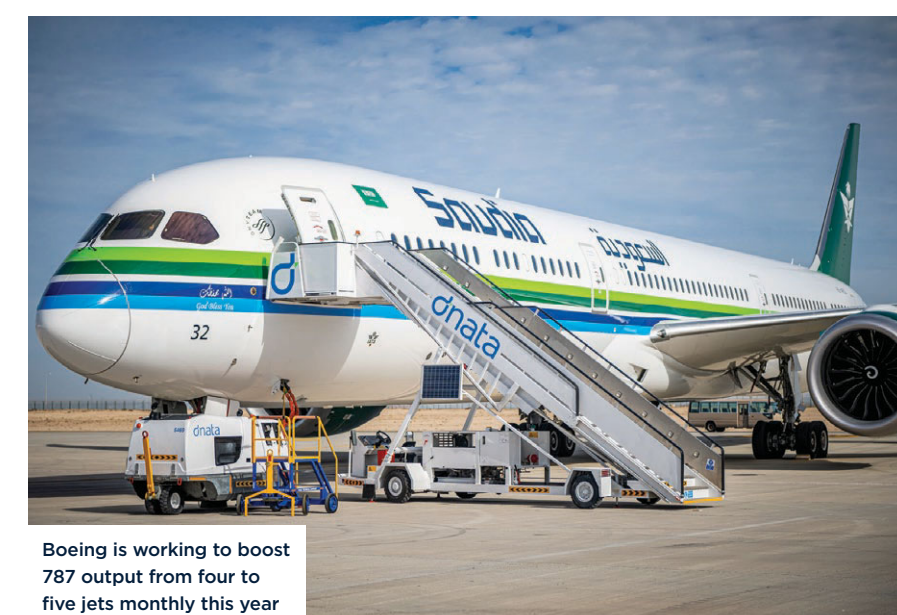
Boeing also recently agreed to provide Spirit with \$100 million to support 737 and 787 rate increases, and the companies revised payment terms to offer Spirit more near-term revenue.

"I... characterise that as an investment in stability, and [it] allows Pat to really focus on the main thing, which is making Spirit AeroSystems the best they can be, in terms of a predictable, reliable supplier," says Deal. "[Pat is] operationally in the midst of everything." ■

The airframer has logged almost 480 net orders for the 737 Max in 2023 so far



Patrick Riancho/Shutterstock



Boeing is working to boost 787 output from four to five jets monthly this year

be complete." "Then, we are off to... testing for score, which means the regulators' pilots are flying," Deal says. Boeing and engine maker GE Aerospace are working to ensure the 777X and its 110,000lb (489kN)-thrust GE9X turbofans are sufficiently durable to withstand

the Middle East's dusty and sandy conditions, which have caused trouble in other powerplants, Deal says. GE Aerospace has completed GE9X tests that included 1,600 run cycles while injecting dust particles into the engines. Boeing will also complete its own durability and operational checks in



Ethihad has followed Qatar Airways in bringing A380s back to service, as a capacity squeeze gives a new lease of life to an out-of-production type many thought the pandemic had largely killed off

# Return of the giant

Graham Dunn

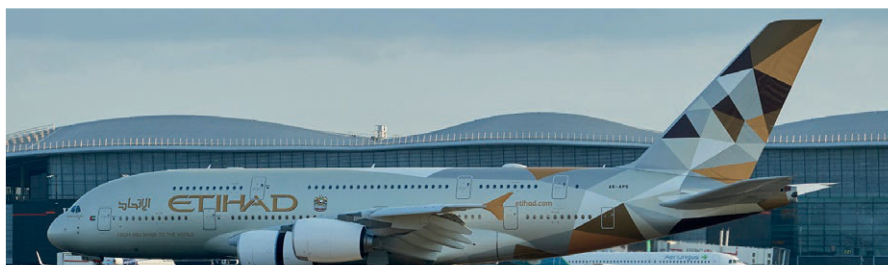
While Emirates' seemingly unshakable belief in the Airbus A380s means it is no surprise that a majority of the ultra-large jets are flying on Middle East routes today, far less certain was that a similar enthusiasm for the superjumbo would also be found at Etihad Airways and Qatar Airways. Cirium fleets data shows that of the 155 A380s that are now in service, more than two-thirds of these – 108 in total – are in-service with the Gulf trio.

