

# SHOW BUSINESS



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Zoom with a woo – the new 777X's wide-body is bound to bewitch the crowds at the show



Boeing hoping to 'turn the tide' as new flagship wide-body makes its debut at the show

## MAGNIFICENT 777X IS OUT TO IMPRESS

**"The airplane is performing well and in line with our customer commitments based on the data we've collected to date"**

**DAVID CALHOUN**  
BOEING CHIEF EXECUTIVE

**T**he sleek lines of Boeing's 777X will woo the crowds here, marking not only the international show debut of the manufacturer's flagship wide-body, but what the company hopes will be a turning point in its commercial fortunes.

The 777-9 flight-test aircraft made the 15-hour non-stop flight from Seattle to Dubai arriving on November 9, its longest flight to date as it undergoes its extensive test programme.

The 777X programme was launched with great fanfare at the 2013 Dubai Airshow with Emirates, Etihad, and Qatar Airways among the launch customers in what Boeing claimed was the largest ever product launch in commercial jetliner history by dollar value.

After launching with 259 orders, sales of the 777X have risen modestly to today's total of 351 orders and commitments from eight customers.

Frustratingly for some customers, first delivery of the 777X has slipped from 2020 to the end of 2023. Boeing is waiting for approval from the FAA to begin formal type-certification testing of the aircraft.

### Freighter launch also on the cards

Presenting the company's latest financial results in late October, Boeing chief executive, David Calhoun, said: "The airplane is performing well and in line with our customer commitments based on the data we've collected to date."

Here in Dubai, Boeing will be hoping to bag new 777X orders and may announce the launch of a freighter version of the aeroplane.

The test aircraft is flying on to Doha after the show to visit launch customer Qatar Airways, with this carrier seen as a strong candidate to order the freighter version. ▲

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Stand 300



**Air chiefs explore the world of multi-domain**

▲ Air Chiefs have plenty to think about at the conference in Dubai

A confident and assured UAE Air Force and Air Defence hosted the tenth Dubai International Air Chiefs' Conference at the Madinat Jumeirah on Saturday.

Both the commander and the deputy commander gave presentations alongside such luminaries as General Charles Q Brown Jr, USAF chief of staff, and Air Marshal Gerry Mayhew, the RAF's deputy commander (operations).

Held under the patronage of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, vice president and prime minister of the UAE and ruler of Dubai, the conference explored the expanding role of air power, space and cyber in the

multi-domain operations that will characterise warfare in the coming years.

Major General Staff Pilot Rashed Mohammed Al Shamshi, deputy commander of the UAE Air Force and Air Defence, told the conference that, for decades, armies, navies and air forces had focused operations on the single domain in which they operated, and that air power had often been applied with what he called a very service-centric doctrinal focus.

Though the advantages of combined or joint operations have been understood, 'jointness' has not come easy, he said, and progress has been steady rather than revolutionary.

Joint operations have moved

on from simply attempting to deconflict in time and space to further integrating the single services in action. And today, air forces are starting to synchronise their actions across air, land and sea.

But the general averred that joint operations now appear to have reached another inflection point.

The definition of what constitutes warfighting has been revised, and there has been an acceptance that actions undertaken in one domain can have similarly decisive effects in other domains, and a recognition that the next logical step from traditional joint operations is to synchronise cross-domain and multi-domain operations.

**Texan II trainers heading for Tunisia**

The Tunisian air force is looking forward to receiving its first Textron T-6C Texan II trainers from October next year, according to Senior Colonel Ramzi Jumaili.

The T-6C, with its glass cockpit, will better emulate the systems and characteristics of modern frontline aircraft and promises to revolutionise Tunisian pilot training. It will replace both the SIAI-Marchetti SF-260 for elementary/basic training, and the Aero L-39s that are now used in the advanced training role.

The US State Department approved the sale of up to 12 T-6 aircraft to the Tunisian Air Force in October 2019, at an estimated cost of US \$234 million.

Late in 2020 the Tunisian defence ministry announced that it would be acquiring eight T-6C Texan II trainers and four AT-6C (now redesignated AT-6E) Wolverine light attack aircraft from Textron Aviation Defence.

The \$325 million sale of the four Wolverines was approved on February 25 2020.



Senior Colonel Ramzi Jumaili



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Arabian Aerospace Show Business is published by Times Aerospace Publishing Ltd

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**Distribution** Ethan Cobbing

**Printed by** Emirates Press

**Times Aerospace TV**

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## Antelope aims to take a giant leap forward

Urban air mobility company, Bellwether Industries, is at the show displaying a working prototype of its private urban aircraft, the Antelope.

The prototype features a different colourway and will have better control capabilities and structural optimisation.

The company said it wants to help break the boundaries of what people think about aircraft and lead the world towards comprehensive urban air mobility.

Kai-Tse Lin, Bellwether's co-founder said: "This year has been an extremely busy one for Bellwether Industries, but we can't wait to meet more people at the show and tell them about our progress and future plans.

"We received fantastic feedback from both DroneX and the AIRTAXI World Congress, so we're really excited to be attending another important industry event."



## Proud moment for Bestfly after ACIA expansion

Angolan carrier, Bestfly Worldwide, announced yesterday that it has agreed the lease of an Embraer E190 and a ATR 72-600 from regional aircraft lessor ACIA Aero Leasing.

Nuno Pereira, chief executive of Bestfly, said: "This is a very proud moment as we add our first commercial crossover jet to our fleet to expand our operational growth." At present, the carrier operates two ATR 72-600s, also on lease from ACIA.

According to Luanda-based Bestfly, which began operating in 2009, it will add more jets next year. "We are also happy to announce that Bestfly is engaged with ACIA for up to four more E190s as we look ahead at further growth in Africa," said Pereira.

ACIA Aero Leasing chief executive, Mick Mooney, said: "This is the start of the second phase of our portfolio growth with Bestfly, and we hope to add further regional jet and turboprop aircraft through 2022 and beyond."



Miles of smiles: From left, Mick Mooney, Alcinda and Nuno Pereira of Bestfly Worldwide, and Sameer Adam of ACIA sign the deal

### NEWS IN BRIEF

#### UK looking for partners

The United Kingdom has a delegation at the show highlighting themes of integration, innovation and partnership.

The Royal Air Force A400M will provide an opportunity for visitors to see and experience the aircraft.

The UAE and the UK have a strong bilateral relationship, which was further strengthened following the visit by Sheikh Mohamed bin Zayed to the UK in September, evidenced through the signing of several MoUs across a range of sectors, including in defence industrial collaboration.

Mark Goldsack CBE, director UK defence & security exports said: "The Dubai Airshow provides us the opportunity to progress our focused discussion to identify and further explore specific areas of industrial collaboration with the UAE, to the mutual benefit of both our nations."





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# Not just a flight of fancy, Sukhoi's Checkmate could be the real deal?

A surprise star of this year's Dubai Airshow is Russia's new Checkmate fighter.

First unveiled at the MAKS 2021 air salon in Moscow in July, Checkmate is something of an enigma.

Appearing straight out of left field, with little warning and no obvious requirement, the aircraft shown at Moscow was clearly a mock-up, albeit one which used major sub-assemblies from an existing Sukhoi Su-57 airframe.

This was, in itself, surprising, since with modern design and manufacturing techniques, building a new airframe is relatively cheap, and using the wing, nose and tailfins from a much larger existing fighter would seem likely to impose significant weight and drag penalties. This led many analysts to question whether the Checkmate was a real but nascent combat aircraft, or whether it was little more than a heavily hyped publicity stunt, rolled out for a domestic audience?

The aircraft's appearance at Dubai would tend to suggest that it is, indeed, the mock-up of a real design, intended as a low-cost alternative to the Su-57 for export customers, and perhaps as a useful adjunct to that aircraft for the Russian Aerospace Forces, sacrificing combat radius and payload for significantly lower operating costs.

The Sukhoi Checkmate uses a single-engined configuration and technology from the Su-57 and

Su-35, coupled with advanced model-based computer-driven design and manufacturing techniques, in order to drive down costs.

In some respects this makes the Checkmate a spiritual successor to aircraft like the MiG-21, MiG-23 and Su-17/20/22 family, and for the Russian aerospace industry it marks a return to the single-engined fighter configuration for the first time in more than 40 years.

Rostec and its subsidiary, the United Aircraft Corporation (Sukhoi's parent company), said that the new aircraft was a new

light tactical fighter that had been developed as a private venture, at the company's own initiative, "without federal budget funds".

It was also said to be a Russian domestic programme, although Yuri Slyusur, head of the United Aircraft Corporation, said that framework design requirements had been "guided by the various requirements of our foreign partners", and hinted at the possibility of international cooperation and technology transfer.

Teaser videos and other pre-launch marketing efforts hinted

that key sales targets for the Checkmate were the UAE, India, Vietnam, and Argentina, and there has been speculation that the aircraft is in some way related to the contract signed between Russia and the UAE in 2017.

At the time, this was said to entail a partnership between Rostec and the UAE Ministry of Defence to co-develop a fifth-generation light combat fighter, and was variously described as covering the development of a new design (perhaps based on the MiG-29) or participation in the Mikoyan LMFS development programme.



Believe the hype: Sukhoi's Checkmate attracted a great deal of interest at MAKS, but there was doubt as to whether it was even a real aircraft programme!

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## THE DOME DESIGNED TO BEAT THE DRONE

Fortem Technologies has announced the release of SkyDome System 3.7, which further extends its long-range end-to-end drone mitigation solution.

SkyDome System 3.7 adds longer range target validation and implementation of additional unique urban clutter suppression algorithms for safely stopping

an autonomous drone threat approaching a protected venue, campus, or metro region.

