

Issue

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FLIGHT DAILY NEWS



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ATR powers up

ATR is to re-engine its 42- and 72-600 twin-turboprops with a new update of the Pratt & Whitney Canada PW127 powerplant and has secured long-term operator Air Corsica as launch customer with an order for five aircraft.

To enter service from the final quarter of 2022, the PW127XT-M will be standard equipment on all new ATRs, and also available as a retrofit on older -500 and -600 aircraft.

Promising a 3% reduction in specific fuel burn, time on wing extended by 40% and maintenance costs reduced by 20%, the PW127XT is also capable of running on blends of up to 50% sustainable aviation fuel.

"We are bringing customers what they want," says Stefano Bortoli, ATR chief executive, citing the affordability and improved operating economics of the new engine.

P&WC has been flying the engine for some time, says company president Maria Della Posta.

Marie-Helene Casanova-Servas, president of Air Corsica's supervisory board, adds that the environmental credentials of the re-engined aircraft were an important factor in the selection decision.



(Left to right) Casanova-Servas of Air Corsica, ATR's Bortoli and P&WC's Della Posta

Air Lease to launch A350F

Second coup for Airbus as lessor commits to new cargo variant as part of order for 111 jets

David Kaminski-Morrow

U S lessor Air Lease has become the launch customer for the Airbus A350 freighter, agreeing to take seven of the type as part of a large order for 111 Airbus jets.

It is the second massive order in as many days at the show for the airframer, which on Sunday unveiled a commitment for 255 aircraft from Indigo Partners airlines.

Air Lease is adding more widebodies, taking four already-placed A330neos, while it will



Scherer with Airbus CEO Guillaume Faury

substantially lift its single-aisle commitment, with a deal for 75 A321neos - of which 20 are the A321XLR - and 25 A220-300s.

But the agreement for the A350F is significant as it marks a launch order for the cargo version of the twinjet, which is slightly shorter than the A350-1000 but still based on its 319t maximum take-off weight. It will have a payload capability of 109t.

"We're gratified by an endorsement as powerful as Air Lease's," says Airbus chief commercial officer Christian Scherer.

Air Lease executive chairman Steve Udvar-Hazy says the lessor is a "very large widebody player", and points out that older Boeing MD-11Fs and 747Fs will be phased out over

the second half of the decade. The lessor indicates delivery dates for the A350F around 2026.

Its A220 acquisition will make Air Lease the largest lessor for the twinjet type, a programme Airbus acquired from Bombardier in 2018.

Chief executive John Plueger adds that the A220 deal is "largely an option exercise" and that it has "enjoyed very strong placements" of the type over the last year.

Air Lease's broad agreement, disclosed at the Dubai air show yesterday, will bring its overall Airbus orders to date to just shy of 500 aircraft.



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Not the real thing: A replica of the combat aircraft is on static

F-35 is no show as deal talks continue

Lockheed Martin says UAE and US governments are discussing terms for \$10.4 billion acquisition of 50 fifth-generation fighters

Craig Hoyle

With the United Arab Emirates having secured US approval to buy 50 Lockheed Martin F-35As almost one year ago, many at the Dubai air show will be surprised to see the fifth-generation type present only in the guise of a full-scale replica.

An F-35 took part in the flying display at the 2019 show, but Washington has not sent an example this time, as discussions continue around the potentially \$10.4 billion deal. The US Department of State has previously summarised this process as relating to “Emirati obligations and actions before,

during and after delivery” of the stealth fighters.

“The LoA [letter of offer and acceptance] is approved, and it’s a government-to-government negotiation going on relative to the terms and conditions,” says Lockheed Martin Aeronautics executive vice-president Greg Ulmer.

While Lockheed is unable to comment on the status of the UAE deal, Ulmer says it is on track to recover output of the F-35 after production delays because of the Covid-19 pandemic.

“We are on track for our year-end deliveries of 132 to 139 aircraft,” he confirms. “All the aircraft are out of the factory, either in flight acceptance or final finishes right now.” Lockheed intends to transfer

about 153 examples in 2022, before hitting peak output of 156 per annum for the following several years.

The F-35A is currently in the mix in fighter competitions in Finland and Canada, which are respectively due to announce their selections next month and by mid-2022.

Other opportunities exist in the Czech Republic, Greece and Spain, Ulmer says.

Meanwhile, referring to the UAE’s current frontline fighter, the Lockheed F-16E/F, he tells FlightGlobal: “There is still interest here in the UAE from a DMS [obsolescence] update and sustainment of that fleet, so we are working with the Emiratis in that regard.”

Embraer studies freighter programme

Meijer expects decision on E-Jet conversion plans



Embraer is looking at options for a freighter conversion programme for its E-Jets after identifying increased demand for smaller cargo aircraft as a result of the boom in e-commerce.

The manufacturer is forecasting demand for around 700 aircraft in the up-to-150-seat segment over the next 20 years as part of its latest market outlook.

“We see exponential growth that requires a smaller aircraft to be able to address the needs of the consumers and in a more reliable way,” says Embraer vice-president of marketing Rodrigo Silva e Souza.

“We are seeing a lot of interest

from customers. We have not launched the programme yet, but we are really seeing a big demand for this size of aircraft and we are working internally on a project for this.”

Embraer Commercial Aviation chief executive Arjan Meijer adds: “You’ll see a decision in the next six months, hopefully, from Embraer on whether we proceed on that, with a time-to-market of around 24 months.”

Meanwhile, Nigerian carrier Overland Airways has ordered three Embraer 175s and taken purchase rights on three more.

Embraer seeks Middle East K-390 sales

Embraer’s busy Dubai air show experience was upped a notch when Brazilian President Jair Bolsonaro took in a tour of its KC-390 tanker/transport during a snap visit.

Already counting the Brazilian air force and export buyers Hungary and Portugal as customers for the distinctive twinjet airlifter, Embraer is looking to attract fresh business.

“We cannot give specific information about sales campaigns, but we have meaningful conversations with several countries around the world, which includes nations in the Middle East,” says Embraer defence and security chief executive Jackson Schneider.

“We do believe that the C-390 is perfect for the Middle East environment,” he tells FlightGlobal. “It has demonstrated successful take-offs and landings on unpaved runways, which is very relevant given the diverse terrains in the region.”

Embraer has so far delivered four of a contracted 28 KC-390s to its domestic customer, with five more in assembly.

However, uncertainty surrounds the final size of the fleet, after Bolsonaro’s government in May indicated that it could reduce its order.

“We have not been formally notified by the federal government, so we cannot comment on any specific point at this moment,” Schneider says.

“What we can reinforce is Embraer’s commitment to the KC-390/C-390 Millennium project, as well as its belief in the export potential of this product.”

Also on show is the A-29 Super Tucano armed turboprop – a type with more than 60,000h of combat experience. Again, Schneider references “meaningful conversations” with a number of nations – including in the Middle East – but declines to identify individual sales prospects.



Flying visit: President Jair Bolsonaro

MB-339s of the UAE's Al Fursan display team

Sound and vision

An array of aircraft have been taking to the skies over the air show. We pick out some of the highlights



Indian Air Force's Sarang display team flies Hal Dhruv helicopters above a Boeing 737 Max 8





Russian Knights display team



Leonardo Helicopters' AW609



Boeing 777X



Boeing C-17 shows flare



UAE F-16



Saab GlobalEye with Mirage 2000s

BillyPik

In brief...

Emirates is IAI convert

Emirates is signing up for Israel Aerospace Industries' Boeing 777-300ER freighter conversion programme, with a commitment to modify four aircraft.

It is part of a \$1 billion plan to increase the capacity of its SkyCargo operation, which will include the acquisition of another pair of 777 freighters directly from Boeing.

The Emirates 777-300ERs will be inducted next year and the converted freighters will be delivered back to the carrier in 2023 and 2024. Conversion of each aircraft is expected to take five months.

First WDS gets bigger

The organisers of Saudi Arabia's World Defense Show are to expand the venue amid what they describe as "unprecedented exhibitor demand" four months ahead of the inaugural event.

WDS will take place on 6-9 March in a purpose-built site outside Riyadh that includes the first runway ever to be specifically built for a show.

Boeing was one of several US companies to confirm its attendance at WDS during the Dubai air show. Others set to take part include Lockheed Martin, General Dynamics, Raytheon Technologies and L3Harris.



PD-14-powered MC-21-310 on show in Dubai

Irkut shrinks MC-21 business jet plans

Manufacturer believes development of a -200 variant will be essential to win customers, as certification of -300 draws near

David Kaminski-Morrow

Russian airframer Irkut has refined proposals for a business jet version of its MC-21, currently based on the -300 variant of the twinjet.

Irkut also suggests the development of a -200 shrink variant will be "obligatory" to capture customers in this sector.

The MC-21 business jet concept, known as the MCBJ, would typically offer a conference hall or dining room linked fore and aft to VIP seating zones, with a more conventional passenger

compartment in the rear. Irkut lists two range options for the MCBJ – a standard 6,500km or an extended 10,000km with additional fuel tanks in the cargo compartment.

Sales and marketing director Kirill Budaev, speaking during a briefing at the show, said the -200 variant of the MC-21 "is still alive".

While the type has yet to be developed and attract customers, Budaev says "it will be obligatory because of the business jet".

"The -200 will definitely find a place in the market," he insists.

It is displaying the Aviadvigatel PD-14-powered MC-21-310 at the show, which is mainly fitted with test

equipment but also includes a few rows of seats to illustrate the cabin and aisle width achievable with its 4.06m fuselage.

The show has provided the opportunity to demonstrate the MC-21's active sidestick control, which enables each pilot to feel the input of the other.

"This allows the pilots to co-ordinate their actions," says Budaev. "You know what your colleague in the cockpit is doing."

Irkut is expecting Russian certification of the -300 – fitted with Pratt & Whitney PW1400G engines – "in the coming months", with Rossiya set to be the first operator.

Rafael, Elbit look to UAE opportunities

Rafael – one of several Israeli companies making their debut at Dubai – suggests that further partnerships with defence companies in the Gulf could be on the cards following last year's Abraham Accords.

"It there is a logic to the move, we would be very keen to do so," says Yuval Miller, executive vice-president of Rafael's air and C4I systems division.

