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

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NEW YEAR BRINGS NEW HOPE FOR US ALL

Perhaps it does take something as drastic as a global pandemic to make the world take a good look at itself and think about new starts.

To be fair, many Gulf states have been ahead of the game with a focus on 'vision 2030' – and nowhere more so than in Saudi Arabia where, as we discover in our cover story, the plans to increase the localisation are now clear – particularly in the defence sector.

The GCC countries are important to the global defence manufacturing businesses and it is unsurprising that those countries that lead the markets are working hard to develop partnerships that will see increasing amounts of work being developed in the region.

At the time of writing, I am still hopeful that IDEX – the major defence show in Abu Dhabi –will go ahead as planned. Organisers are to be praised for the efforts they have made to ensure the venue is Covid-safe and, hopefully, the event will allow the defence industry to meet and conclude so many of the deals that will change the face of industrialisation going forward.

One deal that hasn't yet crossed the line is the UAE's proposed order for up to 50 F-35 stealth fighter jets.

Outgoing US President, Donald Trump, approved the order just hours before leaving the White House. However, the deal is being reviewed by the new administration.

The order had the support of the Israeli Government and it was hoped that this would by a symbol of greater collaboration and communication between Israel and the UAE.

The improved relations between Qatar and Saudi Arabia, the UAE and Egypt, is also to be applauded. A Middle East at peace will see greater economic opportunities and allow the region to soar in a way it has failed to do for a decade.

We need to be putting our minds to new ideas – particularly in the issue of sustainability. That will matter to civil, military and space sectors.

Here at the Times Group, we are also breaking new ground with the launch, this month, of the Times Aerospace TV channel (TATV). We begin with a fortnightly news and current affairs programme, a defence monthly show, and a whole series of special insights into key issues, organisations, products and so on. You can see all of the programmes via our website or catching up on YouTube.

Here's to a brighter future for us all.

Alan Peaford, editor-in-chief

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Dubai Airshow evolves for 2021

A range of new features have been confirmed as the Dubai Airshow gets set to return for its 17th edition from November 14-18 this year.

Tim Hawes, managing director of organiser Tarsus F&E, said: "The show will demonstrate the evolution of the aerospace industry and the fast acceleration of digitalisation as a result of the pandemic.

"The industry has been affected significantly by Covid-19 and we are excited to use the event as a platform to demonstrate the necessity of the aerospace and aviation industries and the potential for future growth and development."

PICTURE: EMIRATES AIRLINES A380 /TARSUS.

Open borders

The International Air Transport Association (IATA) has welcomed the signing of the 'solidarity and stability' agreement that will see Saudi Arabia, Bahrain, the UAE and Egypt open their air, land, and sea borders with Qatar.

The agreement paves the way for commercial airlines to resume regional connectivity, which will shorten flight times and provide essential air links to families and businesses across the region.

777X delay

Emirates has confirmed its first Boeing 777X will now not arrive until 2023, after it was originally slated for 2020. The airline currently has 101 Boeing 777-9s and 25 Boeing 777-8s on order. It has been working with Boeing to push back delivery due to the current aviation climate.

Kuwait boost

Kuwait Airways has received its first two of eight A330neos ordered by the airline.

Chairman, Captain Ali Mohammad Al-Dukhan, said: "The introduction of the A330neos to our expanding fleet strengthens Kuwait Airways' position as a prominent airline in both the regional and global aviation sector."

Dangerous move

With the certification from the General Civil Aviation Authority (GCAA), Flydubai can now transport dangerous goods in addition to general cargo, courier, live animals, postal mail, perishables, priority cargo and valuable cargo.

Digi deal

Serco Middle East has announced a strategic agreement with NG Aviation, a European firm which specialises in making aviation digital.

The deal will enable the development of a product for satellite data-based obstacle surveys around airports.

Serco will enhance its offering to provide transport clients with specialised data capabilities, including data management, airport collaboration decision-making, and total airport management.

DAE delivery

Dubai Aerospace Enterprise has delivered the first of 18 Boeing 737MAX 8 aircraft to American Airlines as part of a purchase and leaseback agreement.