The majority of these are operated by Emirates, whose president Tim Clark never left much doubt the carrier would return to service its more than 100 of the type after their abrupt grounding during the pandemic. However, both Etihad and Qatar had signalled that Covid was likely have drawn a close to their A380 flights.

Qatar Airways' then chief executive Akbar Al Baker had been a vocal critic of the efficiencies, both economic and environmental, of operating the A380 versus new-generation widebodies. However amid industry-wide challenges in ramping up capacity post-pandemic, and with its own capacity further cramped by the grounding of a portion of its A350s, Qatar Airways returned the type to service in late 2021.

"We are so desperate for capacity to fuel the huge growth in passenger numbers the airline is facing in this period," Al Baker said last summer.

But it would not be for another 18 months until Etihad followed suit. The Abu Dhabi carrier in July this



Etihad Airways resumed Airbus A380 services on 25 July 2023 for the first time since the pandemic



In November Emirates said it had brought over 100 of its A380s back into service



Qatar Airways returned its superjumbos to service in 2021

the 787s elsewhere across the network. "As we move into the winter schedule, it allows the 787s... to return to Dusseldorf, four years after we left, [and to add] the new destination of Copenhagen," he adds. Etihad also plans to send 787s to Osaka, its second Japanese destination.

Etihad is not the only carrier to have reinstated the A380 this summer. In June, Lufthansa resumed flights with the A380, again in a bid to counter a wider capacity shortage.

During the pandemic, Lufthansa grounded its then 14-strong A380 fleet. It eventually sold six of the jets. Having initially planned to bring four aircraft back, it has now opted to bring all eight of its remaining A380s into service by next year.

Lufthansa now operates the type on routes including Munich to New York, Boston, and since the end of October, Bangkok. By 2025 it plans to deploy them to additional destinations like New Delhi and Washington Dulles airport.

"Late 20s, early 30s," Lufthansa chief executive Carsten Spohr said in September when asked how long Lufthansa expects to continue operating its Rolls-Royce Trent 900-powered A380s. "It depends on demand, and when Airbus and Boeing are able to deliver other airplanes."

It means 10 airlines have now brought the jet back into service. None of Air France-KLM, HiFly, Malaysia Airlines and Thai Airways have restored A380 flights, while China Southern Airlines, which had been one of the few to operate A380s through the crisis, took the type out of service at the end of last year.

Emirates of course remains the key A380 operator. Clark has been steadfast throughout the crisis in believing demand will warrant the return of the double-decker. In March last year, as international markets reopened in earnest, he flagged a combination of "astronomical demand" and slot shortages at major airports as making the case for the type.

The carrier, in releasing half-year results on 9 November, said it now has more than 100 of its A380s back operational. That is alongside the full restoration of its Boeing 777 fleet.

Further underlining the importance of the type to Emirates' future, the Gulf carrier is retrofitting 67 of its ultra-large jets with a new interior. The first of these, which has been refurbished to include a 56-seat premium-economy cabin, returned to service at the start of the year.

year restored the first of four A380s to service after a hiatus of more than three years, deploying the jet on its London route.

The airline had grounded its 10 A380s indefinitely in April 2021, parking them as part of wider action in response to the pandemic.

While Etihad never completely ruled out the return of its A380s, it appeared one of the least likely operators to bring the widebody back into service. "We don't see them re-entering into our fleet planning unless the yield on the ticket price and the demand could ever make them financially viable," then Etihad chief executive Tony Douglas told FlightGlobal in an interview in March 2021.