Earlier this year, Rafael agreed to launch a joint venture with Abu Dhabi's Group 42 called Presight.AI to "commercialise" artificial intelligence and big data technologies, and set up a research and development centre in Israel.

Miller says there are a number of sectors in which Rafael could work with UAE companies beyond AI, including information, surveillance and reconnaissance sensors, and unmanned air vehicles.

Fellow Israeli company Elbit Systems also announced at the show a new UAE subsidiary called Elbit Systems Emirates, which will "seek to foster a long-term co-operation with the UAE armed forces, and oversee customisation of solutions to operational needs of end-users".

Rolls widens focus to narrowbody market

Rolls-Royce has dropped another strong hint that it is seeking a return to the narrowbody engine market that it abandoned in 2011 by exiting the International Aero Engines consortium.

For the past several years Rolls-Royce has indicated that its developmental UltraFan engine, which is initially sized for a widebody jet, would also be scalable for narrowbody applications.

Speaking at an air show briefing yesterday, Chris Cholerton, head of civil aerospace, reaffirmed that Rolls-Royce is looking at the single-aisle segment.

"We are keen to re-enter the narrowbody space when the opportunity arises," he says, while stressing there was no immediate application for the powerplant.

First runs of the gearbox-equipped UltraFan engine are due to take place in 2022.

Rolls-Royce is pushing its sustainability agenda and on 14 November signed a memorandum of understanding with Abu Dhabi carrier Etihad to explore initiatives on the topic, including using an Airbus A350 as a test aircraft to trial technologies.



Cholerton: Keen to re-enter the single-aisle segment



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Fuel efficiency interest climbs for Safety Line

Paris-based fuel efficiency specialist Safety Line is seeing increased interest from airlines as the requirement for operational savings to support their environmental targets becomes more significant.

Francois Chazelle, chief operating officer at Safety Line, says its solutions use flight data from individual aircraft to build performance models to help predict fuel burn.

"The biggest savings will be achieved from the climb out stage," he says. "You get higher sooner, you can consume less fuel, and you can save 5-6% of climb-out fuel."

Safety Line, which was acquired by SITA this year, is already used by 22 airlines on more than 850 aircraft.

Chazelle notes that airline net-zero targets envisage around a fifth of the savings coming from operations. "They can reduce emissions through this today," he says.

Safety Line has also developed a solution for the cruise phase of the flight, and its research team is finalising a solution for the descent stage.

A220 'like driving a Bentley'

Air Baltic chief executive - rated to fly type - gives his expert view

Lewis Harper

Air Baltic chief executive Martin Gauss can certainly speak from experience when it comes to the Airbus A220-300.

Aside from leading the largest operator of the variant, Gauss is also type-rated to fly the narrowbody.

He describes the pilot experience as being "like driving a Bentley or a Maybach for how smooth it handles". The aircraft gives the pilot "a perfect overview" of tasks and a "lot of technology to take your decisions", he says.

"It is a very, very nice aircraft to fly," he adds.

Air Baltic has 32 A220-300s in its fleet and expects to take delivery of eight more in 2022.



Gauss: Aircraft gives pilot 'a perfect overview' of tasks

CAE simulators to increase training capacity in Dubai

Emirates-CAE Flight Training is to deploy a second Boeing 737 Max full-flight simulator by the end of 2022 to boost pilot training capacity in Dubai.

The training joint venture is adding the CAE 7000XR series simulator

to support Flydubai's future fleet growth. The low-cost carrier, which already has 20 Max aircraft in service, has a further 165 on order, Cirium fleets data shows.

CAE also plans to deploy a new Bombardier Global 6500 simulator

at the Emirates-CAE training facility in Dubai. CAE group president, civil aviation training solutions, Nick Leontidis says: "A first outside of America, the new CAE Global 6500 FFS will heighten the pilot training experience in the Middle East."

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777s for Sky One FZE

UAE aviation services company Sky One FZE has struck a sales agreement for three Boeing 777-300s from Boeing Capital.

It plans to use the Rolls-Royce-powered 777-300s to operate additional commercial flights and to diversify its air charter offerings. Sky One FZE operates Hajj and Umrah charters and provides additional capacity seasonally by wet-leasing to airlines.

LHT partners Jordanian

Royal Jordanian has sealed a new component maintenance agreement covering its Airbus A320-family fleet with Lufthansa Technik.

The five-year deal includes spares support, parts pooling and home base support services for five A319s, six A320s and a pair of A321s.

Iraqi goes Panasonic

Iraqi Airways has chosen Panasonic Avionics for in-flight entertainment and connectivity solutions for its new fleet of 21 narrowbodies and 10 widebodies.

The deal covers 16 Boeing 737 Max aircraft, 10 Boeing 787s and five Airbus A220s. The aircraft will be line-fitted with Panasonic's X Series IFE solutions and are expected to enter service in October 2022.

Thales, SAEI sign MoU

Saudia's MRO unit SAEI has signed a memorandum of understanding with Thales, strengthening the companies' co-operation on line maintenance and on the repair of aircraft parts.

Under the terms of the agreement SAEI will benefit from Thales' support to "promote industrial and technological best practices" in a bid to give SAEI a leading edge in the MRO market.



Adel Ali: 'People want to fly nonstop to their home city'

Air Arabia eyes full fleet service return

Budget operator hopes to have all aircraft back in the sky in the spring, as it plans to fly further with A320-family deliveries

Lewis Harper

Air Arabia Group expects to return all its aircraft to service by March 2022 as it looks forward to eventually extending its reach with larger Airbus narrowbodies.

Speaking to FlightGlobal in the Air Arabia Airbus A321LR that is part of the static display, chief executive Adel Ali says the budget operator's product is strongly matched to the demands of passengers as the travel industry emerges from Covid-19.

"People want to fly nonstop to their home city and they don't want

to sit for too long on an aeroplane," he suggests.

The near-term plan is to bring all of the airline's current fleet back into service over the coming months – a milestone Ali says should be reached in March, "subject to Covid not giving us more surprises". After that, the growth potential will eventually come from incoming aircraft.

Air Arabia ordered 120 A320-family jets at Dubai two years ago, comprising 73 A320neos, 27 A321LRs and 20 A321XLRs. Ali says the group is sticking with the pre-Covid plan to start taking deliveries from 2024.

Some 40% of those jets are for

"fleet replenishment", Ali says, while the rest will be for growth.

The A321LRs and A321XLRs will also give Air Arabia more opportunity "to expand to areas we couldn't go" before.

"With the A321, pre-Covid we were regularly going to Kuala Lumpur, Vienna and Prague," Ali says. "And we had ambitions to expand to other places in southeast Asia and Europe."

As markets recover, the carrier intends to act on those ambitions again. And when it eventually takes the A321XLRs it has ordered, "that basically takes your seven hours to eight hours, eight-and-a-half hours".

Tawazun seals VRT500 deal

UAE investment firm Tawazun Economic Council has completed the acquisition of a 50% stake in the developer of the VRT500 light-single helicopter, a deal first announced at the Dubai air show two years ago.

The VRT500 and the smaller, unmanned VRT300 were being developed by VR Technologies, a subsidiary of Russian Helicopters.

That business will now be owned by a new Singapore-based company called Aeroter. Tawazun will hold 50%; the identity of the other shareholder remains undisclosed.

As part of the agreement in 2019, each party promised to inject \$400 million into VR Technologies.

First flight of the VRT500, which is powered by a single Pratt & Whitney Canada PW207V engine, is planned

for mid-2022 "at the test area of the subsidiary company in Europe".

In 2020, VR Technologies announced that it had bought Vertex Aero, a company based in the east of Italy. It holds European Union Aviation Safety Agency (EASA) design organisation approval, key for the planned European certification for the VRT500.

In total, four flight-test aircraft are planned, and the developer will aim for EASA approval in 2024.

Aeroter has yet to commit to a final assembly location. "Several enterprises in different countries are being considered for the serial production of the VRT500," says chief executive Alexander Okhonko.

"We are planning to produce the first serial helicopter in Europe. At some point in the future, as demand



First flight is planned for 2022

increases, we will launch additional assembly sites in other countries."

A ground-test prototype of the VRT500 is on display at the show.

Aeroter believes the co-axial rotor-equipped VRT500 is suitable for urban air mobility, aerial inspection work and emergency medical services missions.