This update enables the defeat of low flying targets at longer ranges in urban and other highly cluttered environments.

Major General (Ret) Clay M Hutmacher, said: "Fortem's latest software release further enhances

the capability to protect our US and allied government customers from hostile drone attacks.

"As the recent attack on the Iraqi Prime Minister shows, drones pose a significant and growing threat to all peace-loving people."

Timothy Bean, CEO of Fortem Technologies, said: "The SkyDome System naturally evolves to safely

defeat larger and multiple targets where other systems are limited by cost, size, power, range, safety, or single drone targeting.

"This 3.7 update is an example of that natural evolution where updates are added to a fundamentally disruptive autonomous architecture to create real, viable, ongoing solutions to the evolving drone threat."



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# LCC boss hits out at old-fashioned government protectionism

Some governments in the MENA region still regard their national airlines as a government department rather than a commercial organisation, the boss of one of the region's most successful low-cost carriers (LCCs) said yesterday.

More than two decades after the signing of the Damascus Agreement, which was supposed to create an 'open skies' system for Arab nations, many countries still restricted or closed their airspace to competitors, said Air Arabia CEO, Adel Ali.

Speaking at an Embraer airline symposium 'For A Different World' in Dubai, Ali said that those restrictions – often put in place to reduce competition to the national carrier – were counter-productive.

"Tell me which airlines that come from a close or restricted place are successful," he said. The more that a country's skies were closed, the more that a government stopped people from flying, the worse that nation's airline was.

"And that government has to spend taxpayers' money, that should be spent on schools or hospitals, on the airline. We have to ask: 'Is this a commercial business or a government office?' If it's a commercial business, it should be competing on an even footing."

When Air Arabia was set up 18 years ago, many people in the region regarded LCCs as a bad thing, he said. Remarkably today, despite the success of LCCs such as Air Arabia, Flyadeal and Flydubai, that attitude lingered in some quarters.

"Some people in the region still think that it's a bad thing to make a profit. You're supposed to offer a public service. Some of them are good businesspeople, but believe that if you make money as an airline, you're over-charging, and not helping the community."

Airlines could do both, he said. "Twenty years ago, if you were a labourer, you were lucky to fly once every three years. If you were an ordinary person, you would likely

fly once a year; a businessman, a bit more. Today, everyone travels as much as they can – holidays and long weekends. At the end of this month there's a four-day holiday weekend in this country and forward bookings are fantastic. More seats and affordable travel will do that."

As an added benefit, airlines

could play a major part in a country's economy. In Sharjah, for example, Air Arabia contributed 7% of the emirate's GDP. "In a lot of countries, the whole aviation infrastructure doesn't reach that," concluded Ali.

▲ Air Arabia ready for J-V kick-off, page 33.



▶ Making money and serving the community: Adel Ali (left) and Hussein Dabbas, GM Embraer Africa & Middle East

## KUWAIT CHECKS OUT WELL WITH LUFTHANSA TECHNIK

Kuwait Airways has recently signed a contract with Lufthansa Technik AG for comprehensive base maintenance layovers for its Airbus A330ceo aircraft.

The agreement covers a total of four six-year checks for Airbus A330-200s, the first two of which

have already been successfully completed at Lufthansa Technik Philippines (LTP) in Manila.

The first and second of Kuwait Airways' aircraft arrived at LTP in October. With the third A330 being serviced in Manila right now, the fourth aircraft will follow directly behind and is set to complete

the layover sequence at the beginning of December.

Six-year checks, the first in the life of Kuwait Airways' comparably young A330 fleet, usually comprise comprehensive structural and mechanical inspections.

Captain Eisa Al-Haddad, Kuwait Airways chief operations officer, said: "For the first heavy checks of our A330s we were seeking a partner that not only has an outstanding reputation, but also the flexibility to overhaul our aircraft in an almost nose-to-tail sequence."

"Lufthansa Technik and its subsidiary in the Philippines are known for their engineering expertise and highly competitive turnaround times, that convinced us even more that we have put our valuable assets in the right hands."



Lufthansa Technik

▶ Lufthansa's engineering expertise supports Kuwait Airways in Manila



# INNOVATING TOGETHER



▲ NEWS IN BRIEF

**Smart look at airport communication**

Airbus Secure Land Communications is showing its modern hybrid communication for smart airports.

Visitors to its booth can see a demo for its Tactilon Agnet solution, a cloud-based collaboration service highlighting how its features can support smarter teamwork among airport staff and security personnel.

The push-to-talk and end-to-end encrypted Tactilon Agnet has state-of-the-art features for better connectivity and higher operational efficiency and safety. Users can securely talk, send multimedia messages and exchange live video with their teams with just a click.

Apart from its multimedia-enriched messaging and video transmissions capabilities, it is also equipped with emergency calls and real-time location tracking functionalities to promote better staff coordination and faster response time.

**\$7.3bn Inmarsat deal for Viasat**

News last week that satcom giant Viasat had bought Inmarsat for \$7.3bn sent shock waves through the aviation community. With a combined aviation client base that includes Emirates, Qatar Airways and Etihad, the new company will be in a powerful position in the Middle East. Viasat and Inmarsat have not always been best buddies. Viasat famously fought against the legality of Inmarsat's European Aviation Network air-to-ground system in the European Court of Justice (ECJ). The ECJ ruled in favour of Inmarsat in a decision announced in April 2021.

# Why EDGE is centre of attention at the show...

Two years after its launch, EDGE is again making a major splash at the Dubai Airshow, as the single largest exhibitor.

The stand showcases a broad portfolio of cutting-edge aviation, aerospace, and defence industry solutions provided by nine of its focused entities – Halcon, Al Tariq, Adasi, Sign4L, Ammroc, Gal, Epi, Jaheziya, and Horizon.

Khalid Al Breiki, president mission support, said: "From our creation, we have positioned ourselves to be in the forefront of cutting-edge technologies. We have been selected to be in the top 25 of military suppliers."

"We have grown to 13,000 employees, from 89 different countries, and our sales have increased to \$5 billion-plus. We have also launched about 20 new cutting-edge indigenous products and services."

The company benefitted from a culture that allowed it to be responsive and implement change quickly. Al Breiki explained: "We have a greenfield kind of start-up culture embodied in our management, which allows us to remove a lot of bureaucracy in the organisation. But we have cohesive communication from the top down. This allowed us to be really responsive to the market."

"We mix being nimble and fast to respond, with the ability to push, because we have those assets and the huge business behind us. We comprise 25 different diverse entities, from manufacturing to training to services. It gives us the skill go fast and deliver whatever is

needed in the market," he added. The company is open to new approaches during the show. Al Breiki said: "You cannot do anything alone. Even though we have a mandate in the country to become autonomous, we also understand the important of partners."

"We are planning to be a significant player at this event. And we are coming with a message that we are welcoming all partnerships – from major corporations to start ups."

"We know what we want, we know how we want to work with our partners and I think having us all in one place, especially as we approach the post-Covid period, is really a very special time."

**"We mix being nimble and fast to respond, with the ability to push"**

**KHALID AL BREIKI**  
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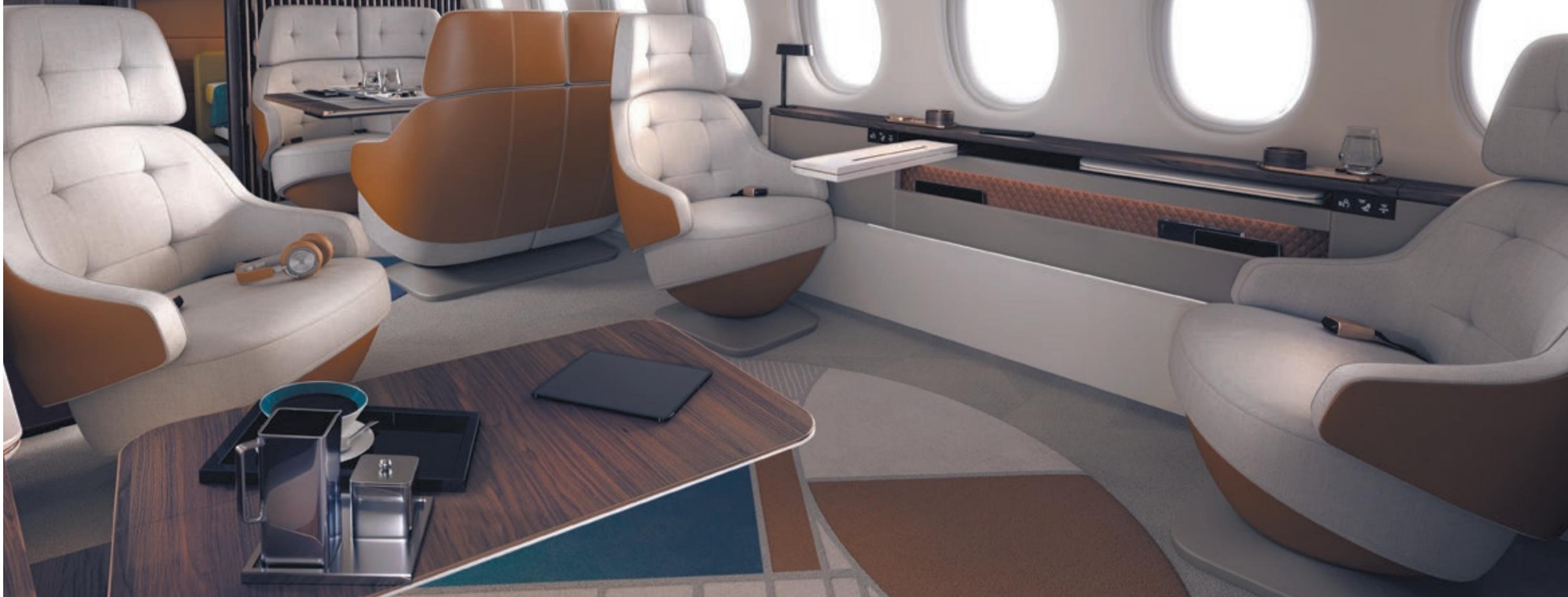


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## JetClub announces Middle East move

JetClub, a fractional ownership-based business aviation brand based in Mexico, is moving into the Middle East, and partnering with regional HondaJet dealer Jetex to do so.