The type though has secured an unexpected stay, as strong demand convinced the airline that restoring some A380s to service would be "financially viable".

"It's a great opportunity to reinvest capacity into [the] London-Abu Dhabi [route]," Ed Fotheringham, Etihad vice-president Europe and the Americas, told FlightGlobal after the ultra-large jet landed at Heathrow for the first time following the Covid-19 crisis.

"As we return from the pandemic, there is a huge amount of growth across the world, and one of the great options Etihad has is bringing back the A380 on a high-capacity route like London-Abu Dhabi."

The airline, which has so far brought three of its A380s back into service, is using the type to replace Boeing 787s on its four daily London flights.

Deploying the A380s, which seat 486 passengers in Etihad's configuration, significantly increases its capacity. The Airbus jets carry about 150 more seats than its two- and three-class 787s.

It also frees Etihad to redeploy



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### A380 in-service fleet: October 2023

Airline	In service	In storage
ANA	3	0
Asiana Airlines	5	1
British Airways	12	0
Emirates Airline	97	24
Etihad Airways	3	7
Korean Air	6	4
Lufthansa	4	10
Qantas	7	3
Qatar Airways	8	2
Singapore Airlines	10	4
<b>Total</b>	<b>155</b>	<b>65</b>

Source: Cirium fleets data as of 31 October 2023. Stored aircraft total includes carriers not flying A380



ECFT – the third-party joint venture from Emirates and CAE – is expanding, 20 years after opening its original simulator centre near Dubai's main airport

# Training the world

Murdo Morrison

“You still get that new car smell,” enthuses Nimrod Meuleman, managing director of Emirates CAE Flight Training (ECFT), of the business's latest full-flight simulator (FFS), a Bombardier Global 6500 – the first for the large-cabin business jet outside North America.

The device has been busy since entering service at ECFT's Al Garhoud centre in May. It took to 18 the number of FFS at ECFT, the Middle East's biggest third-party training provider. They range from Boeing 737s to a Hawker 800/900.

The region has proved lucrative for Montreal-based CAE since it established its joint venture with the Dubai-based airline 20 years ago to pitch pilot training to a wave of airline and business aviation start-ups in the Gulf and beyond. Today, ECFT trains around 12,000 pilots annually.

ECFT's 14-bay building is next to Emirates' in-house training facility and a five-minute drive from Dubai's main airport. Ten years ago, growing demand led ECFT to open a second location, in the city's Silicon Oasis district, doubling that site's footprint to 10 bays four years later.

The Silicon Oasis facility houses seven of ECFT's 18 FFS, and expansion is on the cards. “We will add other simulators there and possibly reposition some of our lower-hours devices from [Al Garhoud] to make more room here,” says Meuleman.

Early in the century a fast-growing Emirates opted to set up its own training arm for its all-widebody fleet, with CAE-built simulators. However, the airline and CAE – which was starting its transition from simply a simulator manufacturer to a training provider – identified a wider third-party opportunity.

Although in 2003 the birth of Emirates' sister short-haul airline Flydubai was still five years away, the Middle East and Indian subcontinent were spawning many new airlines, flying mostly narrowbodies. They were having to send their home-grown pilots to Europe or the USA to train.

Even more importantly, a burgeoning business aviation market in the region meant there was a need for a local resource where flightcrew for a fleet of Boeing, Bombardier, Gulfstream, and Hawker jets could be instructed and qualified.



Meuleman: Dubai is an attractive and easy location to get to for pilots

Bombardier types represent most of the simulators at Al Garhoud. As well as the Global 6500, there is a Global 7500, Global 5000, Global 6000, and Global Express, as well as a Challenger 604 and 605. A Gulfstream G650 and G550, Boeing Business Jet, and Hawker 800/900 complete the line up.