FLIGHT DAILY NEWS

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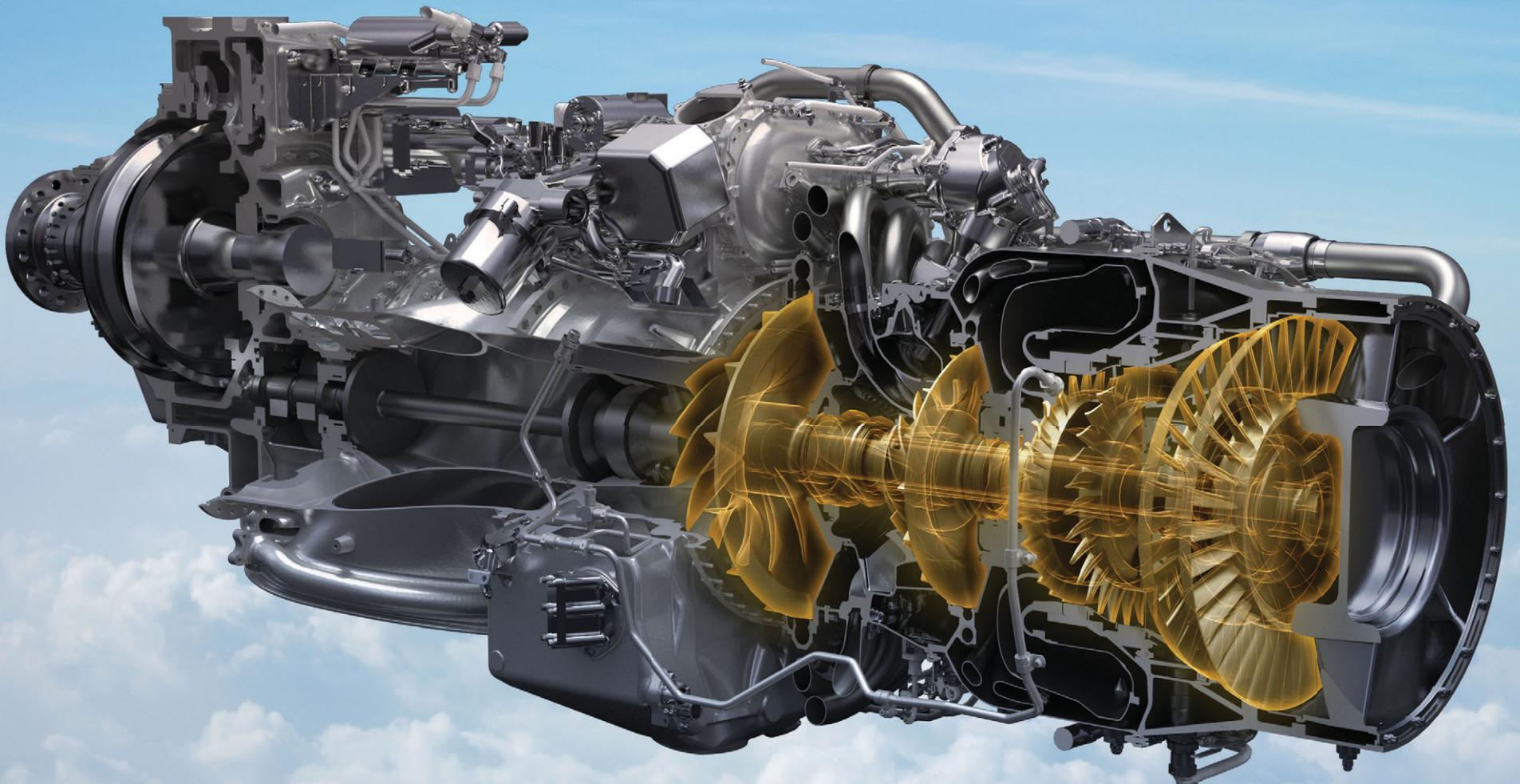
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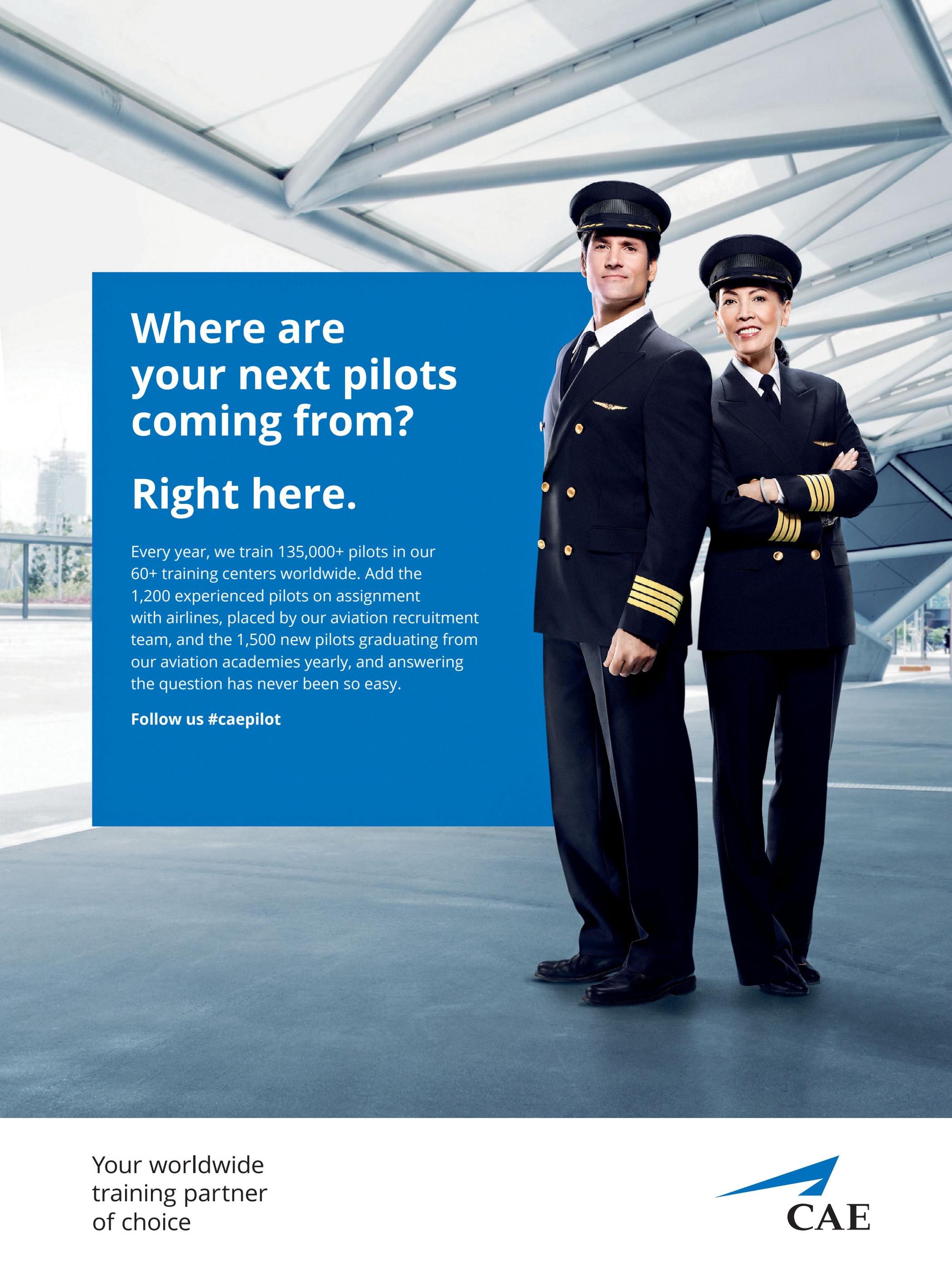
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'Great to show off hard work'

Boeing's deputy chief pilot for the 777X programme, Heather Ross (*below*) is relishing the opportunity to show off the aircraft, having flown its longest and first international flight for its air show debut in Dubai.

The manufacturer has flown a 777-9 from its flight test programme to be on the static park at the show. The 15h flight was its longest mission so far.

"It was a really good flight," says Ross. "We've been focusing so much on getting the test programme done and flying domestically in the US to different locations to accomplish that testing, to be able to bring it here is kind of an opportunity to show off the airplane."

"It is the real positive of the hard work you have done. It's great to be able to show it off."



Opening up on 777X

Seattle says it is being as 'transparent' as it can with customers waiting for delivery of long-range jet, but 'cannot be specific'

Dominic Perry

Boeing insists that it is being "as transparent as we can possibly be" with its customers on the timeline of the 777X, despite the lack of precise delivery guidance.

Emirates president Tim Clark has been particularly outspoken on the lack of clarity on when the carrier might receive its first aircraft, saying in October that Boeing seems

unable "to predict when this aircraft will be delivered".

But Mike Fleming, Boeing senior vice-president for commercial derivative programmes, says the company is talking regularly to 777X customers.

"We are sharing with our customers what we are doing on the airplane and how it's working on a performance basis," he says.

"From that perspective we are trying to be as transparent as we possibly can be with our customers."

However, he points out Boeing "does not control certification" and when the regulator requests something "we have to comply".

While customers may want a "specific delivery date", at present, Boeing can only provide a target range, says Fleming.

"We are trying to share everything we can; [customers] would like greater certainty but then we all would. But the reality is that we have to make sure that we comply with the regulator."

In addition, there is as yet no decision on which airline will receive the first aircraft in late 2023, he says.

Boeing's efforts are presently focused on the 777-9 and Fleming offers no clarity on the status of the longer-range -8, simply noting that "it will follow the -9".

"When that's done we will turn to the -8," pointing out that the variant's development will be driven by Boeing's customers and the market conditions.

Boeing to start Max 7 deliveries next year



Boeing expects to begin deliveries of the 737 Max 7 in 2022 followed by the Max 10 around a year later.

Flight test activities on the 737-7 are "complete", Mike Fleming, Boeing senior vice-president for Max return to service and commercial derivative programmes, said during a briefing at the show.

He says the company is now finalising the required certification paperwork to present to the Federal Aviation Administration.

"We are getting very close from our perspective to having our work done on that airplane," he says.

While he cautions that it will be the regulator that "decides when it's completed", he adds: "We still expect to get that airplane certified and make deliveries in the 2022 timeframe."

Flight tests of the 737-10 began

in June. Boeing will subsequently implement changes to the angle-of-attack system, a modification that has been mandated by the aviation safety authorities as part of the Max's recertification following its grounding.

A critical design review for the changes was recently completed, adds Fleming, who expects deliveries to begin in 2023.

Boeing has presented those designs to the regulators "and they are happy with that - or at least they have not told us they aren't happy", says Fleming.

While he says he cannot rule out further modifications to the 737-10 "we still have margin in our schedule for any unknowns to come up."

Two aircraft are being used for the flight-test programme, with a third to be used to evaluate the interior.