The company, through which club members purchase a share of the aircraft in return for a number of days use, signed an MoU with Jetex to promote its HondaJet fleet share.

Vishal Hiremath, founder & CEO JetClub said: "After successfully starting operations in Europe, we are exploring the Middle East market as our next strategic opportunity.

"Business and leisure travel has resumed, and private aviation is a fast, hygienic, safe, efficient option.

"Our agreement with Jetex allows us to explore the market, gain feedback from clients and

expand our service offering, ensuring our clients have the best possible experience around the world. Our goal is to allow our clients in the United States, Europe or Asia to have access to a worldwide fleet."

While the HondaJet has yet to find a purchaser in the region, Jetex founder and CEO, Adel Mardini, said that there has been great interest, and feels this partnership will help raise the profile of the aircraft.

"I believe that the two companies are in an excellent position to continue to grow and further strengthen our lead in the global aviation market. Both JetClub and Jetex are leaders in innovation as they offer a new way for more consumers to access private aviation and enjoy its benefits.

"We are confident of the value Jetex can add to JetClub's discern-



Club ME: JetClub is moving into the Middle East and partnering with Jetex ▲

ing fractional aircraft owners and passengers."

Fractional ownership has made private jet travel accessible to new consumers for the first time, making the business model attractive, globally.

JetClub and its sister company, Jet It, now operate a fleet of 14 HondaJet aircraft, making the group the largest HondaJet operator in the world. The distinctive JetClub HondaJet can be seen on the static.

## PUTTING THE PERSONAL INTO CORPORATE JETS



If you are in the market for a new runaround, look no further than the static display, where Opus Aero presents a stunning ACJ319 for sale by a private owner. Never chartered, this

Andrew Winch interior design manages to bring a cosy family feel to a rather large corporate jet.

Featuring a distinctive, but subtle, grey lined exterior, the interior has five separate living areas, including a family TV/cinema room, galley, dining area, double bedroom and luxurious bathroom with two mosaic tiled sinks and a roomy shower.

Classic dark wood and leather seats finished in shades of beige and brown give a truly traditional feel, whether for family travel or a corporate flying boardroom.

Seating 14 passengers and three crew, the aircraft is technically upgraded to allow narrow runway and high-altitude airport operation. It is also equipped with brake fans for instant cooling and short time take-off, an unusual element in a private jet. Internal stairs give access to airports that may not be suitable for large aircraft otherwise.

In a booming private jet market, where good quality stock is becoming rapidly more scarce, this could be your ideal next purchase.



◀ A magnum Opus: the stunning ACJ31 is classically styled with dark wood and leather

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## SAAB RUNS OUT OF SURPRISES

In recent years, the Dubai Airshow has been a happy hunting ground for Saab Aerospace. At Dubai 2015, the UAEAF&AD announced a \$1.27 billion contract for two Saab GlobalEyes, and a third was added at Abu Dhabi's international defence exhibition (IDEX) in February 2017, worth another \$234 million.

Dubai in November 2019 saw an announcement for two more GlobalEyes, worth \$1.018bn, which was signed off in January this year.

So, what surprises could we expect at this year's event?

Saab CEO and president, Micael Johansson, smiled: "It's hard to believe what we have achieved here

in recent years, but I'm not sure there will be any surprises this time.

"It's an important show for us, for many reasons – the local customer is very important to us and we have a good position in country.

"Of course, we have several amendments to the business we have been awarded, like assisting them with ground support equipment and more systems analysis, which looks at the information that GlobalEye provides or generates. So it will be continuous business, and a few other things on the naval side, but no major sales."

In Sweden, the government announced on October 28 that it had started the acquirement process for the GlobalEye, to speed up the replacement of the existing turboprop ASC 890 Erieye.

Finland has also been offered the GlobalEye by Sweden as part of the Finnish MoD HX fighter procurement

programme, which should be settled before Christmas.

Johansson also talked more about the Brazilian Air Force (FAB) Gripen E programme. "Four Gripen Es will be presented in November; they will then be transferred to Brazil shortly afterwards," he said.

"Two are likely to go this year. We could have delivered all four, but the Brazilian Air Force wanted two to go to Gavião Peixoto, and the second pair to Anápolis Air Force Base (Wing 2) in early next year. We are running to plan, and that was the plan all the time.

"The FAB has 28 F-39Es and eight F-39F Gripens on order, with 15 of them being assembled in Brazil."

Johansson concluded: "There is already one F-39E in Brazil, delivered last year to Embraer's plant in Gavião Peixoto, which is helping to open up the aircraft's flight envelope alongside an aircraft at Linköping flight-test centre."



▲ All eyes on ME at the show: Dubai in November 2019 saw an announcement for two more GlobalEyes, worth \$1.018bn

## AFI KLM E&M viewing major opportunities

Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) sees several development opportunities in the Middle East and the Dubai show is a timely opportunity to reconnect with all stakeholders, according to Aymeric Méchin, VP sales Africa & Middle East.

AFI KLM E&M will showcase its MRO solutions within the GIFAS French pavilion including aircraft engines, components, APUs, via Epcor, and nacelles, via Aerostructures Middle East Services, a joint venture with Safran Nacelles based in Dubai.

The company is currently working with Middle East airlines including Emirates, Etihad, Qatar Airways, Oman Air, Kuwait Airways, Air Arabia, and Saudia. It

offers a wide range of services for aircraft (B777, A320, A330, B737) and engines (CFM56-5B, CFM56-7, GE90).

Gulf Air has recently renewed its contract with the company for equipment support of its Airbus A320neo/ceo family, as well as its new fleet of A321neos.

According to Méchin, airlines are discarding their mature aircraft in the wake of the Covid-19 crisis. Opportunities lie with next-generation aircraft, such as the A320neo, A321neo, Boeing 737MAX and the A350.

There is also equipment and APU support for these medium-haul aircraft.

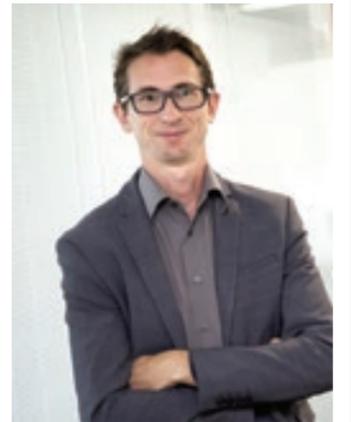
Deliveries of B787s to Etihad or Saudia are also gaining momentum. Consequently, AFI KLM

E&M is gradually increasing its capabilities on these new-generation aircraft fleets.

Méchin observes that the industry is still suffering from fleet restructuring plans around the world. The main challenge is to bring aircraft back into service progressively with suitable workscopes, while reducing costs.

"The Covid-19 crisis is pushing us to be more flexible by considering important issues like the fact that aircraft are flying less," he explained. "As an airline MRO, we tailor our services to the needs of our clients and we are also a reliable long-term shop."

Predictive maintenance remains another interesting growth opportunity. AFI KLM E&M is developing predictive analysis programmes



▲ Aymeric Méchin: "The Covid-19 crisis is pushing us to be more flexible"

to replace avionics system equipment by foreseeing breakdowns which can disrupt operations.

It offers Prognos, particularly for the Airbus and Boeing fleets. This solution increases the operational reliability of companies by anticipating maintenance needs, which minimises AOG risks and operating costs.

AFI KLM E&M

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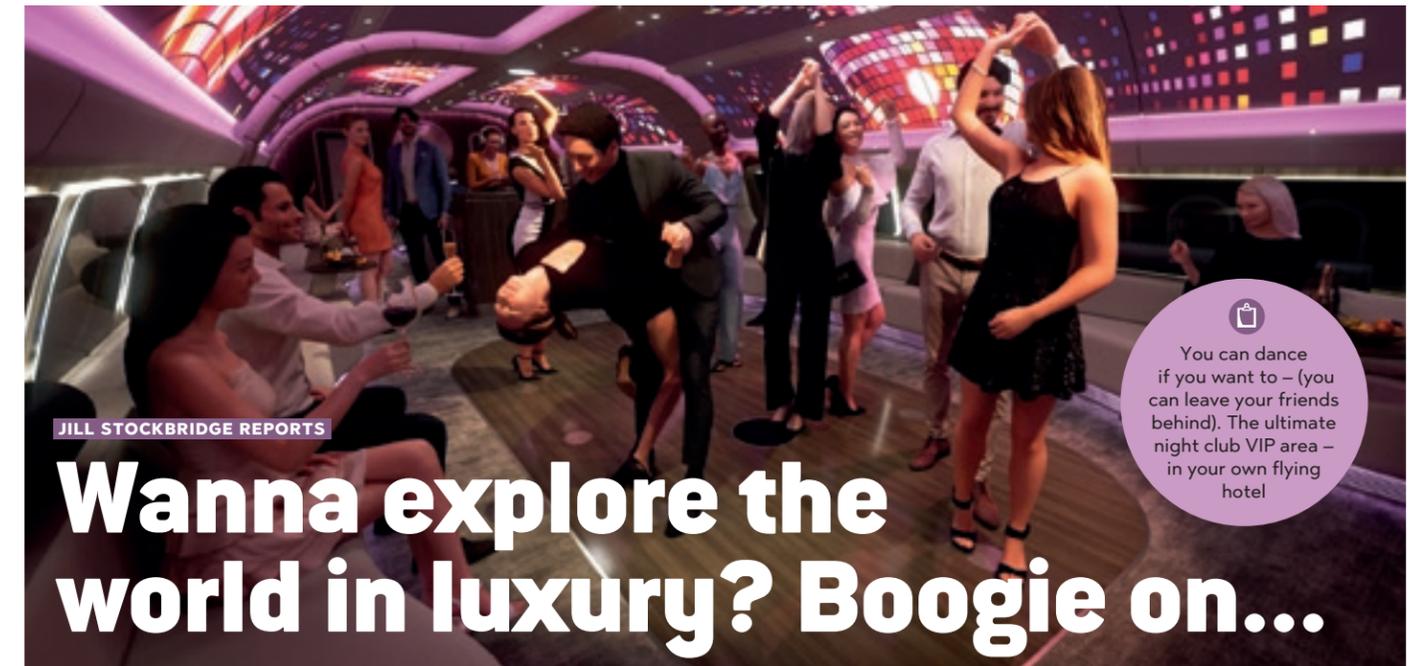
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JILL STOCKBRIDGE REPORTS