New Tunisair CEO

Olfa Hamdi, described as a global expert in capital project strategy, has been appointed chairman and CEO of Tunisair, replacing Elyes Mnakbi. Hamdi is an American-trained engineer, inventor, and Silicon Valley entrepreneur-founder and CEO of Concord Project Technologies.

Tunisair saw its passenger traffic and its turnover fall by approximately 75% during the first three quarters of 2020.

A restructuring plan was announced by the Tunisian authorities last year, including a recapitalisation and layoffs.

New deal: HE Sheikh Khalid Isam Al Qassimi, chairman of the Department of Civil Aviation, Sharjah (right) and Phil Malem, CEO, Serco Middle East. PICTURE: SERCO ME

Serco secures Sharjah service contract

The Department of Civil Aviation, Sharjah, has awarded Serco Middle East a five-year contract for the delivery of air navigation services at Sharjah Airport.

The contract continues Serco's provision of teams to oversee the operation of smooth aircraft movements, as well as full compliance to safety, at the airport.

Under the new agreement, Serco will continue to upgrade the service levels at Sharjah Airport, while ensuring an excellent operational efficiency and continuity of the service in accordance with the latest technologies and international standards. The company is also required to increase the percentage of emiratisation at Sharjah Airport, with targets of a 47% Emirati workforce by 2025.

In order to reach the emiratisation targets, Serco will be responsible for training nationals to become qualified air traffic controllers and assistants.

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Military contracts

Boeing has acknowledged three foreign military sales contracts with the US Air Force for training services and support in the Middle East valued at more than $800 million.

The first, previously unannounced, contract was awarded in 2019 and will support the Qatar Emiri Air Force with F-15QA programme management, maintenance and aircrew training, valued at $240 million over a five-year contract period.

Flight-tests begin

The first of Qatar's naval frigate NH90 helicopter troop transport variants has successfully carried out initial flight-testing in Italy and France. Qatar has orders for 16 troop transport variants and 12 naval helicopters, the first of which will be delivered by the end of 2021. The delivery schedule will run until 2025.

Simulations start

EgyptAir Training Academy has started operating the new A320neo flight simulator, which has acquired European Aviation Safety Agency (EASA) accreditation.

Bags of security

Qatar's Hamad International Airport is the first in the region to obtain Smiths Detection's HI-SCAN 6040 CTiX system, which offers advanced screening of carry-on baggage at security checkpoints.

The equipment uses a gantry that rotates at a constant speed as baggage is carried through on its conveyor belt. Hundreds of images are taken of each bag to create 3D imagery, allowing for more accurate assessments of the contents.

PICTURE: BOEING.

Freighter milestone for Qatar Airways Cargo

Qatar Airways Cargo has taken delivery of three Boeing 777 freighters. The milestone also marks the 200th 777 freighter to be delivered. The triple delivery comes as air freight is playing a pivotal role amid the Covid-19 pandemic – including transporting newly approved vaccines – and is projected to increase more than 4% over the next two decades.

Qatar Airways Cargo now operates 24 of this aircraft model, along with two 747-8 freighters.

"With the arrival of these new freighters, we are injecting more capacity into the market, which is very much required during the pandemic," said Qatar Airways Group chief executive, Akbar Al Baker.

"The added capacity will also enable us to support operations around the Covid-19 vaccination, which is projected to be one of the greatest logistical challenges for the industry."

PICTURE: SKYTEAM CARGO ALLIANCE.

Hariri appointed SkyTeam Cargo Alliance chairman

SkyTeam Cargo has appointed Omar Hariri (pictured) as chairman of its executive board.

Hariri, concurrently the CEO of both Saudi Airlines Cargo Company, and Saudi Arabian Logistics Company, replaces Shawn Cole, VP Cargo of Delta Airlines, who held the position for three years.

Hariri said: "SkyTeam Cargo, with its two decades of experience, has come a long way and, with its 12 member airlines reaching every corner of the globe, enjoys a vast geographic reach and connectivity."