Sitting comfortably

Emirates shows off its new premium economy product

Murdo Morrison

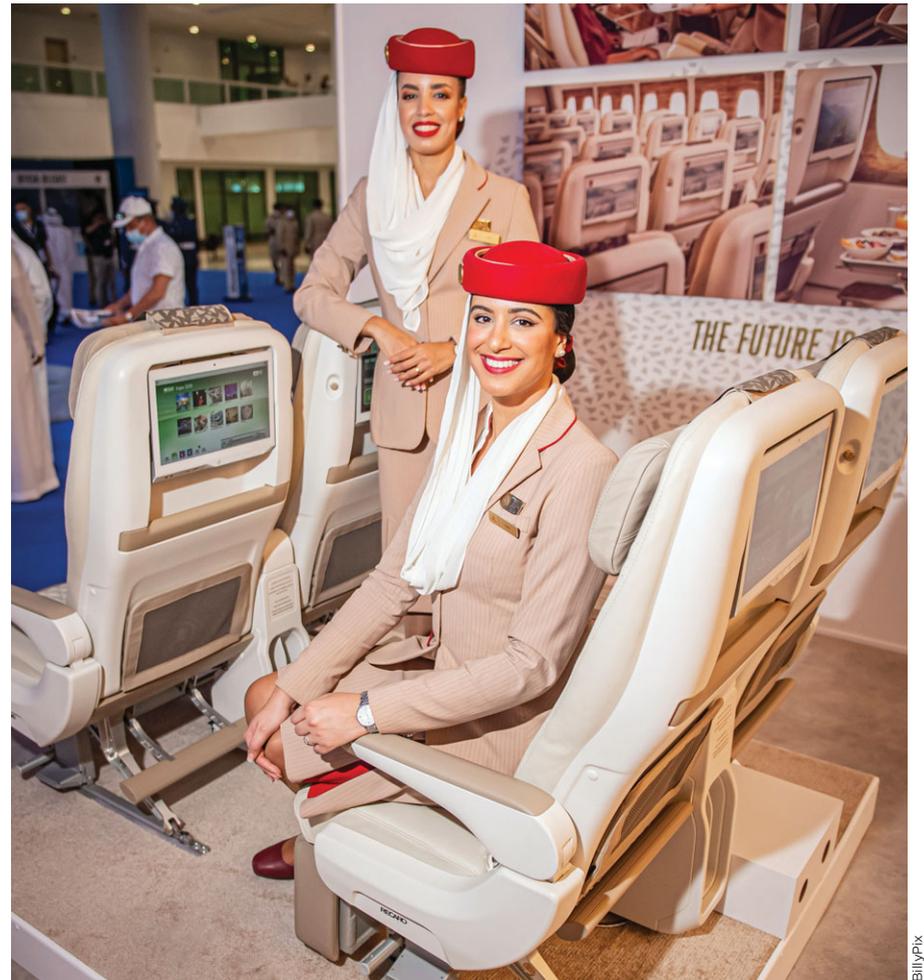
Visitors to the Emirates stand will have a chance to sit back and enjoy the comfort of the Dubai airline's new premium economy seats, which are being fitted to its five newest Airbus A380s, and retrofitted to the rest of its approximately 120-strong superjumbo fleet.

It is the first time Emirates has offered a product between economy and business, with the new 56-passenger premium economy cabin situated at the front of the main deck of the double-decker.

The Recaro-designed seats come with a 13.3in Panasonic screen and a USB socket, and are fitted in a two/four/two configuration.

Emirates announced its new premium economy cabin plans last December.

Pictured with the seat are Emirates cabin crew Raja (back) and Nadja.



Upcycling the A380

When aircraft come to the end of their working life, Fawaz Mohammed Ali turns their scrapped parts into coffee tables, benches, and laptop bags.

His Ajman-based company is exhibiting at the show with Falcon Aircraft Recycling, which recently won the contract to dismantle and recycle Emirates' first Airbus A380 - with proceeds going to the Emirates Foundation.

The products on show include a clock manufactured from an A380 fuel panel, and signed by the Airbus pilots who delivered the airline's first superjumbo, as well as a vanity bag crafted from economy seat covers.

"We are all about trying to give every part a second life," says Fujairah-based Falcon's sales director Angus Mackenzie.



Arash Mahin with sales and marketing head Peter Bahraini

Robot Ray makes light work of cleaning cabins

Meet Ray, the airliner cabin disinfecting robot from Canadian launch company Aero Hygenx. Ray uses powerful UVC light to destroy viruses and bacteria, and can operate autonomously, meaning cleaning crews can remain outside the aircraft.

The 45kg device uses sensors and sonar to navigate the aisles, and facial recognition technology that causes it to shut down if anyone enters

the cabin, explains chief executive Arash Mahin.

Ray, which has a unit price of \$45,000, is more sustainable than other disinfecting methods because it avoids the use of chemicals, he adds.

The company has won orders from Ethiopian Airlines and business jet charter operator DC Aviation, among others, and has partnered with Lufthansa Technik to distribute the product.



Nate Klatt: Clear visionary

Seeing through smoke

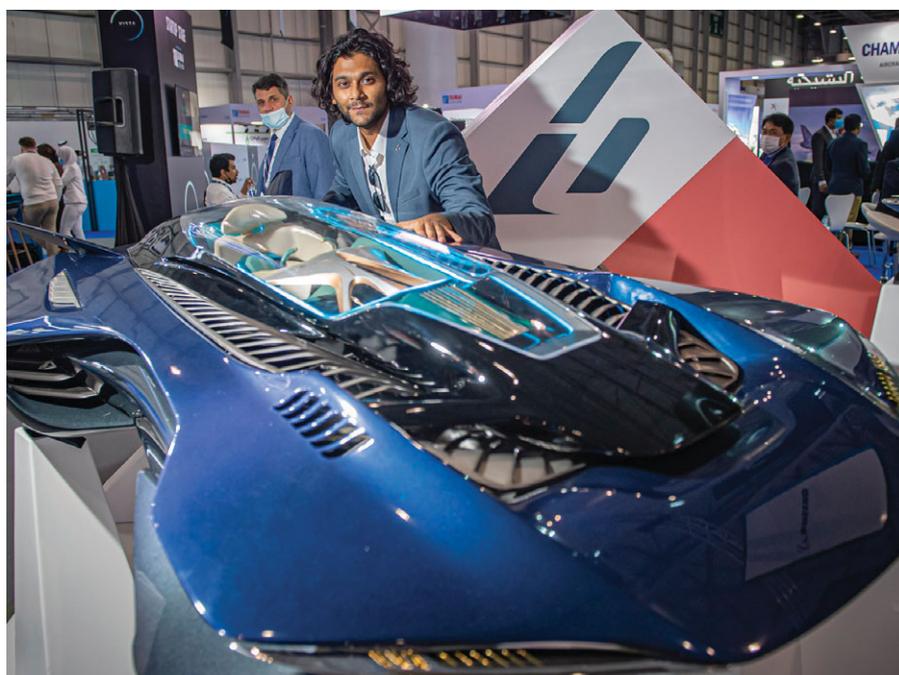
Smoke in the cockpit during an emergency is one of the biggest hazards facing pilots. They are equipped with oxygen masks but lack of visibility can prevent them seeing the controls.

Silicon Valley entrepreneur Nate Klatt thinks he has a solution. His company, Klatt Works, has used its expertise in designing augmented reality consumer electronics products to develop a device that can be fitted inside an oxygen mask that projects a version of the head-up display on to the goggles.

The display is activated by a toggle button attached to a cord, so that even if the pilot is disoriented by smoke he or she can quickly regain control of the aircraft, says Klatt.

Klatt Works is developing a commercial version with a "large commercial carrier" which plans to roll it out across its Boeing 777 fleet once a supplemental type certificate is awarded by regulators.

Klatt says he is confident of gaining approval for the invention by the middle of 2022.



Urban air artistry

Of the dozens of electric vertical take-off and landing (eVTOL) developments that are in progress, one of the most unusual looking must be the Antelope from UK start-up Bellwether.

The sleek, single-seat, carbonfibre and Kevlar urban air mobility design - with its thrust-vectoring propulsion system hidden under the

body fairings - resembles a flying racing car, but it is purely an aircraft, says the company's mobility design director Vidyut Jacob (*pictured*).

Bellwether, which was founded by graduates of the Royal College of Art in London, has a model of its concept on display but says a production version will weigh around 600kg.

Small but perfectly formed

It has four cameras - including two electro-optical and one thermal - and sense-and-avoid technology. It can send back images in real time by datalink and operate at 600ft for 25min. But the Humming Bird weighs just 35g and is small enough to

be held in the palm of a hand, as Echo Guo, sales manager with Chinese developer HQ Innovation demonstrates (*below*).

"It is easy to control and easy to fly," says Michael Chen, chief executive of the Zhenzhen-based firm.



Air, crafted¹



INNOVATING TOGETHER



T-7



With demand for private travel showing no signs of slacking, all-Bombardier operator VistaJet is extolling the virtues of its largest jet to the Gulf business aviation community

Murdo Morrison

The world's biggest Bombardier business jet operator, VistaJet, is exhibiting one of its four flagship Global 7500s at Dubai as it looks to persuade Gulf-based flyers to buy into one of its block-booking programmes.

VistaJet customers typically commit to three-year advanced purchases of 100 to 150 hours on one of its aircraft – with the option of shifting to another type for a fee – and this is how the Malta-based company prefers to market its product, explains chief commercial officer Ian Moore.

The Middle East has traditionally been a “last minute” region, where end-users go to brokers to source aircraft at a day or two’s notice, he says. However, this is changing as soaring demand for private aviation has created shortages in available suitable aircraft, believes Moore.

Such is the Global 7500’s popularity since the first aircraft went into service in 2019 that VistaJet’s four examples are averaging 1,400h per year, maintains Moore. “Many business aircraft fly maybe 300h a year. Most operators would love to be flying 1,000h,” he says.

VistaJet, which was founded by entrepreneur Thomas Flohr in 2004, portrays itself as the “only truly global private aviation company” as its all-Global and Challenger fleet of 77 aircraft are “physically and permanently based in every region”. Its aircraft also share an identical interior design and livery.

As launch customer, the company committed to its first Global 7500 in 2013 when the programme – at the time known as the Global 7000 – was little more than a concept drawing, says Moore. VistaJet has a further nine examples due to be delivered by the end of next year.

Unlike major competitors such



VistaJet is the launch operator of Bombardier’s biggest business jet

VistaJet

as NetJets, which offers shares in aircraft to fractional owners, or charter operators that manage aircraft on behalf of third-party clients, VistaJet is unusual in that it owns its aircraft outright and sells around 80% of its flying time directly rather than through brokers.

The Maltese-registered Global 7500 is at Dubai after a whistle-stop publicity tour that took in events at Farnborough airport, near London, and Paris Le Bourget. VistaJet is hoping the four-section cabin, including a rear double bedroom, will impress locals who tour the aircraft this week.

The GE Aviation Passport-

powered, 7,700nm (14,300km)-range Global 7500 is “perfectly suited for the market it serves”, asserts Moore. VistaJet’s Global 7500s typically fly legs of 8-10h. “When you fly those sorts of distances, you really need the space,” he says.