## Wanna explore the world in luxury? Boogie on...

You can dance if you want to – (you can leave your friends behind). The ultimate night club VIP area – in your own flying hotel

Lufthansa Technik hinted at its new 'Explorer' interior design for wide-body VIP jets at the Monaco Yacht Show, but here at the Dubai Airshow the team has revealed the full design for the first time

Designed for the A330, the Explorer concept is based on cruise ships in the air, providing a base camp from which to explore the world, while bringing your friends, family and a full range of fun equipment, with you.

Wieland Timm, head of sales VIP & special mission aircraft services at Lufthansa Technik, said: "It is a flying five-star hotel, with special suites, luxury facilities and all the toys you might require to explore your interests, whether hunting, fishing, whale watching, skiing or being on safari.

"Due to Covid, people may not want to go on a cruise ship, and even if you have your own yacht you're limited. In two to three weeks on a yacht you can only travel around the Mediterranean, but with an aircraft you have the flexibility to see the whole world. This is ideal for people who have limited time for holidays and family."

The concept of the flying hotel is not exclusive, but Lufthansa has added some exceptional elements to the design. Timm said: "The beauty of this is that it is a converted cargo aircraft. That means that it has a large cargo door at the front of the aircraft, which we have

incorporated into the design as a veranda. So, you can sit outside of the aircraft, raised up, enjoying the sunset with a drink from the bar, which is just behind the veranda. This is unique and it allows you to feel at home in any environment.

"In the belly of the aircraft we have created a flexible room for all the toys you need to discover and explore the part of the world you are visiting – such as mini submarines, special cars or motorbikes. We have also an option to put a cigar lounge in the belly, or a golf driving range with monitors.

### The world's your oyster

"We have incorporated a glass floor on the main deck, allowing a view into the belly space. Also on the main deck, as with our A350 concept, we have a spa to allow beauty or sports treatments to be given," he added.

In developing the cabin floor plan, emphasis was placed on a wide range of possible uses. To help facilitate this, a projection system has been fitted that covers large areas of the ceiling and sides of the cabin.

Timm explained: "This unique projection system, from Diehl Aerospace, is integrated into our

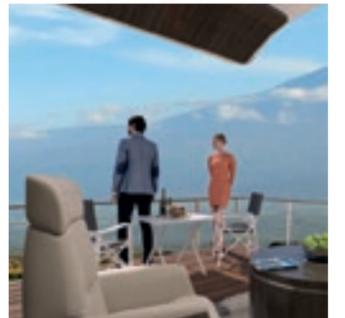
design concept. We have 10,000 filmed choices, or you can combine it with an external camera, so that the camera picture is projected on to the lining." As well as ever-fluctuating decor, it changes the function of the space, by completely changing the lighting and ambiance.

Timm added: "The idea is that it is multifunctional. The table and chairs in the dining area are removable. The projection system can then convert the front area into a night club, with a dance floor, and full disco lighting."

Lufthansa has chosen to reveal the new design at the Dubai Airshow, as the Middle East remains one of its most important markets. It expects potential clients to come primarily from MEASA, with some interest from Europe and Africa.

Timm said: "We currently offer a design with between 16-20 passengers, for a highly individualised experience, but it could be increased.

"At the back of the aircraft there are four fully equipped suites, with bathrooms, and then there are some smaller areas for people who are travelling alone, in more first-class style. This could be increased. Everything is customisable." ▲



Top: Zoom with a view: the flying hotel has its own veranda and (below) Luxury liner: with a unique projection system 10,000 choices can be viewed on the lining

Daily news updates on [timesaerospace.aero](https://timesaerospace.aero)

## L3HARRIS OFFERING HIGH-TECH SOLUTIONS

L3Harris is demonstrating its new SRVIVR25 flight recorders and flight data analytics services.

These provide more than 140 hours of flight data information available for download using the new recorder data interface (RDI) tablet and/or software package.

The RDI enables technicians to connect to the recorders and extract the large amount of data in a short

amount of time without removing the device from the aircraft, saving critical time and cost.

This large data set can then be added into the L3Harris data analytics portal for flight data management and flight operations quality assurance (FDM/FOQA) review, intelligibility report generation, and identification of maintenance risks.

The new suite detects equipment maintenance needs and safety risks and reports generated quickly, reducing maintenance and training cost and enhancing crew safety.

The recorders are a line-fit selection for a select number of OEMs, while the FDM/FOQA are services used among hundreds of operators.

The service also provides a

semi-automatic process for datalink reporting recently mandated by EASA. The flight data connect service provides rapid data processing, accurate recreation of flights in graphical and 3D formats, and allows review of urgent safety and maintenance issues within minutes. This quick analysis enables operators to take immediate, mission critical decisions.

## Confidence in narrow-body ops: Air Arabia ready for J-V kick-off by mid-2022

Air Arabia chief executive, Adel Ali, is confident that its new joint venture airline launching in Armenia and Pakistan will be operating by mid-2022.

“We hope that in quarter two of 2022, both will be flying,” he said.

Air Arabia is working with the Armenia National Interests Fund to establish an Armenian flag-carrier to be called Fly Arna. In Pakistan, the carrier is forming Fly Jinnah in collaboration with Lakson Group, one of the country’s leading business conglomerates.

“While Air Arabia works extremely well in the Arab world, it doesn’t have to be Arabia as long as the business model remains intact,” said Ali. “So, we looked at the opportunity in Armenia first. We felt that, from a geographical location, and as a potential business, the country is moving in a positive direction, particularly with the tourism and in-bound promotion of tourists.”

Pakistan, too, is a large market with great possibilities and the Lakson Group approach – a

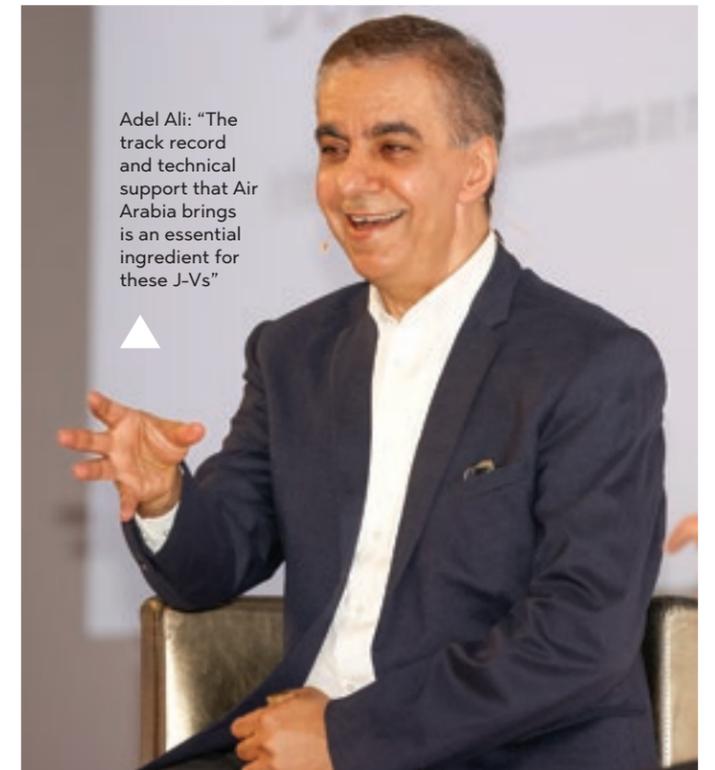
“long-standing, very good business family” – was an attractive opportunity, said Ali.

“The track record and technical support that Air Arabia brings is an essential ingredient for these J-Vs,” said Ali.

At the last Dubai Airshow in 2019, Air Arabia ordered 120 Airbus A320neo family aircraft, including the long-range A321XLRs. At that time, the prospect of some of these aircraft going to J-V airlines was not envisaged, said Ali.

The A321XLR opens new route possibilities for Air Arabia carriers of stage lengths up to seven hours, added Ali, with routes to far-flung destinations like Vienna, Prague and Kuala Lumpur from its Middle East bases working well in pre-Covid times.

But the airline will not move away from its tried and trusted model of narrow-body operations. “I have always been a believer of don’t fix it if it’s not broken. It’s working. So, we’ll stay there,” he said.