At Silicon Oasis the focus is more on the commercial sector with two 737 Max simulators dedicated to Flydubai – ECFT is the carrier's exclusive training provider – as well as two 737NGs. There are also an Airbus A320, a Hawker 800XP and a Bell 412, the joint venture's sole rotorcraft.

CAE's partnership with Bombardier is significant. Running to 2038, the agreement means CAE works closely with its Canadian compatriot through the design process of all its business jets, so simulators are available as soon as a new type is certificated.

The Middle East and North Africa make up 30% of ECFT's customers, with 30% from Europe and the rest largely from Asia and Latin America. Lack of simulator capacity is a

factor, particularly with business aviation. While the USA has many options, there are fewer choices elsewhere.

Even in Europe, CAE's Burgess Hill site in southeast England and rival FlightSafety International's facilities at Farnborough and Paris Le Bourget are the only dedicated business aviation training centres and are often full (although CAE hopes its new site in Vienna, due to open in 2024, will help).

Dubai as a location is also an plus when it comes to attracting customers. “Emirates has great connections all over the world, so it is an easy place to get to, and people feel comfortable once they are here, with many adding personal leave to their stay,” says Meuleman.

While ECFT no longer accepts pilots from Russia, other parts of the former Soviet Union are a growing market, as is China. “When China finally opened up [from Covid-19 travel restrictions] at the end of 2022, we saw a huge increase in demand,” says Meuleman.

ECFT rode out the pandemic relatively unscathed, thanks partly to

Dubai's very early border reopening in mid-2020. The following year saw a surge in business aviation operations.

“By the end of 2021 we had recovered any losses [from the Covid-19 period],” he says.

While ECFT has a foot in both business and commercial aviation, with 20% of its revenues from the latter, the economics are different. Because of lower volumes and their more complex flightdecks, business aviation simulators are more expensive and take longer to amortise, says Meuleman.

CAE's involvement in the Gulf goes beyond ECFT and Emirates, for whom it supplies the devices for the airline's own training centre. A new six-bay extension to that facility, for its future A350 and 777X fleets, is due to open in March.

CAE also supplies the kit for Etihad's 11-simulator training centre next to its headquarters in Abu Dhabi. It also has a joint venture with offshore specialist Abu Dhabi Aviation to operate Embraer ERJ-145 and Beechcraft King Air 350 simulators at its facility in Khalifa City. ▀

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The aerospace hub around Dubai's second airport has a new brand identity, and is attracting a flurry of maintenance and other service companies

# Strength in numbers

Murdo Morrison

For most of the 13 years since Dubai's second airport opened, the area around Al Maktoum International has comprised a few aviation enterprises dotted amid the desert. Slowly, however, more infrastructure has emerged, and the long-term vision of creating a thriving cluster of business aviation, pilot training, MRO, and other service providers is finally taking shape.

New residents of the 700ha (1,730 acre) Mohammed bin Rashid Aerospace Hub (MBRAH) - part of the vast Dubai South commercial and residential development and next to the airport itself - include ExecuJet MRO Services, which opened a hangar capable of housing around 20 business jets in May, and its former sister business ExecuJet, which will run an adjoining VIP terminal.