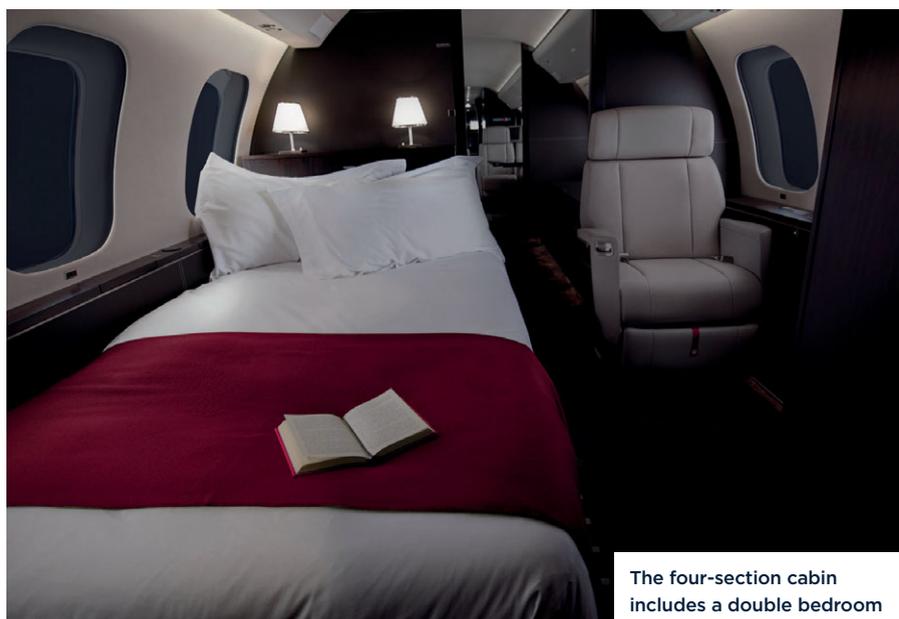
Moore says VistaJet has seen demand “go through the roof” since the easing of pandemic restrictions in much of the world, with flying hours “above 2019 levels”. This is despite, he says, much of the world, particularly in Asia-Pacific, still being constrained by travel restrictions.

Aside from the 7500s, VistaJet operates 36 of the smaller and

shorter-range Global 6000s and Global 5000s. The rest are Challengers, mostly the Challenger 350. As well as the nine additional Global 7500s, the company also has 10 more Challenger 350 aircraft on order. All are net increases to the fleet, says Moore.

Most of VistaJet’s fleet is registered in Malta, which means the aircraft can operate in Europe and international flights around the world. It also has 14 US-registered Global 5000s and Challenger 350s which can carry out internal flights in that country.

VistaJet has committed to become carbon neutral by 2025. ▀



The four-section cabin includes a double bedroom

VistaJet



The Global 7500 offers a single-table dining option for six people

VistaJet



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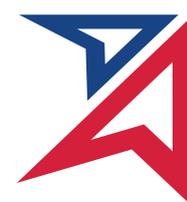


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Dubai-based lessor says it went into the crisis in good shape – thanks to a diversified customer base, strong liquidity, and an optimised fleet. Now, its chief executive insists it is well positioned for recovery

Murdo Morrison

Dubai Aerospace Enterprise (DAE) will be arriving at its local air show having ridden out the Covid-19 crisis relatively unscathed, and with chief executive Firoz Tarapore anticipating strong market recovery. Its performance has been helped by the strong liquidity that comes with being a state-owned concern, a diversified portfolio that has reduced the risk of major customer defaults, and a Boeing 777F fleet – DAE is the largest lessor of the freighter – in high demand during the pandemic.

“Broadly speaking, 2021 has been a very good year on the back of a strong 2020, despite all the challenges,” says Tarapore, who has led DAE for eight years. That was partly due, he maintains, to the position the firm found itself in going into the downturn. “Last year was one in which we could play offence instead of defence. We didn’t have a large overhang of orders. We didn’t have crazy SLB [sale and leaseback] deals we had made that looked insane.”

Reduced exposure

The fact that DAE’s aircraft are spread among so many customers has reduced its exposure during the past 20 months, says Tarapore. At the three-quarter point of this year, DAE had a fleet of 425 aircraft, around 300 of which it owns, operated by 114 airlines. This gives an average of just over three aircraft per client. Take away equipment under contract for major client Emirates – ultimately a sister company and a rock-solid credit risk – and that ratio falls to about two.

“For the past decade or so, that has been a hallmark of how this franchise handled risk,” says Tarapore. “Around 90% of our customers hold no more than 2% of the portfolio each. That distribution has been by design. In the good times, you have to run a lot harder,

but in the bad times, it stops risk permeating. This is one of the reasons we didn’t have to take an impairment [during the crisis].”

When we spoke to Tarapore ahead of the 2019 Dubai air show, he suggested that major aircraft orders, particularly of narrowbody aircraft, were off the cards, and that DAE was more likely to attain scale through organic growth or a further acquisition (in 2017 it more than doubled in size when it purchased Irish lessor AWAS). Prices of Airbus A320neo aircraft and even the then-grounded Boeing 737 Max were too high and delivery slots too distant, he said.

However, in April this year, DAE announced it was placing an order for 15 Max aircraft, its first for the re-engined narrowbody, although it has a 737 fleet of just over 100. It followed a sale-and-leaseback agreement last year with American Airlines for 18 new 737 Max 8s – the first of which was delivered at the end of 2020 – and a similar deal

with Brazilian low-cost operator Gol for five of the same type.

Tarapore justifies the change of heart by saying that “2020 was a unique year that created new priorities for Boeing in particular”. He adds: “For someone like us, with massive balance sheet capability, we were able to find the right deal for that small number of aircraft.” All 15 aircraft have been placed, with some customers announced and others to follow. He says further “opportunistic” moves might follow, but “it’s unlikely that we will place a 100- to 400-aircraft order.”

Newer technology

Another large-scale acquisition is also not on the cards. “When we look at the world, we look at it from the vantage point of not having a large orderbook. For us, it wouldn’t make sense to look at a large [acquisition] event, as all it would mean is acquiring 200, or whatever, current-technology assets. We are trying to gear our portfolio to newer assets, so it is better for us to wait two or three more years to buy something with a better mix of newer and older technology,” he says.

Tarapore describes the 777F as a “gold dust asset” that will continue to be “the backbone of global e-commerce”, even after a return of belly-hold capacity eases the squeeze for freight forwarders. However, he says DAE will stick to the factory-built version and not dabble in passenger-to-freighter programmes. He is also unconvinced about the A350 freighter, saying it has “attractive elements”, but “we would have to be comfortable that the customer base will blossom”.

ATR 72-600s – of which DAE has 70 in its portfolio – are also a “phenomenal product”, which Tarapore describes as “purpose-built for that 70-seat market, with

a low trip cost, and, as a turboprop, very environmentally friendly”. DAE would like to have more examples in its fleet, he says: “We’d love to grow it, but ATR is not too happy at the moment with the growth of that market. When they figure it out, we’d be happy to grow with them, but we are content for now to be patient.”

As well as AWAS, DAE’s other major acquisition in the Tarapore era, in 2016, was Amman-based maintenance, repair and overhaul house Joramco, which forms the DAE Engineering part of the DAE Group. MRO had been part of the original vision of DAE when it was established in 2006. However, a move to develop a third-party MRO facility in Dubai fell by the wayside when DAE’s ambitions were curtailed after the financial crisis of 2008.

Joramco’s hangars are “full” and “our brand equity is strong with the quality and value combination we offer”, says Tarapore, who has previously hinted at opening a second facility at Dubai’s Al Maktoum airport. Is that still possible? “As I look around the clients we could have if we had a location here, the answer is, yes,” he says. “And we definitely want to do something that takes that brand equity and allows us to grow the franchise. But I am quite conservative about deploying money to add hangar capacity on spec.”

As far as next year is concerned, Tarapore is optimistic that a continuing global vaccine roll-out should send Covid-19 into reverse and restore both demand for flights and new equipment. “The thing about this downturn is that it was not a downturn of choice,” he says. “Consumers didn’t stop flying or businesses tighten their belt because they ran out of confidence.”

“Recovery will be driven by how predictably we exit the pandemic conditions.”



The ATR 72-600 has been a ‘phenomenal product’

DAE

Tarapore: We have been able to play offence rather than defence



BillyPK

Over the three issues of *Flight Daily News* at Dubai, we look at EDGE – the new consolidated aerospace and defence group based in Abu Dhabi

Powered by precision

AL TARIQ is the UAE's brand of modular, precision-guided, long-range air munitions systems. Proven in service with the domestic customer, the EDGE business now has export markets in its sights

AL TARIQ – both a company within EDGE's Missiles & Weapons cluster, and the name of its family of three precision-guided air munitions – was born out of a 2012 joint venture agreement with Denel of South Africa to develop a long-range airborne missile system for the UAE. Now the country is ready to offer what is a mature and operations-proven product line-up to the world.

The AL TARIQ products – which have been in service for several years on the UAE's air force's Dassault Mirage 2000-9 and BAE Systems Hawk jets – are perfectly positioned to meet the requirements of nations flying older and latest generation fighter jets, as well as the advanced trainers such as the Leonardo M-346 and Embraer Super Tucano, believes chief executive Theunis Botha. "We can fast track integration onto almost any type of aircraft," he says.

One of the advantages of the AL TARIQ system is its flexibility. A modular kit that converts unguided Mk81, Mk82 and Mk83 aerial bombs into high-precision munitions with a reach of up to 120km, it comes with a series of options including a range-increasing wing kit. Several operation configurations offer customers "optimal mission flexibility for low collateral damage or maximum impact", says Botha.

The wing kit can be fitted within a very short space of time to give a mission commander the ability to switch from near-targeting to a longer stand-off capability.

Seekers can also be adapted, with a GNSS capability potentially augmented by a semi-active laser to give higher accuracy against moving targets, or imaging infrared to ensure automatic target recognition.

The longest-range precision guided weapon on the market, AL TARIQ gives air forces the security of being able to go on the offensive out of enemy range. Among the other features of the system are its ability to, deceptively, fly away from the target before returning, and dive at a 90-degree angle. A GPS anti-jamming capability adds to the missile's chances of evading countermeasures.

CONTINUED INNOVATION

Any effective missile must deliver three things, says Botha: range, accuracy and the ability to avoid collateral damage. As well as its enviable range, the AL TARIQ system uses advanced seeker technologies to ensure the weapon impacts within 3m of its target. If increased lethality is required over a larger area, the system also comes with the option of a proximity fuze.