Adel Ali: “The track record and technical support that Air Arabia brings is an essential ingredient for these J-Vs”

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# Jetstream claims training breakthrough for the Gulf region

Below: Jetstream Aviation Training & Services is now a fully EASA-authorized examination centre.

For the first time, aviation students in the Gulf will be able to complete their EASA ATPL pilot training and examinations without leaving the region.

This is because Jetstream Aviation Training & Services, based in Silicon Oasis, Dubai, is now a fully EASA-authorized examination centre.

Captain John Diskos, CEO and founder of Jetstream, said: "This is an incredible breakthrough. Students attending ATPL pilot training in our training centre in Dubai can now participate in the exams without the need to travel to Athens, or anywhere else in Europe, thereby avoiding the inconvenience, expense and stress

of an intercontinental journey to sit the exams.

"This is especially important in the present climate, with the pandemic continuing to make flights and visas unpredictable."

Students converting their ICAO licence to EASA will also benefit, as ATPL and CPL exams can be taken at the centre. In addition, the EASA Part FCL examination can be conducted for fixed-wing and helicopter pilots at the fully equipped centre, located equidistant between Dubai's two international airports.

Jetstream is an established and accredited approved training organisation (ATO) a certified flight and type rating training



organisation (FTO/TRTO) and an approved Part 147 maintenance training organisation, under EASA regulations, with crew training centres in Athens and Dubai.

The training centre in Dubai has been approved since 2019 as an examination centre for EASA Part 147 engineers examinations to acquire the Part 66 licence.

Dynamic Duo: On Dassault's static display you can see a Rafale C combat aircraft and a Falcon 8X business jet...

## DASSAULT BACKS TWO HORSES IN DUBAI

Dassault Aviation is at the show demonstrating both of its main business lines – defence and business aviation – and showing how it is firmly behind the key themes of the show cooperation and sustainability.

On the static display you can see a Rafale C combat aircraft and a Falcon

8X business jet.

The business jet flew from France to DWIC with sustainable aviation fuel. The Rafale will take part in the flying display every day. It will be presented by the French Air and Space Force, which operates a detachment of Rafales at Al Dhafra

Air Base in the UAE. Dassault Aviation has been a partner of the United Arab Emirates Air Force (UAEAF) since the Mirage 5 era in the 1970s. The UAEAF currently operates a fleet of Mirage 2000-9s, which are in the process of being modernised with Dassault's support.

### The likely LADS for glass cockpits

Nir-Or, a subsidiary of IMCO Industries, is showing the next generation of its 20" x 8" large area displays (LADs) for glass cockpits.

Nir-Or specialises in integrating hardware and software solutions into real-time embedded systems for the defence sector, focusing on LCD displays for glass cockpit, avionics systems, and rugged computer systems.

The large area display is a main flight display with full dual-redundant screens showing both avionics panel and other flight or mission-specific operational features.

Specially designed for airborne applications, LAD provides a dynamic viewing range, from full sunlight reading to night operation with night-vision goggles compatibility.

Featuring an illuminated bezel keyboard with optical multi-touch screen functionality and showing both graphic symbology and other flight-specific operational features, Nir-Or's LAD supports multiple video inputs to meet mission needs.



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AACO Conference

## Airlines in 'impossible position' over trafficking

Alan Dron reports from the Arab Air Carriers Organization meeting in Doha

**T**he crisis between Belarus and the European Union (EU) has placed airlines in an almost impossible position in trying to weed out human trafficking, the AACO meeting heard.

The Belarussian authorities have been accused of encouraging refugees from several war-torn Middle East countries, including Syria and Yemen, to fly to Minsk, from where they are ferried to the Polish border, where they attempt to claim asylum in the EU.

The EU has accused Belarus of waging 'hybrid warfare' in response to sanctions imposed after a Ryanair aircraft carrying a Belarussian dissident was forced to land in Minsk, where he was arrested.

While airlines obviously wanted to play their part against human trafficking, they were in a difficult position, said IATA director general, Willie Walsh, during a CEO panel discussion.

If passengers had the correct documents to travel, it was very difficult for an airline to discern if

they were normal travellers or were refugees, who intended to travel onwards and claim asylum in a third country.

On sustainability, the vexed question of inadequate supplies of sustainable aviation fuels (SAF) came under the spotlight. "I want to buy large quantities of SAF and I can't get it," said Qatar Airways Group CEO, Akbar Al Baker. "I've contacted several oil companies and they say that are not ready."

Henrik Hololei, director general of MOVE, the EU directorate that

handles transport, agreed that finding sufficient SAF depended largely on fuel producers. "This change isn't just about airlines, it's about the aviation eco-system."

Walsh added that the airline industry had "done an appalling job" of putting forward the aviation industry's case in the sustainability and global warming debate. "We thought we could get away with it because we're only a small part of [the problem]. We should have been stronger in getting our message across."

## IATA boss rails at covid test costs

If governments insist on Covid tests for passengers before they fly, then governments should pay for them, IATA director-general Willie Walsh told the AACO annual meeting.

"We need to have truly hassle-free travel for vaccinated people," Walsh said.

The Middle East had been a pioneer in implementing the IATA travel pass, with Emirates, Etihad, Jazeera Airways and Qatar Airways introducing it and seven more airlines piloting the solution. Initial reports from Saudi Arabia, the UAE and Qatar were very positive.

However, for some countries, a PCR test was required. "And the cost burden of testing is placed on the passenger, in contravention of the World Health Organisation's international health regulations. Travellers to Kuwait can expect to pay \$100 for the required PCR test, \$60 if you are traveling to Oman."

Walsh added that all states should respect and recognise all the vaccines on the WHO emergency use list for travellers.

And there should be efficient alternatives to enable travel for those without access to vaccines. Affordable antigen testing should replace expensive PCR testing, he added.

Governments and oil companies came in for criticism on the increasingly critical area of sustainability. "We all recognise that freedom to fly depends on flying sustain-



Willie Walsh: "We need to have truly hassle-free travel for vaccinated people"

ably," Walsh said. But mandates that insisted airlines used certain quantities of sustainable aviation fuels (SAF) were not the way forward.

"The challenge with SAF is not on the demand side. Airlines want to buy it. But there is not enough of it available at commercially acceptable prices.

You cannot mandate the purchase of something that does not exist. We need to work with governments to ensure that reasonable market prices and strong SAF availability is made possible."



Henrik Hololei: "The health authorities like to be in charge"

## Health bureaucrats "don't want to let go"

National health authorities are a major factor behind the continued hurdles placed in the way of returning commercial aviation to normality in the aftermath of Covid, according to the European Union's (EU) head transport official.

The pandemic had seen health experts come to the fore in setting government policy in many fields, including transport, said Henrik Hololei, director-general of MOVE, the EU department that deals with transport.

"The health authorities like to be in charge," Hololei said. "I'm afraid they don't want to let go... and let us get back to the way it was."

Hololei also aimed criticism at the continued refusal of European governments to cede control of their airspace. The EU has been arguing for years that a move to larger, more efficient blocks of airspace covering several countries would allow airlines – such as Gulf carriers heading to western European destinations – to take more direct, fuel-saving routings.

The proposed single European sky (SES) project has progressed at a glacial pace because of the intransigence, both of governments and air traffic controllers' trade unions, who fear job losses if national ATC centres disappear.

However, said Hololei, if SES could be introduced, "we can get a 10% reduction in CO<sub>2</sub> emissions".



# AURUS BUSINESS JET

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Communications

## Going live: Liban trials Panasonic's TV service

STEVE NICHOLS REPORTS

Middle East Airlines-Air Liban (MEA) is halfway through a two-month trial of Panasonic Avionics' in-flight live television service.

The integrated service was rolled out on MEA's fleet of nine Airbus A321neoLR aircraft on October 1, serving passengers with a wide range of premium news and live sporting events.

It enables passengers to watch news channels, including BBC World and CNN International, along with live sporting action in partnership with Sport 24.

Sport 24 is provided exclusively by Panasonic Avionics and is the world's first and only live in-flight sports platform. It broadcasts 24-hours a day, 365 days a year, connecting airline passengers to more than 16 hours of premium live content from more than 30 different global sports leagues.

MEA's customers are able to enjoy all the live action from the world's top sporting events, including the NFL, NBA, NHL, all four tennis grand slams, all four golf majors, Premier League soccer, UEFA Champions League, AFC Champions League, Euro-



pean and Asian World Cup qualifiers, and more.

The live television service on board MEA's aircraft is powered by Panasonic Avionics' in-flight connectivity services, and broadcast through its eX1 in-flight entertainment platform, both of which were launched on the airline's A321neoLR fleet in 2020.

Panasonic's eX1 is designed specifically for narrow-body aircraft and offers full HD seat-back monitors, complete with touch displays and handsets, and an intuitive, personalised interface.

Houssam Moghrabi, head of in-flight services at MEA, said: "Panasonic Avionics is a proven partner for MEA. The trial of their live television service is a natural next step following the installation of their state-of-the-art in-flight entertainment and connectivity systems last year, which has been well received by our passengers."

From its home base in Rafik Hariri International Airport in Beirut, MEA operates flights to 32 international destinations in Europe, the Middle East and West Africa. ▲

## DEMO BOOST FOR INTELSAT AND ONEWEB

Intelsat and OneWeb have successfully demonstrated a multi-orbit satellite communications solution to the US Army and Department of Defense (DoD).

The demonstration showed transport diversification between geostationary orbit (GEO) and low-Earth orbit (LEO) constellations with seamless switching between them.

Referred to as automated primary, alternate, contingency, and emergency (APACE) communications, the solution enables soldiers to survive and excel in contested electronic warfare environments.