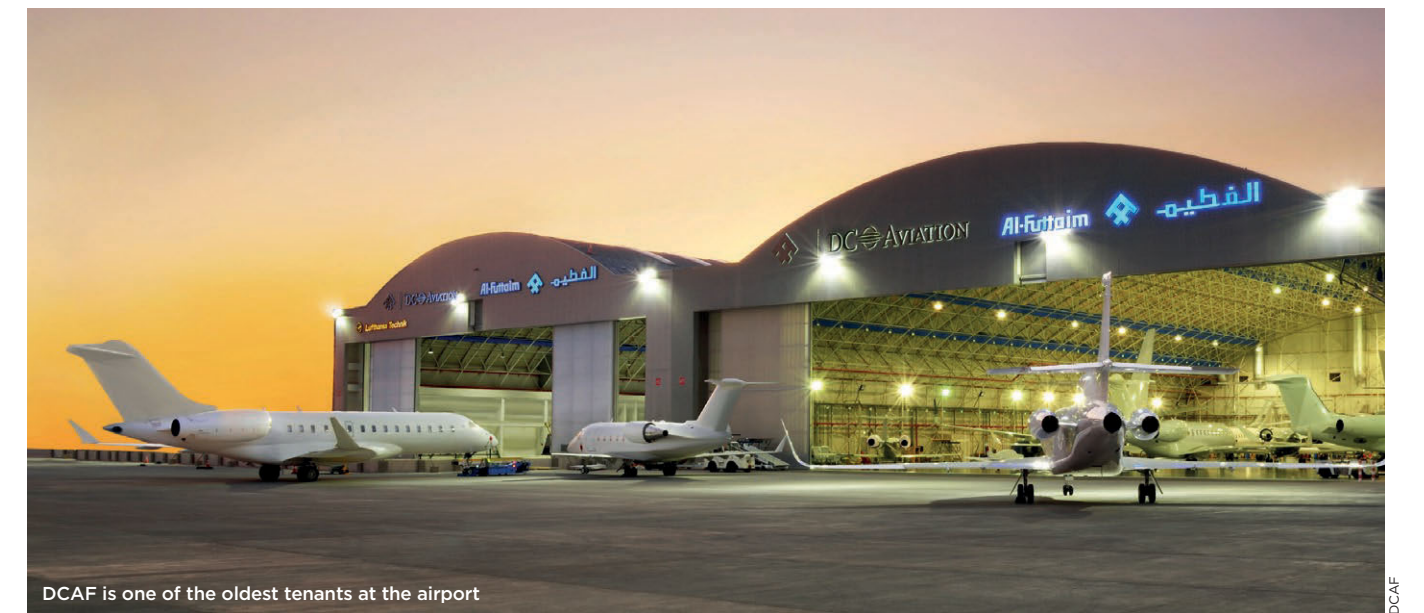
Private aviation firm Comlux will open its new facility this spring, consisting of a 5,000sq m (53,000sq ft) hangar and showroom for the Airbus ACJ TwoTwenty - the Swiss company has a contract to outfit the first 15 examples of the modified narrowbody airliner. Aircraft painting specialist Satys Aerospace and Dubai-based aircraft management and charter operator Empire are also moving in.

They join long-time tenant DC Aviation Al Futtaim (DCAF) - which has run a hangar and fixed-base operation (FBO) at the airport for 10 years - as well as Jetex and Falcon Aviation which jointly rent the main VIP terminal. Lufthansa Technik has a small MRO operation, and Emirates' ab initio flight training academy occupies a large corner. The air show site is also adjacent.

A suppliers' complex - aimed at attracting small manufacturing or service companies - opened at the end of 2022 and is due to be expanded next year. MBRAH has also begun constructing the second phase of a helipark that will include a hangar and extension to the apron to allow parking for 12 helicopters.

"Our mandate is to attract a wide range of partners, including MRO companies," says Tahnoon Saif, MBRAH chief executive. "At the same time, we are keen to build an integrated system to meet the needs of all types of companies. Through this approach we can contribute to the vision to make the emirate the aviation capital of the world."

When Al Maktoum International opened in 2010, the strategy of Dubai's rulers was for the desert airport to eventually replace the



DCAF is one of the oldest tenants at the airport

increasingly congested Dubai International as the city's main gateway. However, with its tiny terminal and limited passenger flights, that transition is likely to be at least a decade distant.

That said, the emirate has done a good job of moving most cargo and private aviation flights to Al Maktoum, and the airport is no longer as remote as it once seemed. Large upscale residential developments south and east of The Palm and Dubai Marina mean that the new airport is more convenient for many than Dubai International, in the heart of the original city surrounding the creek.