Able to be operated in all weathers and day or night, and adapted rapidly for evolving threats and mission requirements, the AL TARIQ system is a "true fire and forget solution", says Botha.

AL TARIQ's newly-developed penetration warhead is in the final stages of integration and will add to the company's credentials the ability to successfully engage hard-



AL TARIQ assembles its products in-house

BillyPix

ened targets such as underground bunkers, bridges, or control centres. Qualification is due to begin in early 2022.

It is an example of continuing innovation and product development by an entity, which, unlike its sister business Halcon, focuses on final assembly and developing and integrating software and flight controls rather than component manufacturing, most of which it outsources. "We put everything together and test it," says Botha. "But our core business is the R&D."

That research and development – underpinned by a team of senior engineers who are veterans of the missile industry, coupled with emerging local talent – should see AL TARIQ continue to add new features and capabilities to a combat-proven airborne system.

With its products US International Traffic in Arms Regulations (ITAR)-free, AL TARIQ stands ready to compete with the established players of the sector in key export markets, providing both sovereign long-range missile capability for the UAE, and another important asset for EDGE in the export markets. ▀

The 21st century has seen a transformation in the ways conflicts are fought and threats deterred. Unmanned aerial systems – an infant technology in the 1990s that was the preserve of the USA and a handful of other states – are now accessible to many more militaries throughout the world. Today's UAS are lighter, more capable, and more affordable than their first-generation predecessors.

And as entry costs have fallen, the range of missions on which UAS can be used have expanded greatly. These go beyond the traditional "eye in the sky" surveillance platforms to now include loitering munitions – "intelligent" missiles that can sit over a target area for hours before striking at precisely the right moment and place. Unmanned platforms, matched with appropriate payloads, have become a fundamental tool for many nations to use in security surveillance, for deterrence and, when required, lethal strike.

Autonomous technologies are an area in which the UAE is becoming a pace-setter through EDGE company Abu Dhabi Autonomous Systems Investments, or ADASI. Over its 14-year existence, ADASI has developed a portfolio of tactical unmanned products, from tethered, lighter-than-air platforms to electro-optical/infra-red camera-equipped vertical take-off and landing (VTOL) rotorcraft. All these are helping the UAE achieve sovereign capabilities in this critical area of defence and security, as well as creating opportunities for

Autonomous future

With ADASI, the UAE is rapidly becoming a leader in unmanned systems. We chart the EDGE unit's remarkable record of product innovation over 14 years, and assess what the future holds

export to friendly countries.

ADASI's record of new product development in this time – sometimes in cooperation with sibling businesses within EDGE – has been impressive. Its latest launch, at the IDEX show in Abu Dhabi earlier this year, was its QX family of four battlefield-deployable loitering munitions, which vary in payload from 0.5kg to 6kg, and have a range from 10km to 40km.

However, ADASI's portfolio does not just include airborne autonomous platforms. The company offers ground-based products and is moving into the naval domain. "Our goal is to be focused on air, land, sea and even under the sea," notes Ali Al Yafei, chief executive officer.

For instance, earlier this year, ADASI unveiled the result of a project with sister company NIMR to create a robotic version of a manned armoured carrier.

"Autonomous systems are the future," enthuses Al Yafei, who says that ADASI is now developing its own platforms and capabilities after beginning by adapting those designed by partners. Aside from the domestic customer, Al Yafei sees export opportunities in the Middle East and North Africa as well as South Asia. "Our vision is to be a world leader in this market," he says.

ADASI was established in 2007 with a "day one requirement" to develop a home-grown capability to deliver advanced UAS and other autonomous systems to

Staying on target

HALCON, an end-to-end manufacturer of precision-guided munitions, aims to offer a full complement of guided weapons, by focusing on key international partnerships and nurturing home-grown IP

By the second half of this decade, the UAE will be designing and producing a complete range of air-to-ground, air-to-air, naval, and ground-launched airborne weapon systems, with its own proprietary technology. This progress is set to place the Gulf nation on a par with a select group of states that have this capability within their borders.

The pledge is from Saeed Al Mansoori, chief executive of HALCON, which is part of the group's Missiles & Weapons cluster. His roadmap is all the more impressive in that the company was established only in 2017, with the "task of being the custodian for UAE IP [intellectual property]" in the field of guided weapons.

HALCON's first family of missiles was Desert Sting, a drop-launched, delivery system for warheads ranging from 5kg to 25kg, which uses inertial guidance technology and the global navigation satellite system to lock onto a target. In 2019, HALCON signed a \$1 billion contract to deliver the DS-16 (16kg warhead) variant to the UAE armed forces.

P2 was developed with Denel Dynamics in South Africa to the level of a demonstrator, after which HALCON made 11 changes to the version produced in the UAE, which translated to Desert Sting-16, says Al Mansoori. These modifications include a new semi-active laser (SAL) seeker, warhead, safety and arming device/fuze, advanced missile structure, MCB, lug system, actuator system, fin locking mechanism, safety electronics, thermal batteries, height of burst sensor (HOBS), and guidance system. The inertial guidance system is augmented by global navigation satellite system (GNSS) technology. "It was our intention to take a product, but then to use our IP to convert it for our requirements," he explains.

The manufacturer's other main current offering is Thunder, another drop-launched family of three carriage systems that transports standard Mk81 (250lb),

Mk82 (500lb), and Mk84 (2,000lb) warheads. With gross weights spanning 140kg to 1,150kg, the Thunder P31, P32 and P4 have ranges of 27km, 24km and 16km respectively. They are released from 40,000ft.

So far, HALCON's products are unpropelled and gravity-launched, albeit with sophisticated guidance technology, but Al Mansoori suggests that innovations are afoot that will take HALCON into entire new segments of the aerial munitions market. "Next year, we are looking into propelled air-to-ground weapons," he says. "By 2024 we hope to demonstrate a ground-to-air capability and by 2025 air-to-air. We are putting into place building blocks that will take us there."

STRATEGIC DIRECTION

A glimpse into HALCON's strategic direction came at the IDEX defence show in Abu Dhabi earlier this year, when the company unveiled SkyKnight, the first short-range counter-rocket, artillery and mortar (C-RAM) missile system to be developed in the UAE. SkyKnight will be part of a wider air defence system, called Oerlikon Skynex, developed by Germany's Rheinmetall.

The product provides protection against a range of asymmetric and conventional threats, including standoff missiles, and can be deployed against up to 80 incoming targets at once. Transportable in 20ft containers, SkyKnight can be used to guard static assets such as military bases or critical infrastructure, as well as, conditionally, mobile units.

Also at IDEX, HALCON displayed the HAS-250, an under-development AntiShip surface-to-surface cruise missile capable of up to Mach 0.8 over a range of up to 250km. The sea-skimming weapon can seek out its target at an altitude of between 5-10m, using global navigation satellite and inertial navigation systems.



Al Mansoori wants to recruit 400 Emirati engineers as missile specialists

BillyPix

One feature of HALCON that sets it apart from numerous competitors is its high level of vertical integration, as witnessed in a tour of its assembly plants in Abu Dhabi's Tawazun Industrial Park. With around 35 modern CNC machines producing a range of metal parts, and another 30 about to be installed, including the region's only example with nine axes, HALCON is able to manage virtually its whole supply chain internally.

Al Mansoori explains the logic. With the UAE's small manufacturing sector still in its infancy, it is simply not possible to outsource such crucial supply contracts. "We need to control the quality," he says. "We have a big contract to deliver to the government and those quantities justify the investment."

Another priority for Al Mansoori is local recruitment. While the company has drawn on overseas talent from Brazil, South Africa and elsewhere, it has a scheme - Project 400 - to recruit and train 400 Emiratis as missile specialists. "Over the next 15 to 20 years, maybe as few as 10, we will be in a position where we can rely on UAE engineers in most areas of guided weapons," he says. ■



ADASI CEO Ali Al Yafei has his sights on export opportunities

BillyPix

the UAE armed forces, says Al Yafei. But there was also an early focus on the international marketplace, and this is where ADASI hopes to hone in with a diverse range of products.

ADASI's progress has been impressive. Its first product was the Al Sabr, an adaptation of the rotary-wing, VTOL

Camcopter S-100 from Austrian company Schiebel for a domestic customer. With a range of 100km and able to carry a 50kg payload, the type has an endurance of up to 6h, and can be operated directly by a pilot or automatically using pre-programmed waypoints.

The next decade saw the unveiling of the Aerostat family - tethered blimps ranging from 15m to 19m long that can operate at altitudes up to 1,000 feet with surveillance payloads. In 2017, the launch of the RW-24 saw ADASI move into another area of unmanned systems: a 100km-range loitering munition with a rhomboid wing - a joined wing consisting of four surfaces in a diamond shape.

Last year, ADASI revealed an all-new VTOL, rotary-wing design, the Garmoocha, again with the UAE armed forces as the launch customer. A step up in size from the Al Sabr, the type has a maximum take-off weight of 500kg and can carry a 150kg payload. Staying in the air for 6-8h at a range of 150km, the Garmoocha can be used for pipeline surveillance and other reconnaissance missions.

This year witnessed another departure, with the man-portable QX range, designed for use in the field by infantry or special forces. While the QX-1 is a micro loitering munition drone, designed to destroy itself along with the target, the mini QX-2 and small QX-3 variants have the option of deploying precision-guided weapons from close range. The QX-4 is a fixed-wing VTOL UAS.

The QX family makes use of artificial intelligence algorithms to target and strike, and has an aim accuracy

similar to laser guided munitions, according to the company. The first products will be delivered to the local customer before the end of the year, and Al Yafei reports "strong interest" in the range from countries in the region.

Another new ADASI-designed product shown for the first time at the show was the Rash family, a fixed-wing guidance kit that can be attached to a standard mortar to convert it into a glider-based guided munition system. The product comes in a variety of sizes to accommodate different payloads and ranges, and will also be supplied to the UAE armed forces.

UNMANNED TECHNOLOGIES

Features that set ADASI apart from many of its international competitors include a complete range of platforms, battlefield operation capability, the ability to integrate its products with complex payloads, and sustainment packages that include mobile ground systems, maintenance and training, says Al Yafei.