MEA gets a lift

BOC Aviation has delivered the first two of five new Airbus A321neo aircraft for lease to Middle East Airlines (MEA). The aircraft are powered by Pratt & Whitney's PurePower PW1100G-JM engines.

MEA chairman, Mohamad El Hout, said: "The new arrivals will further enhance our commitment to offer our passengers the best product and continued modernisation, despite the local and international challenges."

Facing the future

Etihad Airways has partnered with information technology company, SITA, to trial the use of facial biometrics in order to check-in cabin crew at the airline's crew briefing centre at Abu Dhabi International Airport.

The trial will allow crew members to complete check-in procedures and mandatory pre-flight safety and security questions digitally via their own mobile devices. The system will replace the current kiosk-based check-in process, which requires crew to use their staff identity cards as a form of authentication.

Eyes up…

FalconEye has been successfully launched by Arianespace. The high-performance Earth observation satellite will act as an eye from space for the UAE armed forces (UAEAF).

The optical observation satellite was launched using a Soyuz rocket from the Guiana Space Center (CSG), Europe's Spaceport in French Guiana, on December 1.

This mission marks Arianespace's 31st launch for a customer from the Middle East.

IATA role

The International Air Transport Association (IATA) has appointed Kamil H Al-Awadhi as regional vice president for Africa and the Middle East. He takes up his appointment on March 1, succeeding Muhammad Albakri, who will become the organisation's senior vice-president for customer, financial, and digital services.

New Dubai office

Air France KLM Group formally inaugurated its new regional headquarters at Dubai Airport Freezone in the presence of His Highness Sheikh Ahmed bin Saeed Al Maktoum.

The entire Air France KLM regional team is now based at the new offices.

His Highness said: "The inauguration of the group's new headquarters at the heart of the world's leading aviation sector is an affirmation of Dubai's strategic position. It highlights Dubai's ability to continue its growth and overcome challenges by attracting global players in the sector.

Ready and waiting: Flydubai will be one company particularly keen to see the 737 MAX return to service. PICTURE: FLYDUBAI.

The MAX is back... but not yet in the Middle East

Boeing's troubled 737 MAX is starting to return to service. **Alan Dron** *looks at what this could mean for airlines, passengers and the aircraft's future?*

On December 29, 2020, a Boeing 737 took off from Miami International Airport, landing three hours later at New York La Guardia with 87 passengers on board.

At any other time, such an event would arouse no interest. But this was the first commercial sector flown by the 737 MAX since its return to service was agreed by the US regulator, the Federal Aviation Administration (FAA).

After a 20-month worldwide grounding following two crashes in Indonesia (Lion Air) and Ethiopia (Ethiopian Airlines) that killed 346 people, the aircraft has been cleared to resume revenue flights.

However, although some regulatory authorities – notably in Europe and Canada – have also certified the aircraft as being fit to fly, others have not. The UAE's General Civil Aviation Authority (GCAA), for example, said in mid January that it was "still evaluating the situation".

The resumption of services will bring huge relief to Boeing, which saw its reputation take a significant knock as details emerged over problems with the MAX's maneuvering characteristics augmentation system (MCAS) and the lengths to which some individuals in the company went to cover up its shortcomings.

Flight control law

The MCAS flight control system was designed to enhance the MAX's pitch stability, so that it felt and flew like earlier members of the 737 family. However, a faulty angle of attack (AOA) sensor triggered erroneous inputs to the control system and put both Lion Air and Ethiopian Airlines' aircraft into dives from which their pilots were unable to pull out.

Boeing has now developed a software update for the MCAS to provide added protection if erroneous data is generated. One change has been the addition of a second AOA sensor, so no 'single point of failure' can jeopardise the aircraft.

The flight control system will now compare inputs from both AOA sensors. If they disagree by 5.5 degrees or more with the flaps retracted, MCAS will not activate and an indicator on the flight deck will alert the pilots.

Additionally, MCAS has been modified so that it can never command more stabiliser input than can be counteracted by the flight crew pulling back on the control column.

So, what will this mean for Middle East carriers that operated the MAX before it was grounded?

Several were in the process of having aircraft delivered in March 2019 and these are among the 400 or so parked at airports around the US as Boeing starts working to reduce this backlog.