The reliability of communications is significantly improved by simultaneously sending data over multiple paths and adjusting the traffic flow in real-time between GEO and LEO satellite constellations.

Intelsat and OneWeb used both GEO and LEO services simultaneously, switching the data flow between orbits instantly at the packet level, using software to determine

which connection could provide the best experience based on the technical requirements of the end service.

The software solution can be hosted on existing fielded ruggedised virtual machine platforms, allowing the system to run in the harshest environments.

Two satellite links were established during the demonstration – one on the Intelsat 37e (IS-37e) satellite and one on a OneWeb satellite. The links communicated through various end-user terminals, including a SatCube terminal, a Kymeta U7/8 terminal, a Lite Coms GEO terminal, and a OneWeb Intellian terminal, demonstrating applications such as two-way voice and data downloads and MP4 video.

Dave Micha, president of Intelsat General, said: "This demonstration shows how, through the power of partnership, we can provide a reliable, secure, multi-orbit, multi-band capability for the military that connects our war fighters to meet their evolving mission requirements."



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Boeing

ALAN DRON REPORTS

According to Boeing, the underlying fundamentals of the Middle East economy and the position of the airline sector within it remain in good shape

# Boeing remains bullish – despite the pandemic

Travel within the Middle East and to areas such as Europe and the Far East is showing signs of steady improvement, but the recovery rate is slower than some other regions around the globe.

According to Randy Heisey, Boeing’s managing director, commercial marketing, Middle East and Africa, government travel restrictions in many countries will continue to be challenging over the next few months. However, the combination of strengthening domestic travel and the growing number of vaccinated people will allow the recovery to continue.

“In general, the industry is on a positive trajectory,” he said in a pre-show briefing. “Not only are flights returning in domestic and local regional markets, we’re seeing very high load factors.”

Globally, the average load factor is more than 70%, with the highest level being found in Russia at 90%, due to its large domestic market.

In the Middle East, load factors in late summer were more modest at around 50%, but are moving upwards, with capacity at around 90% of pre-pandemic levels.

As in most regions, pent-up demand has been obvious, with rapid increases in bookings as borders have reopened.

The pandemic has seen the number of annual retirements of older aircraft roughly double, from the usual figure of 2%-3% of the global

fleet to 4%-5%.

In the Middle East, as elsewhere, many aircraft were grounded and some, such as the Airbus A380s of Etihad Airways and Qatar Airways, are unlikely to return to service. (Although some of Qatar’s aircraft have been pressed back into service to cover for the grounding of the airline’s Airbus A350s after what the airline describes as a deterioration of the fuselage surface under their paint.)

**Knock-on effect**

The Middle East’s economy is progressing, strengthened by the recent rise in oil prices, said Boeing, with the global economy predicted to return to on-trend growth levels by the middle of this decade. That will have a knock-on effect on the world’s air transport market.

At present, said Heisey, domestic air travel markets were recovering slightly faster than expected, while long-haul markets were rebounding slightly slower than predicted. Intra-Middle East and intra-regional will recover before long-haul, with 2019’s levels of business expected to materialise by the end of 2023 or early 2024.

Under Boeing’s latest 20-year forecast, single-aisle aircraft will account for around 75% of the expected 43,000 new aircraft deliveries globally.

Meanwhile, “The underlying fundamentals for the Middle East and globally remain intact. We reckon growth will be enhanced by diversification of economies, notably tourism in Saudi Arabia.

“Although two to three years’ growth has been lost, the Middle

East’s unique geographic position [and] that connecting business model means it will recover.”

Well-known long-haul airlines in the Gulf and elsewhere in the region mean that many people think of the local airliner fleet as being largely composed of wide-bodied aircraft, but Boeing says that 44% are single-aisle types and that “at least 50%” of orders over the next two decades will be narrow-bodies.

Overall, around one-third of deliveries to the region will be replacements, while two-thirds will feed growth. “We continue to see strong demand for 787-sized aircraft,” said Heisey. “At the top end, the 777-9, with around 350 passengers, will remain essential for connecting people and cargo.” ▲



The Boeing 777X is scheduled to make its first international appearance at the show

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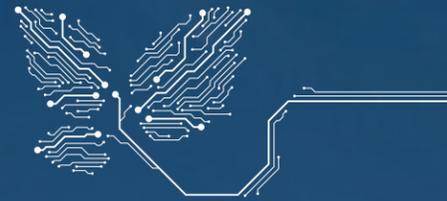
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ALAN WARNES REPORTS

Airbus Defence and Space has carved a sizeable niche in the Middle East market over the last decade or so and is now looking to take things forward

# AIRBUS OPTIMISTIC OF MORE MILITARY SALES

**A**t the last Dubai Airshow in 2019, the UAE Air Force and Defence (UAEAF&AD) announced a requirement for three more A330 multirole tanker transport (A330MRTTs), to double the fleet size.

All the signs are that a deal has been struck and will be announced at this year's event.

However, when *Show Business* asked the head of Airbus Defence and Space Military Aircraft, Jean Brice-Dumont, in late October whether a purchase might be announced, he would only say: "Ask the customer!"

The A330MRTT has been relatively successful in the region, with three sales each so far to the Royal Saudi Air Force (RSAF) and (UAEAF&AD). Both air forces have a sizeable fighter inventory, and with strategic interests, particularly in Yemen as well as the odd overseas exercise, a multirole tanker transport was an urgent requirement.

Airbus is also now on the cusp of certifying the revolutionary automatic air-to-air refuelling (A3R) system on the A330MRTT after four years of integration and trials work.

Having signed a contract with the Republic of Singapore Air Force (RSAF) in 2019 to develop the system, one of the RSAF A330MRTTs has been based in Madrid for the past year assisting with the certification work.

Ivan Garcia Ferreiros, marketing manager A330MRTT said: "We flew to Singapore earlier this year and carried out more than 200 'contacts' with RSAF F-16s, and next year's campaign will concentrate on the F-15s."

It won't be lost on many that the UAEAF&AD operates F-16s and the Royal Saudi Air Force flies F-15s. It's likely both air arms will sign up for the A3R system.

Airbus also has 42 C295 light tactical airlifters flying in the region – Egypt with 24 is the biggest operator.

The UAEAF&AD has taken delivery of five, and the

Saudi Ministry of Interior (MoI) three, out of a requirement of four. One of the latter appeared at the Dubai Show in 2017.

According to Fernando Ciria, head of Airbus marketing airborne ISR and tactical airlifters, the Saudi MoI operates aircraft in both the tactical and surveillance role.

There has been some suggestion that both the UAE and Saudi fleets include an armed version, although no one at Airbus would confirm that. Certainly, an armed version, mainly with Spanish and Turkish armaments, was exhibited at the Dubai show in 2017 as well.

During a recent trade media briefing, Ciria told reporters that there were now three operators of the third-generation fully integrated tactical system (FITS). Brazil has four, Canada 16 on order, and Saudi Arabia four.

A C295 integrated with FITS has up to two operators on board working the radar and electro-optical sensors. Ciria added: "We want to establish the intelligence surveillance and reconnaissance (ISR) mission on the C295 – not just for maritime surveillance and maritime patrol, but to customise for the operators' needs and not just with electro optical systems."

The heavier tactical A400M airlifter has not been as successful as its two counterparts in the Middle East, but Jeronimo Amador Zambrano, head of marketing A400M and MRTT, hopes that will change soon.

"The A400M has now entered a new era, marked by the recent order by Kazakhstan for two aircraft," he said.

With the gearbox issue behind it and advanced tactical systems now integrated, the future is certainly looking brighter for the A400M, which is bad news for Lockheed Martin, which still has more C-130J Super Hercules sales in the region.

Airbus is expecting to be presenting the C295, A330MRTT and A400M at the show. ▲



The latest A330MRTT to be converted sits on the ramp at Getafe on October 25

Alan Warnes

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## MBRSC signs MoU on space payloads

The United Nations Office for Outer Space Affairs (UNOOSA) and the Mohammed Bin Rashid Space Centre (MBRSC) have signed a memorandum of understanding (MoU) to promote technical development and cooperation in the peaceful uses of outer space.

MBRSC's payload hosting initiative (PHI) is intended to contribute to broadening space activities and applications and to advancing human resource development in line with the mission and objectives of

**"We launched PHI to facilitate a greater understanding of the benefits of using satellite-related technologies"**

**HE YOUSUF HAMAD ALSHAIBANI**  
DIRECTOR GENERAL, MBRSC

UNOOSA's access to space for all initiative, and MBRSC's commitment to promoting space science and technology.

HE Yousuf Hamad AlShaibani, director general, MBRSC said: "We launched PHI to facilitate a greater understanding of the benefits of using satellite-related technologies, as well as to assist partners and entities to deploy and operate payloads in space on board our satellite.

"Our partnership with UNOOSA will further bolster this programme and enable us to provide countries with better opportunities to deploy their planned space payloads using our platform and give access to space to developing nations.

"PHI will also act as a platform for new countries to enter space through cooperation with the UAE."

### STEVE NICHOLS REPORTS

*The United Arab Emirates has announced plans to launch a probe that will collect data on the origins of the universe*

## Ambition to land on asteroid is out of this world

In possibly its most ambitious project yet, the UAE plans to launch a probe that will slingshot around Venus before landing on an asteroid between Mars and Jupiter.

Sarah Al-Amiri, Emirati minister of state for advanced sciences and deputy project manager of the Emirates Mars mission, said: "When we embarked on the Emirates Mars mission, we took on a six-year task that was in the order of five times more complex than

the Earth observation satellites that we were developing. This mission is in the order of five times more complex than the Emirate Mars mission."

The science goals of the asteroid mission, and the instruments it will carry, will be announced in mid-2022, UAE officials said.