With unmanned technologies identified by EDGE as an area in which it can be a true differentiator, Al Yafei is confident that the company can go on to win a bigger share of the global military market.

With more than 20,000 flying hours recorded on its still young range, and "additional products on the way", ADASI is on its way to being the next big name in UAS. ■

Abu Dhabi carrier slashes CO2 by almost three-quarters on trial SAF-fuelled flight from London in its latest demonstration of sustainability initiatives under Greenliner partnership with Boeing

Etihad's emission mission



Etihad's 787-10 'Greenliner' was used for the flight

Lewis Harper

Etihad Airways claims to have cut CO2 emissions by 72% on a London-Abu Dhabi flight using a combination of initiatives that highlighted some of the challenges ahead if the widespread adoption of sustainable aviation fuels (SAFs) in particular is to become a reality.

The special 23 October flight was part of Etihad's Greenliner programme – a two-year partnership between the airline and Boeing that uses the former's 787 fleet as a testbed for sustainability improvements in partnership with other organisations.

Overall, the 787-10-operated service reduced CO2 emissions by 39,000kg and fuel burn by 1,800kg, Etihad says, compared with an equivalent 2019 flight. It also points out, however, that flight number EY20 brought into focus some of the current roadblocks to widespread SAF use, which most industry roadmaps say is crucial if the airline industry is to achieve net-zero CO2 emissions by 2050.

"It is well known that SAFs are a credible alternative to current fossil fuels, however they are currently very expensive, and

difficult to source and load on to the aircraft," says Etihad Aviation Group's chief operating officer Mohammad Al Bulooki. "EY20 was a dramatic example of those constraints wherein Etihad was unable to directly load the 38% SAF blend into the aircraft given inherent infrastructure constraints at Heathrow airport.

"Instead, the SAF purchased by Etihad was loaded into the fuel hydrant system, which serves all airport users."

That meant the flight did not directly receive the benefit of the 38% SAF blend intended for it.

Etihad suggests that the aviation industry and governments "must work together to address these issues through the funding of the research and development of SAFs and other parts of the planning and operating of flights".

It notes that its greatest learning point from the two-year Greenliner programme "has been that even when solutions are available, they are not easily deployed on a regular basis due to constraints throughout the entire aviation ecosystem".

Etihad says it intends to work with industry partners to overcome that challenge.

Among the other initiatives used to reduce emissions from the 23

October flight were sustainable in-flight products, optimised flight routings calculated with support from air traffic management, new-technology flightdeck tools, and optimised airport handling processes.

Furthermore, passengers were encouraged to keep luggage weight to a minimum and engines were cleaned pre-flight.

Contrail-reduction measures were also adopted, in what Etihad claims was a first for a commercial service.

Flight route

Working with UK-based SATAVIA, Etihad identified areas of ice super-saturated regions in the atmosphere where harmful contrails are likely to form, and the flight route was adjusted to avoid those areas.

Etihad says that based on the original and adjusted flightplan, the strategy avoided the production of approximately 64 tonnes of CO2, with a fuel penalty of only 100kg, or 0.48 tonnes CO2.

Overall, Al Bulooki describes the efficiency savings of the flight as "noteworthy".

"When Etihad committed to achieve net zero, it was acknowledged that it was only possible if the airline worked collaboratively and positively with

our industry partners," he states. "That is exactly what Etihad has done with the sustainable flight. Of equal importance, Etihad, Boeing and its partners – airports, ANSPs and suppliers – used the flight to learn where further improvements could be made."

Etihad names a number of those partners, including NATS, Eurocontrol, GE Aviation, Vitol, SATAVIA, deSter, Sola The Netherlands, ButterflyCup, Agthia, Jubail Island Mangroves and DNata Catering.

"Each of these partners played their own, significant role in the step we took today," the airline states.

The airline's comments chime with those made by IATA director general Willie Walsh during the association's AGM in early October, when he said that "the cost and effort of breaking our industry's dependence on fossil fuels cannot all fall on the backs of airlines alone".

Walsh added: "Aviation has a history of realising what was thought to be impossible – and doing so quickly. We are launching a transition that is challenging. But in 30 years it is also within reach of human ingenuity, provided governments and the whole industry work together and hold each other accountable for delivery." ▀



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The Abu Dhabi-based services company is bringing the leasing and MRO parts of its business together this year, improving and broadening the range of options it can offer to customers



Sanad says it lived up to its name – which means support in Arabic – during the crisis

Murdo Morrison

Sanad means support in Arabic, and “the pandemic gave us an opportunity to live up to our name”, says Mansoor Janahi, chief executive of the Abu Dhabi-based engine maintenance, repair and overhaul specialist Sanad Aerotech.

The company – owned by state investment house Mubadala and known as Turbine Services & Solutions (TS&S) until 2019 – kept working throughout the pandemic: “We didn’t lose a single day,” says Janahi. It also had enough reserves to see its customers through the worst of the crisis, as grounded flights led to a cash crunch at a number of airlines.

Under contract

Originally part of Abu Dhabi Aircraft Technologies but spun off when the airframe side became Etihad Engineering in 2014, Sanad carries out service contract work for CFM International, GE Aviation, Pratt & Whitney, and Rolls-Royce. However, a “growing percentage” of its revenue comes directly from operators, where effectively Sanad competes with the engine makers. It is here where the company had to step up during the pandemic,

suggests Janahi. “We were able to reposition some long-term agreements and ultimately help a lot of people’s survivability,” he says.

Since the last Dubai air show, the business has marked several milestones. It carried out its 100th service of a GENx in 2020 and its tally has now reached 130. Sanad was the first independent shop outside GE’s network to be accredited for the Boeing 787 engine in 2013, and it has since graduated from quick turn to full overhauls. Its first overhauled engine will be delivered this year.

The company also extended its contract with P&W for the International Aero Engines V2500, which Janahi calls a “sign of confidence in Sanad and our good relationship with the OEM”.

But the contract Janahi is “very excited about” is for the CFM Leap. Sanad is the first MRO in the Middle East and Africa authorised to service the engine that powers 737 Max aircraft and about half of all Airbus A320neo-family types. Under the agreement with the GE Aviation and Safran partnership, signed at the 2019 show, Sanad will carry out quick turns on 237 Leap engines until 2030. Sanad is also increasing capacity on the other programme it is an authorised maintenance centre for – the A330’s R-R Trent 700.

Another key development for Sanad Aerotech this year is its full amalgamation with its sister business Sanad Capital into Sanad Group. Sanad Capital is a leasing business, which manages \$1.2 billion of assets comprising engines, auxiliary power units and components. It was established in 2010, also as part of Mubadala’s aerospace portfolio, but until 2019 had been run independently from the MRO operation. By bringing them together, the group hopes to be able to “bundle” attractive deals for third-party airlines.



Lambeth: Many customers seek simplicity

Sanad has about 30 MRO and 12 leasing customers, and most of these would traditionally have had separate contracts and relationships with MRO and finance providers, explains Troy Lambeth, chief executive of Sanad Capital, who has now taken on the same role at Sanad Group.

“By integrating our two businesses, it means we can offer a catalogue of options to customers, many of whom are looking for simplicity when it comes to these sorts of arrangements. This has been an important strategic change of the past two years.”

Long-term objectives

A push into the industrial services sector – both on maintenance and finance – is also on the cards for Sanad, although Lambeth says more detail on this will be announced by the end of the year. “We are a long-term player, and diversification is important to the business. That is why we are looking at this new market,” he adds.

At the Dubai show, however, the focus is firmly on aviation, with Sanad confident that the recovery in passenger traffic and aircraft deliveries should soon feed through into a corresponding rebound in demand for MRO services and asset financing solutions. ▀


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Diversified systems specialist highlighting 'strategic initiatives' it believes will reshape aerospace over this decade and beyond



Collins Aerospace

Collins has been working on ideas around 'the connected ecosystem' of a passenger journey through the airport, including touchless terminals

Murdo Morrison

Unless you have been paying very close attention, it has been hard to keep up with the consolidation spree in recent years that has created Collins Aerospace. Formed in 2018 from the merger of Rockwell Collins and United Technologies Aerospace Systems, previous acquisitions during the decade had given the business a portfolio that stretches from cockpit avionics and ejection seats through communications technologies and cabin furniture to nacelles and auxiliary power units.

Collins Aerospace was in turn absorbed early last year – along with sister engine manufacturer Pratt & Whitney – by defence giant Raytheon. The move, one of the biggest US industrial mergers, created an entity bigger than Boeing and Airbus and second in size only to Lockheed Martin in the latest FlightGlobal Top 100 ranking of aerospace companies by revenue. Collins is now one of four business units within the expanded Raytheon Technologies.

Explaining what Collins can offer and what connects its diverse product range, including with the other Raytheon Technologies businesses, is one of the company's objectives at this year's show, explains Colin Mahoney, vice-president customer and account management. He admits that today's Collins is a many-legged giant compared with the Rockwell Collins of a few years ago, but that

there is a strong thread that links its multiple activities.

This allows Collins to offer more "integrated solutions" across a range of product offerings, and also to benefit from synergies and economies of scale in research and development. Mahoney likens it to a series of Venn diagrams, where there are distinct market areas within the Collins portfolio, each with their own customers, but that overlaps give the company the opportunity to bundle different offerings to create innovative solutions, including with other Raytheon businesses.

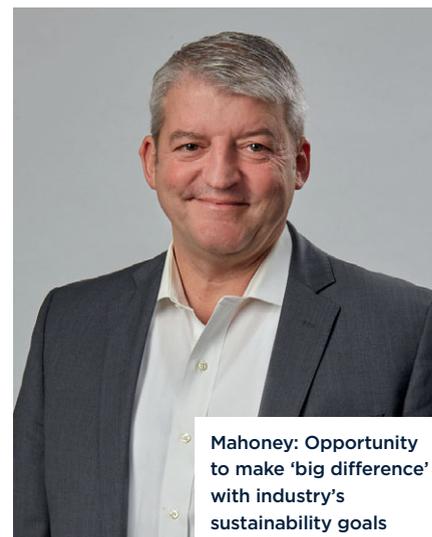
The merger between Collins' then-parent United Technologies with Raytheon – completed in April 2020, just as much of the world was locking down populations and grounding international air travel – also helped shield Collins, and allow it to continue spending on R&D, maintains Mahoney. Raytheon's legacy defence business provided a hedge against the downturn in the airline market, from which Collins derives most – though far from all – of its revenues.