There remains no clear timeline for Middle Eastern regulators to recertificate the aircraft, or whether, like the European Aviation Safety Agency, they will require modifications to the aircraft over and above those mandated by the FAA.

Anxious to have a recertificated MAX

Dubai-based low-cost carrier, Flydubai, will be among the carriers most anxious to have a recertificated MAX restored to service.

The carrier had 14 MAX 8 and 9s flying in March 2019, the vanguard of an order for 250 that will hugely increase the airline's scale; its existing fleet is based on some 50 earlier-generation 737-800s.

The airline's second tranche of MAXs – 175 ordered in December 2017 at a list price of $27 billion – was the largest single-aisle airliner order in Middle East history.

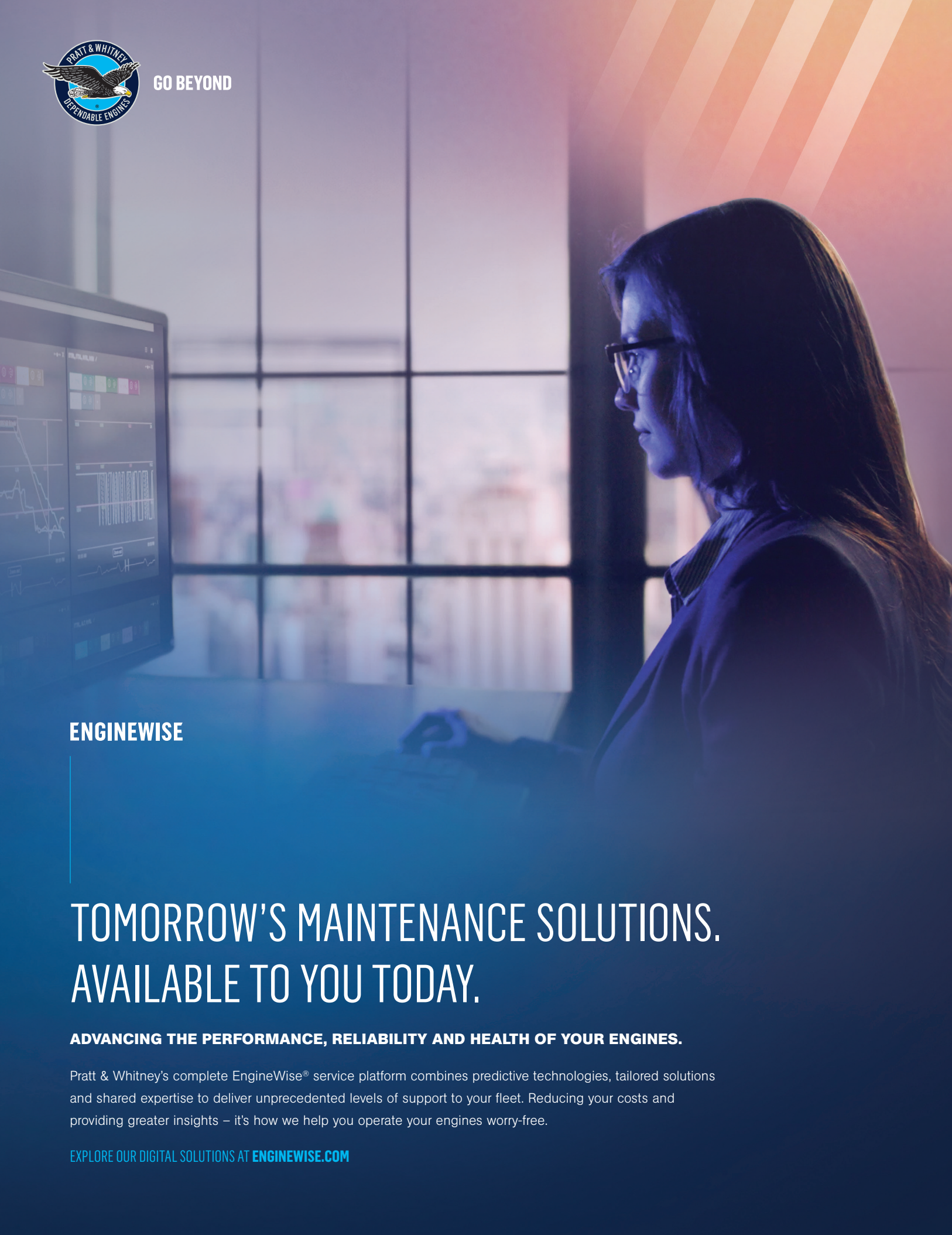
Another major MAX operator is Turkish Airlines, which has 65 MAX 8s and 10 MAX 9s on order. It had 12 in service when the flight ban started.