The programme is targeting a 2028 launch with the landing in 2033. The five-year mission will see the spacecraft travel

around 3.6 billion kilometres (2.2 billion miles).

It will need to slingshot around Venus and then Earth to gather enough velocity to reach the asteroid belt, around 560 million kilometres (350 million miles) away.

The probe will then examine seven asteroids before landing on one of them.

The plan is for the probe to remain on the asteroid while transmitting data on its composition back to Earth

The UAE's Space Agency said it will partner on the project with the Laboratory for Atmospheric and Space Physics at the University of Colorado. Al-Amiri said decisions have yet to be made on what equipment the spacecraft will carry and what it will be able to observe.

The project comes after the Emirates successfully put its 'Amal', or 'Hope' probe in orbit around Mars in February. It is also building MBZSAT, which is slated for launch in 2023.

MBZSAT will use an advanced ion propulsion system to



United Arab Emirates Space Agency

manoeuvre and will carry a high-resolution camera that will take images of the Earth from a 500km orbit.

The UAE also plans to send an unmanned spacecraft to the Moon in 2024 and has the ambitious goal of building a human colony on Mars by 2117.

Sheikh Mohammed bin Rashid

Al Maktoum, UAE prime minister and ruler of Dubai, said: "We have set our eyes to the stars because our journey to development and progress has no boundaries, no borders and no limitations.

"With each new advancement we make in space, we create opportunities for young people here on Earth." ▲

### NEWS IN BRIEF

#### Venturing further into space

Mohammed Bin Rashid Space Centre (MBRSC) has launched its Space Ventures initiative, which is a launchpad for start-ups in the space sector from the region and around the world.

The initiative aims to inspire innovation and create a new market for space-related companies in the UAE and the wider region.

Space Ventures says it is looking to build solid partnerships in the upstream and downstream areas of the space sector, including communications, data storage, the internet of things (IoT), satellite manufacture and launch, robotics, space hardware and software.



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STEVE KNIGHT REPORTS

Dubai has been used for a special study on the challenges of storing aviation fuel in extreme temperatures

## Dubai study helps fuel storage safety

Given the great variation in ambient conditions and tank designs around the world, the aviation industry has developed a protocol of periodic testing to monitor fuel quality in storage.

This typically involves taking a representative sample every six months for laboratory analysis to ensure the product is ready for use.

Any degradation in the fuel could cause or contribute to a variety of problems, including corrosion, odour, filter plugging, decreased stability, and deterioration of fuel/water separation characteristics, the consequences of which could be very serious.

One of the leading suppliers of aviation fuel is Air bp. Its aviation fuels research and development programme manager, Dr Alisdair Clark, has been specialising in the subject for more than 20 years.

“Just like the food in your shops, aviation fuel has a storage life,” said Clark. “This could be as short as six months or last for many years, depending on the type of fuel and storage conditions.

“The first aspect to consider is which product is in storage – Avgas or Jet fuel?”

Avgas is designed to deliver safe and reliable operation in spark ignition aviation piston engines, while Jet fuel – or kerosene – is used in all turbine-powered aircraft. “Avgas, as a gasoline, must maintain a reasonable vapour pressure to perform correctly in an aircraft. Such volatility is required to ensure a fuel-vapour mixture can form to start and run the

Vital storage: Global networks cover environments as extreme as the freezing winters of Greenland and searing hot summers in places like Dubai



Pictures: Air bp

engine,” explained Clark.

“The current manufacturing specification range is 38 to 49kPa. However, high temperatures and small, vented, tanks can cause fuel volatility to be lost. This is why the industry likes to include ‘pressure – vacuum’ valves on Avgas tank vents to prevent loss of low-boiling hydrocarbons.”

Another consideration with Avgas storage is gum formation, when sticky, insoluble polymers form in the product by reacting with air. “With the aviation industry mindful of such effects, the fuel must pass a strict requirement featuring 100psi of pure oxygen/100°C to ensure no problems. In addition, additives, called antioxidants, are used to

where temperatures in August (the hottest month) average 36°C.

“The study found that a full drum survived six months, while a quarter full drum was border-line/fail on gum due to the larger volume of air in the container oxidising the fuel,” revealed Clark.

Jet fuel, as a kerosene product, does not have the same volatility requirements as Avgas. Under the right conditions, Jet fuel can be stored for years and, sometimes, in very unusual tanks, such as caves underground.

“Similar to Avgas, there is the risk of gum formation. To control this antioxidants are used. These additives are typically ‘hindered phenols’, which work by capturing any reactive oxygen species in the fuel. However, once all the antioxidant is used up, the fuel starts to degrade,” said Clark.

Another factor for consideration is that Jet fuel does not like catalytic metals, such as copper. “These, even at parts per billion concentration, can cause the fuel to become unstable when flowing through high temperature sections in an aircraft fuel system,” explained Clark. “To ensure a long fuel life, brass and other catalytic metal alloys should not be used in Jet fuel storage tanks.”

Microbial contamination is another risk with aviation fuel storage. “If trace water is present in the storage tank, microbes can grow at the fuel-water interface, feeding on the fuel and living in the water. Draining any water present in Jet fuel and Avgas storage tanks is crucial,” said Clark. ▲



**“At Air bp we are committed to on-specification, on-time supply of our aviation fuel to meet operational requirements”**

DR ALISDAIR CLARK AIR BP

help reduce gum formation,” said Clark.

To investigate the influence of air on fuel storage, Air bp studied the impact of severe conditions on Avgas stored in drums in Dubai,



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STEVE NICHOLS REPORTS

Honeywell has two main SATCOM offerings that it is keen to promote at the show – Aspire and JetWave

# Honeywell homing in on military SATCOM customers

Honeywell has solutions for both fixed- and rotary-wing aircraft, according to James Schaan, the company's senior director, defence aftermarket, EMEA.

"Honeywell's Aspire 300 and 350 are Iridium satellite communications systems that meet the requirements for SATCOM safety services voice operation and can be used in lieu of HF radio, thereby delivering significant savings in terms of size, weight, and power," he explained.

The system includes a low-profile Iridium antenna, providing continuous coverage from 1610MHz to 1626.5MHz, that is qualified for both high-speed military, or commercial aircraft.

Also included are a satellite data unit (SDU) and the SDU configuration model (SCM).

The Iridium NEXT constellation comprises 81 satellites built by Thales Alenia Space, with 66 in the active constellation, nine in-orbit spares, and six ground spares. Approximately \$3 billion has been invested in the Iridium NEXT satellite replacement programme since it was announced in 2007.

"The use of Iridium satellites means it can work pole-to-pole, moreover the Aspire 150/350 will use the Iridium NEXT constellation that will enable high-speed connectivity up to 700kbps," said Schaan.

Honeywell's Aspire 400 systems provide single- or dual-channel Inmarsat SwiftBroadband (SBB)



Honeywell JetWave was chosen by the US Air Force for its Boeing C-17s

Pictures: Honeywell

connectivity, with two independent channels for segregated cockpit and cabin safety services.

When cabin services are not requested, such as on helicopters, the single-channel Honeywell Aspire 200 is the right solution.

"Honeywell Inmarsat SBB terminals can be upgraded by installing the high-data rate (HDR) software that adds more data capability to the system, enabling speeds of up to 650kbps, and allowing data transmission through the helicopter rotor blades," said Schaan.

SwiftBroadband HDR, like SwiftBroadband itself, is available globally via the Inmarsat-4 satellite network. This will soon be joined by the Inmarsat-6 satellites, which will offer dual L-band (SBB) and

Ka-band (GX) capabilities.

The first I-6 satellite is due to be launched from the Yoshinobu launch complex at the JAXA Tanegashima Space Center in Japan on December 21 this year.

Ultimately, Inmarsat's I-6 technology roadmap will see the launch of seven satellites by 2024.

Meanwhile, Honeywell's JetWave MCX offering, specifically designed for military and governmental aircraft, expands on the success of its earlier JetWave Ka-band products. More than 2,000 Honeywell JetWave systems have now been fitted across the business aviation, air transport, and defence sectors.

Launched in June this year, JetWave MCX builds upon the capabilities of its commercial cousin and provides secure communications and the capability to connect to various Ka-band satcom networks.

It can connect to Inmarsat's GX network and is upgrade-ready to connect with the wideband global SATCOM (WGS) system beginning in 2022.

JetWave MCX provides a secure dual-network data connection for

transmitting sensitive data between air and ground operations and providing operators with real-time situational awareness.

The terminal is specifically designed for military or government aircraft used for surveillance, combat or humanitarian missions like search-and-rescue operations.

JetWave MCX was chosen for the US Air Force Special Operations Command's Lockheed Martin MC-130J Commando II aircraft as part of the AbMN suite for ongoing system performance evaluation.

The AbMN suite, from the Sierra Nevada Corporation (SNC), improves interoperability between special operations platforms as well as other US air force, army, navy, marine and coalition platforms. This permits operators to focus on one set of critical mission data rather than monitoring multiple systems.

"Honeywell JetWave was also chosen by the US Air Force for its Boeing C-17s and the Royal Australian Air Force (RAAF) for its Lockheed Martin C-130Js," Schaan said. ▲

**"Honeywell's Aspire 300 and 350 Iridium satellite communications systems meet the requirements for SATCOM safety services voice operation and can be used in lieu of HF radio"**

**JAMES SCHAAN** HONEYWELL SENIOR DIRECTOR, DEFENCE AFTERMARKET, EMEA



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JON LAKE REPORTS

# Progress stalls on Emirati Lightning deal

With a recent win in Switzerland, Lockheed Martin is increasingly bullish about prospects for the F-35 Lightning II Joint Strike Fighter. However, here at Dubai, many are asking what has happened to Emirati plans to acquire the aircraft

A \$10.4 billion deal to supply some 50 F-35As to the UAE was driven through in the dying days of the Trump administration as part of a wider \$23.37 billion package that also included the supply of 18 MQ-9B Reaper UAVs (\$2.97 billion) and a \$10 billion package of support, sustainment, and weapons. The deal was paused by the incoming Biden administration to allow a review, but was then 'green-lighted'.