"Many commercial companies have had their struggles [as a result of the pandemic], and we are no exception. But we have had that balance overall within Raytheon Technologies to be able to continue to invest in discretionary spending, which is always an easy target when cuts have to be made. We have been fortunate in not having to do some of the draconian things others have," says Mahoney.

The fruits of some of these product development efforts are on show this

week in Dubai, with Cedar Rapids, Iowa-based Collins highlighting a number of "strategic initiatives to redefine the future of aerospace", according to Mahoney. These are in the areas of: connectivity, advanced structures, integrated systems, alternative power sources, autonomous operations, and the connected battlespace.

When it comes to connectivity, a major trend for Collins has been towards the "connected ecosystem of being able to take a passenger through the whole process of a journey in a very connected way", he says. This includes everything from biometric records that allow the traveller to pass more smoothly through airport security to technology that allows them to connect to the internet while in the air.



Collins Aerospace

Mahoney: Opportunity to make 'big difference' with industry's sustainability goals

For operators themselves, connectivity means advances in predictive maintenance techniques that mean real-time information can be transmitted from aircraft and analysed to highlight when parts need repair or replacement before they break. Collins' offering in this field is its Ascentia data tool. "The whole infrastructure to bring the connected ecosystem to life is advancing year by year, and starting to become very exciting," says Mahoney.

A second "strategic initiative" is in the "connected battlespace" sphere, where Collins' offerings in connectivity and analytics sit comfortably alongside Raytheon's legacy expertise in command and control networks. In alternative power sources, Collins is working closely with its sibling Pratt & Whitney, as well as other OEMs, on hybrid-electric initiatives. Its own APU business – the former Hamilton Sundstrand – also has experience in this area.

While pilot-less aircraft – in the commercial segment at least – may be years or even decades away, says Mahoney, advances in cockpit autonomy are helping relieve pressure on flightcrew, and this is a field that Collins will continue to develop.

Finally, in the area of advanced structures, Collins has been working on new lighter materials in aerostructures as well as aircraft seating that will help the industry reach its sustainability goals. "We have the opportunity to make a big difference," he says. ▀

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Launch customer Comlux believes the generous cabin of Airbus's latest corporate jet gives it the edge over its rivals. Could the Swiss business aviation services company be set for a big deal at Dubai?

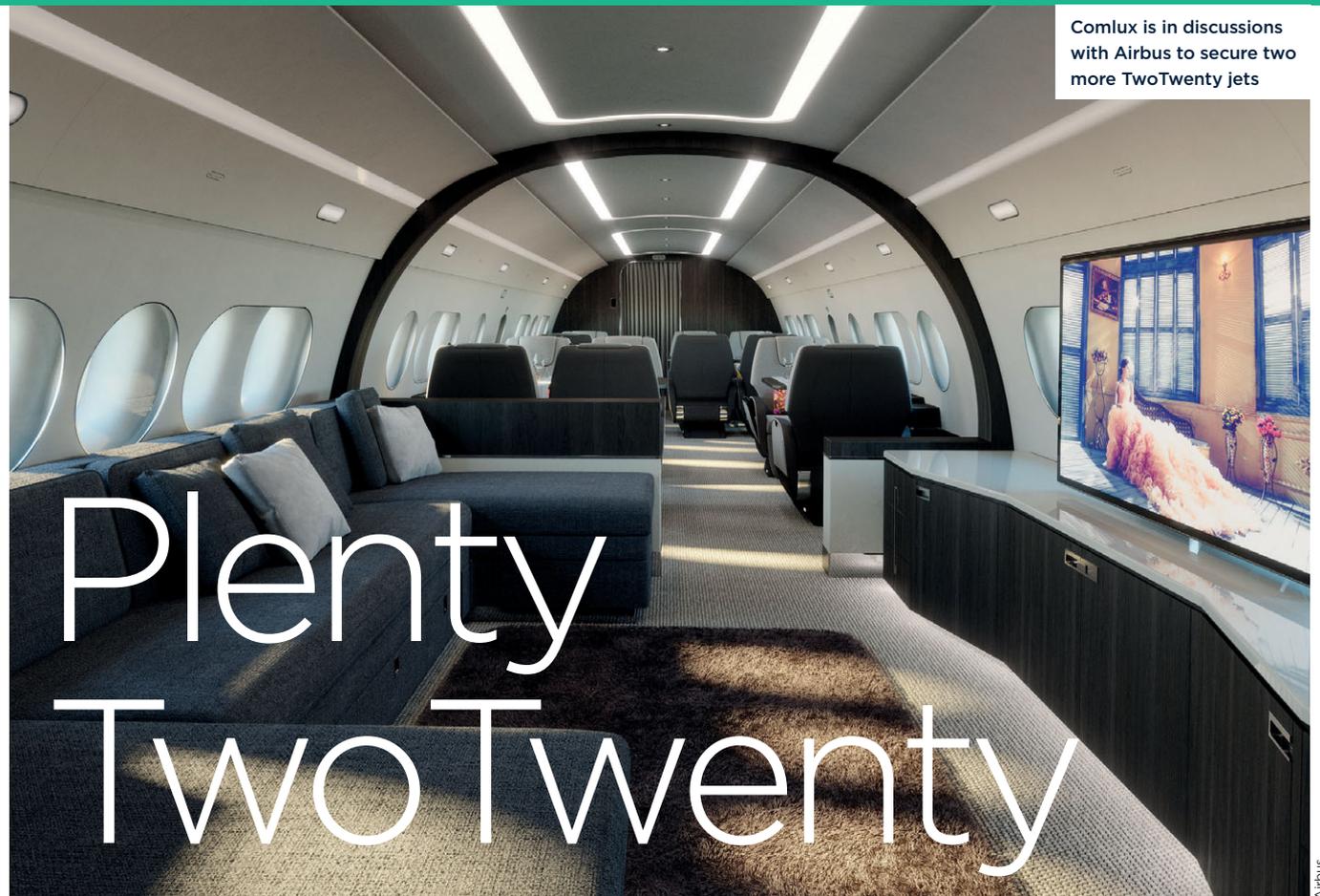
Murdo Morrison

It will not have one at the show – its first example is delivered next month – but for Comlux, the new Airbus TwoTwenty is central to its presence here. The Swiss business aviation company is this week expected to announce a buyer for one of two aircraft it ordered when the corporate jet variant of the A220 was launched last October. It has already secured an undisclosed client for the second, and chief executive Richard Gaona says he is in talks with Airbus to secure two more examples.

As well as being the launch customer, Zurich-headquartered Comlux has invested in the TwoTwenty cabin as a risk-sharing partner in the programme. As part of the agreement with the European manufacturer, the first 15 aircraft off the production line, including the two purchased by Comlux, will be outfitted at the Swiss firm's US completions centre in Indianapolis. After a year there, the first TwoTwenty is due to enter service early in 2023.

Although Comlux has a fleet of 20 owned and managed aircraft – ranging from an Embraer Legacy 650 and Bombardier Challenger 604 to a Boeing 777-200LR – Gaona is excited about the potential new customers he believes the TwoTwenty could attract. The type will compete with the largest Bombardier, Dassault and Gulfstream types rather than the traditional corporate jets versions of the Airbus A320 family or Boeing 737, he believes.

While the TwoTwenty's ability to fly for about 12h means it lags its rivals, Gaona insists most clients rarely make use of the 7,500nm (13,900km) ranges they deliver. "The TwoTwenty has unique capabilities, such as its wider cabin and room for up to 18 passengers, and for the price of a Global," he says. In addition, the fact that it is derived from an airliner means the cost of maintenance is low, and fuel consumption is half that of a larger



Comlux is in discussions with Airbus to secure two more TwoTwenty jets

Plenty TwoTwenty

Airbus Corporate Jet or Boeing Business Jet, he adds.

The A220 began life as the Bombardier CSeries before the Canadian manufacturer's financial troubles in 2017 led it, first, to sell a majority stake in, and then finally the entire programme to Airbus. While Bombardier had long spoken about launching a business jet version of its airliner – its Global, Challenger and Learjet brands made it the industry's foremost player in that segment – it never quite pulled it off.

Also this week, Comlux is announcing that it is opening a two-bay line-maintenance hangar at Al Maktoum airport, close to the air show site, in 2023. The company is applying for local regulatory approvals, which Gaona believes will be a smooth process as Comlux has a team of six engineers in place. With increasing numbers of



Aircraft's wide cabin is one of its unique features, says Gaona

its aircraft operating in Dubai and the wider Gulf, he says Comlux will be able to offer a local alternative to travelling to its site in Malta for smaller repairs.

Here at the show, Comlux is exhibiting two aircraft, although not at the same time. For the first three days, it will have an Airbus ACJ319 on display, which will be replaced at the half-way mark with its Boeing 767-200ER. The twinjet is operated under Comlux's Aruba air operator's certificate and was built in 2001, although the interior was fully refurbished in 2020. It caters for 51 passengers – seven "VVIP" in three sections at the front, 15 in business class mid-cabin, and 29 standard at the rear.

Gaona says that what stands Comlux out from its competitors is that, as well as managing third-party aircraft, it buys aircraft "on speculation and at our risk",

completes them in-house, and seeks buyers. Its position at the head of the queue on the TwoTwenty means its customers can get their hands on aircraft much earlier than if they were to order from the airframer directly, but Gaona admits that if he was not able to sell the aircraft on he would be "paying Airbus with my own money".

In an evolving business aviation world, Gaona believes success means identifying new niches. For instance, Comlux is adding a 737-500, with 56 business class seats, to its Malta-based managed fleet. Until now, the owner has pitched it largely at sports teams. However, Gaona believes the lifting of Covid restrictions mean wealthy individuals will want to splash out on weddings and landmark personal events by chartering aircraft for friends and family. "It's a market we can develop," he says. ■

Comlux will also have a 767 on display at the show





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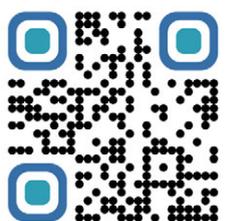
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