"The aviation industry's significant shift towards the southern part of Dubai bolsters MBRAH's growth," suggests Saif. "On current trends, we are projected to witness substantial growth in the next three years. This projection is backed by the anticipated recovery of the aviation industry to its pre-Covid levels."

Dassault Aviation-owned ExecuJet MRO Services is one that made

the north-south shift as more of its clients began asking for slots at Al Maktoum airport. Based for many years at Dubai International, its new 15,000sq m development at MBRAH was in train before its split from the rest of Luxaviation-owned ExecuJet in 2019, the reason the two similarly branded businesses will share the overall plot.

Comlux is a new Dubai arrival, announcing its new facility late last year. While it will, at least at first, offer parking rather than maintenance, Middle East director Jean-Michel Champredonde expects the ACJ TwoTwenty showroom to be popular - many of the variant's prospective customers are in the region. Comlux operates the first example on behalf of launch customer, Dubai hotel group Five.

Champredonde, who arrived in the city amid the Covid-19 crisis in 2020 to head the project and recruit a team, cites the ease of establishing a new business in Dubai. "Everyone is so helpful," he says. "In other places, when you are dealing with

government organisations, they finish at 5pm and might deal with your problem tomorrow. Here they pick up the phone 24/7."

Empire Aviation was set up in Dubai in 2007 and late last year also signed an agreement to build a "multi-purpose business aviation facility" at MBRAH which is due to open at the end of 2024. The site will incorporate the company's headquarters as well as a crew check-in and briefing area, and a rooftop lounge for events.

Satys, a leader in aircraft painting and interiors, with more than 2,000 employees around the world, says its new two-bay paintshop, due to open in January 2025, will be able to handle up to 20 aircraft a year, narrowbody airliners as well as large business jets. The move will make Dubai a "centre of excellence" for aircraft repainting, states the Toulouse-based firm's chief executive Christophe Cadot.

How do MBRAH's existing occupants feel about the new competition moving in? While he expects some added pressure on the FBO side, with ExecuJet becoming the fifth provider of aircraft and passenger handling services at the airport, DCAF's managing director Holger Ostheimer says the hub's popularity with new tenants reflects growing customer demand.

"Dubai as a city remains an extremely attractive location for ultra-high-net-worth individuals, including from the likes of China and India, and that is good for all of us," he says. "You have to focus on your own activities, because that is all you can influence, but we are committed to a growth plan that anticipates more business coming into Al Maktoum."