However, despite the signature of a letter of acceptance, no further progress has been made. US sources suggest that this is because the UAE has so far not made the required 'down payment' to unlock the process, but other factors are certainly affecting progress.

The UAE is understood to be concerned about possible restrictions that Washington may try to impose on its use of the new fighters, including where they are based, and how they might be deployed – in particular, outside UAE territory.

The US State Department could seek to prohibit their use for 'unapproved' expeditionary operations, and to insist that they were used only "in a manner that respects human rights and fully complies with the laws of armed conflict".

There may also be wider implications for the UAE, since Wash-

ington may seek to limit Emirati weapons purchases from Russia – ruling out the acquisition of further advanced surface-to-air missile (SAM) systems, for example.

This is because the US believes that operating such systems could compromise the F-35As technology, making it more vulnerable to such systems in the future.

The UAE already operates the Pantsir system, and is understood to be interested in the newer and more capable S400. Turkey's procurement of the S400 SAM system led to the halting of F-35 deliveries to Turkey and triggered a major breach with the US.

**Washington piles on pressure**  
Washington has also pressured the UAE to scale down of its relations with China, in particular with regards to its links with Chinese communications giant Huawei, which helped the local telecommunications service provider, Du, to launch the world's first commercial software-defined network in 2016, and which joined forces with the UAE's Telecommunications Regulatory Authority to open a 5G & IoT Joint OpenLab in Dubai.

The UAE may also have been irked by crude and inaccurate representations of the nation's human rights record, and by US opposition to the Emirates' participation in the Saudi-led campaign against



A \$10.4 billion deal to supply some 50 F-35As has been 'green-lighted' but progress is slow

Iranian-backed actors in Yemen.

While the UAE Air Force would like to operate a low observable (or stealthy) fifth-generation fighter aircraft, as one of the most professional and advanced air forces in the world, it knows that there are other ways to achieve the same effect, not least by using advanced long-range stand-off weapons, and by making clever use of electronic warfare and electronic attack.

The F-35 purchase was always planned to give an additional capability to that provided by the UAE's existing F-16E/F Desert Falcons and Mirage 2000-9s, and not to replace either of those aircraft types. The F-16s and the Mirages have been upgraded and modern-

ised and will remain viable for some years to come, but in the medium term they will need replacing.

The UAE is expected to continue its search for another combat aircraft (probably from Europe) to provide the capabilities that the F-35 lacks, and/or that the US may be unwilling to provide – in particular, the ability to carry long-range stand-off missiles.

And, while Eurofighter GmbH is not at Dubai, Dassault most certainly is, and will no doubt hope that the thrilling displays by its superb Rafale are enough to keep Emirati attention from becoming too focused on exciting new alternatives offered by the Russians! ▲

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### Sunday 14th November – Fish Tank Talks Schedule

**Time:** 12.30-13.30

**Topic:** The next epoch in aviation? A discussion, trends and analysis

**Speakers:**

Ghaith Al Ghaith, CEO, Fly Dubai

Andrew Charlton, Managing Director, Aviation Advocacy

John Strickland, Director, JLS Consulting

Will Horton, Aviation Analyst



Dubai Airshow brings you a host of thought-leadership content based on current themes and trends that are backed by leading experts and practitioners from the aerospace sector.

	HUB STAGE	NEW TECH XPLORE	AEROSPACE 2050 FORUM	NEW VISTA
14 November		Future of Travel	NEW IAWA* Talks	Mentorship Clinic
15 November	Global Air Traffic Management	Cyber Security	NEW Aviation Sustainability	Startup Pitch Competition Semi-Finals & Panel Discussions
16 November	Cargo Connect	Artificial Intelligence	Space	Mentorship Clinics & Panel Discussions
17 November	Cargo Connect	Automation	NEW Advanced Aerial Mobility	Mentorship Clinics & Panel Discussions
18 November		5G	Next Gen Leaders	Pitch Competition Finale

\*International Aviation Womens Association

## DUBAI AIRSHOW APP

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# KEY INFORMATION



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## OPENING HOURS

Sunday 14 - Thursday 18 November: 10:00-17:30

## FLYING DISPLAY

Daily from 14:00 – 17:00



**Shuttle Buses:** A daily shuttle bus service will run between the Dubai Airshow Site, the Ibn Battuta Metro Station and the Expo Metro Station.



**Mandatory Mask:** Keeping in line with the latest COVID-19 regulations the wearing of masks is mandatory at Dubai Airshow 2021.



**Taxis:** Demand for taxis in Dubai can be high especially at peak times. We strongly recommend the shuttle bus service as the quickest way to and from the Airshow site.



**Cafés:** At the front of the exhibition hall and near the exits to the static display.



**First Aid:** Outside the exhibition hall, next to the Air Traffic Control Tower.



**Toilets:** In each corner of the exhibition hall.

## SHARE YOUR SHOW EXPERIENCE!

Share your favorite moment from Day 1 with the tag **#DubaiAirshow** and get featured in tomorrow's edition.

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# FLYING DISPLAY - DAY 1 SUNDAY

14:00:00	UAE FORMATION
14:11:00	RUSSIAN KNIGHTS
14:45:00	F 16 UAE
14:54:00	BOEING 777-X
15:03:00	L15
15:13:00	MC 21
15:23:00	RAFALE
15:34:00	SARANG
15:52:00	TEJAS
16:01:00	A 350
16:09:00	KA 52
16:14:00	MIRAGE 2000
16:23:00	ANSAT
16:28:00	SAUDI HAWKS

## COMMENTATORS

First Lt. Hazza Fahad Al Nuami, UAE Air Force

Joe McGrath

## FLYING CONTROL COMMITTEE (FCC)

Brig. Gen. Staff. Pilot Abdulsalam R.Al Mehairbi, Chairman - FCC

Ibrahim Ahli, Deputy Chairman - FCC, Deputy CEO, Dubai Air Navigation Services

**PROGRAMME SUBJECT TO CHANGE**

Not known for half-measures, Dubai's new attraction is another extravaganza

# Dubai Expo has the X-factor

As life starts to get back to 'as normal as possible' from the pandemic, there is probably nowhere more exciting to be than at Expo 2020 Dubai – the biggest event the Middle East has ever held. Here's a small taste of what you can expect.

Expo 2020 Dubai is about 'connecting minds and creating the future'. Open seven days a week, the event features cutting-edge architecture, an inspiring arts and culture programme, and a range of interactive exhibitions.

You're going to need more than a day to get around the 191 diverse global pavilions that are dotted round districts named 'opportunity' 'mobility' and 'sustainability'.

If you've not had enough aircraft action at the air show, make your way to the opportunity district – within walking distance of the Al Wasl Dome – to the Emirates pavilion, where you can see a preview of the future of commercial aviation, reframing the role that science and technology will play in the next 50 years of air travel. You can even design your own aircraft!

The UK pavilion, also located in the opportunity district, is highlighting artificial intelligence and the space sector, while the US pavilion showcases a giant replica of the SpaceX Falcon rocket.

At the Netherlands pavilion see water being created out of thin air while, in the mobility district, the Syrian exhibit boasts a replica of Ugaritic writing, widely believed to be the first alphabet in history, dating back to around 1,400 BC.

While touring around the Expo, visitors can buy a passport and get a country stamp for each place visited. The Expo features a women's pavilion, which celebrates the

important roles females, known and unknown, have played throughout history and continue to play.

Away from all the science and history, catch one of 60 live shows a day: everything from operas and orchestras to A-listers, pop-up theatre, dance shows (this week you can see Dance Ireland perform the iconic Riverdance) and flash mobs.

There are also sporting events and programmes, where you can even run and cycle 'round the world'.

For a tranquil moment, the Garden in the Sky gives you a view of the Expo from the top of a rotating observation tower, and if you're up for shopping,

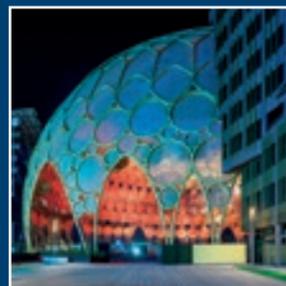
the World Souq will be a winner.

Let's not forget the food. Enjoy dishes from every corner of the world, from street food to haute cuisine, with more than 200 eateries to choose from. There are also food halls: Rising Flavours includes a chef's table and live cooking shows from GCC-based chefs; the Talabat offers 30 different concepts using cutting-edge technology and robots; while Alkebulan is

the world's first African dining hall. Once the sun goes down, soak up the atmosphere of the buildings and spaces as they come alive with stunning projections and light installations. ▲

**MORE INFO**

You can get to Expo 2020 by metro, bus, taxi or car. Metro's Route 2020 takes you there directly and there are three main entrances 20-minutes drive from Dubai Marina. You can check out events and book tickets online



Pictures courtesy of Expo 2020 Dubai

Right: An aerial view of the incredible Expo site; (top) the Mobility Pavilion; and the beautiful architecture of the Al Wasl Dome (above)

NEW DATES ANNOUNCED

In association with  
Rwanda Civil Aviation Authority  
and RwandAir



## AVIATION AFRICA

15th - 16th September 2022

Radisson Blu Hotel & Convention Centre, Kigali, Rwanda

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