Comlux will open its facility - shown here as an artist's impression - next year

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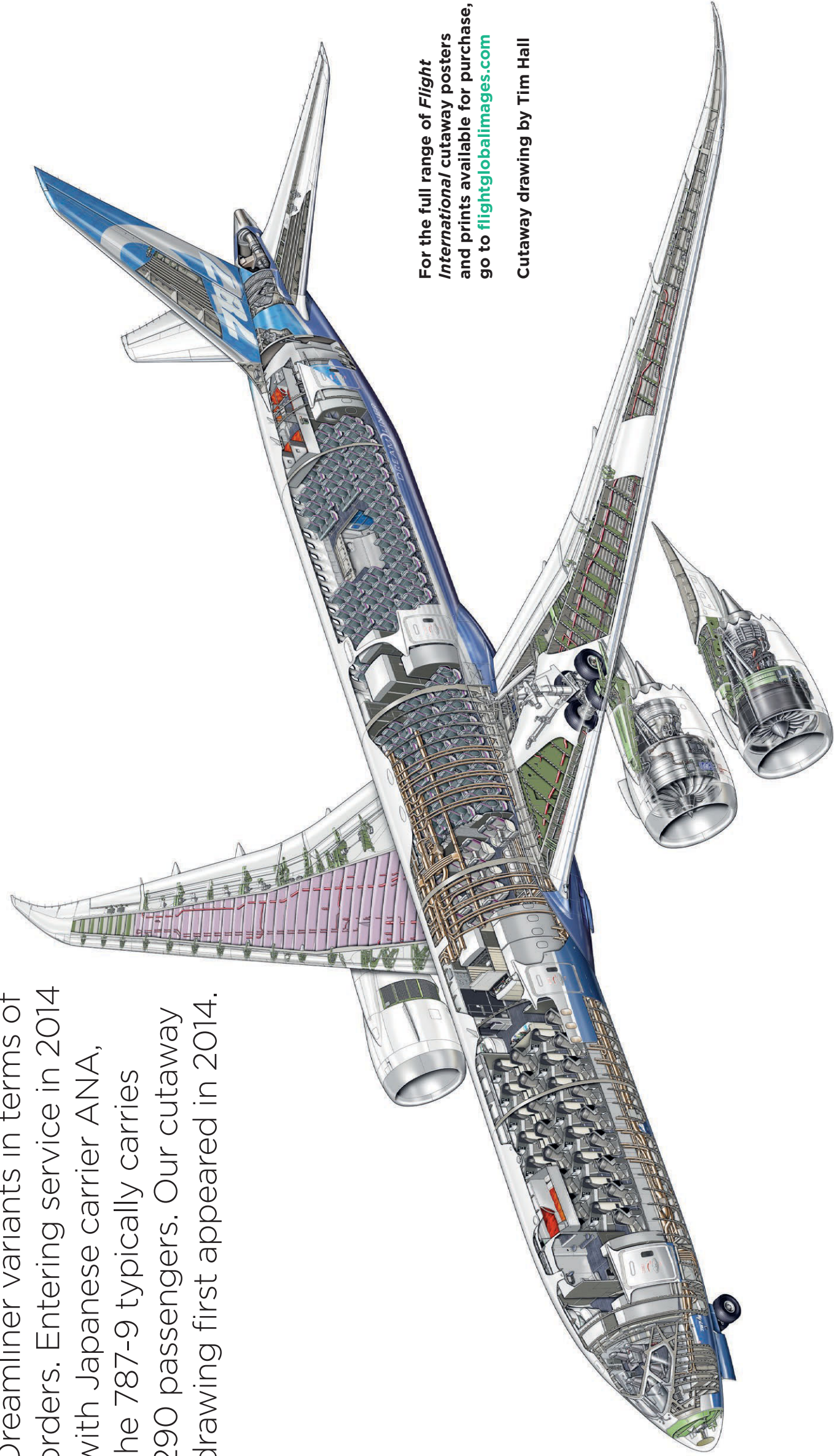


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# Boeing 787-9

The 787-9, which features on the static display, is the middle and most popular of three Dreamliner variants in terms of orders. Entering service in 2014 with Japanese carrier ANA, the 787-9 typically carries 290 passengers. Our cutaway drawing first appeared in 2014.

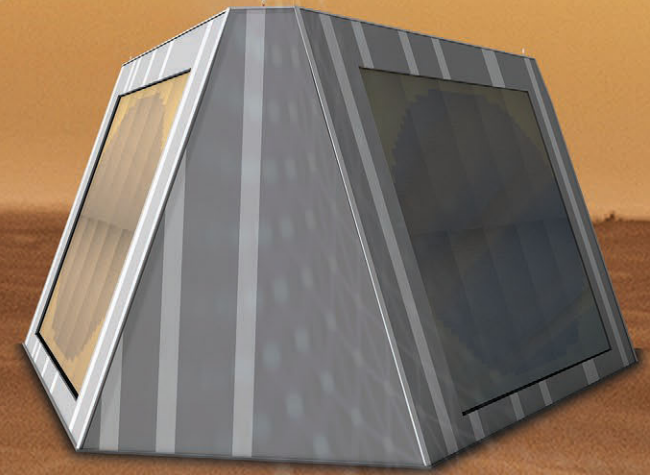


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