Oman Air had five MAX 8s in service, part of an order for 30. Royal Air Maroc is a much smaller operator of the type, with two MAX 8s.

Other Middle East companies have accounted for some of the several hundred MAX cancellations since the grounding began. Saudi low-cost carrier, Flyadeal, planned to take 30 MAX plus 20 options, but was the first operator to cancel, in July 2019, opting instead for the same number of Airbus A320neos.

Kuwaiti lessor, ALAFCO, cancelled 20 MAX 8s in July 2020, while Qatar Airways had taken delivery of five MAX 8s for its associate carrier, Air Italy, as part of an order for 30, but cancelled them after the Sardinia-based airline collapsed.

Qatar's Group CEO, Akbar Al Baker, has urged Boeing to drop the MAX name, saying it is irretrievably damaged. ■



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As Etihad Airways announces its restructuring into a 'mid-size' airline, **Alan Dron** *asks: What now for the carrier after the formalisation of its new, scaled-down role?*

Downsizing Etihad changes its fleet path

Although always the youngest and smallest of the so-called 'Middle East 3', Etihad Airways strove to be on a par with Emirates Airline and Qatar Airways.

Its rapid expansion and attempts to out-do rivals in the luxury stakes marked it out as an airline that wanted to go places.

It has been obvious for some time that it has adopted a different path. The divestment of stakes in its partner airlines, scaling back of its fleet – even before the pandemic – and its move towards a route network focused more on point-to-point services made that apparent.

However, it was in the announcement of senior management changes in early November 2020 that the airline openly stated that it no longer saw itself as a truly major player.

"The restructuring sees the airline continuing its transformation into a mid-sized, full-service carrier concentrating on its fleet of wide-body aircraft," part of the statement read.

"As a responsible business, we can no longer continue to incrementally adapt to a marketplace that we believe has changed for the foreseeable future," said Etihad Aviation Group CEO, Tony Douglas. "That is why we are taking definitive and decisive action to adjust our business and position ourselves proudly as a mid-sized carrier."

In the middle of the last decade, there was always a sense that Etihad was playing catch-up – hence the plan by the then-CEO, James Hogan, to rapidly expand its reach by taking stakes in airlines that theoretically could feed traffic into Etihad's Abu Dhabi hub.

Analysts could see the logic behind the plan but questioned the choice of partner airlines. Jet Airways (India) and Airberlin (Germany) went bust, while Alitalia (Italy) entered administration after Etihad withdrew its support in the face of union opposition to reconstruction plans and underwent an ultimately unsuccessful recovery before being renationalised by the Italian Government.

And, in January this year, Etihad was seemingly content to allow its previous 49% shareholding in Air Serbia to be diluted to 18% after the Serbian Government recapitalised the national carrier.

Huge annual losses

Etihad has, for several years, been racking up huge annual losses; in 2019 alone they amounted to $870 million, although the airline noted this was "significantly reduced" on 2018's figure of $1.28 billion.

Its report for the first half of 2020 said that, before the pandemic crushed demand for flights, it had been on track for its strongest financial results since 2015. It was on target to achieve an earnings before interest, taxes, depreciation, and amortization (EBITDA) figure of $900 million in 2020, compared to $453 million in 2019.

One intriguing aspect of Etihad's new direction is the future shape of its fleet. Like most A380 operators, the Abu Dhabi company has grounded its 10-strong fleet of the double-deck aircraft in the face of a dearth of passengers, and it remains to be seen whether

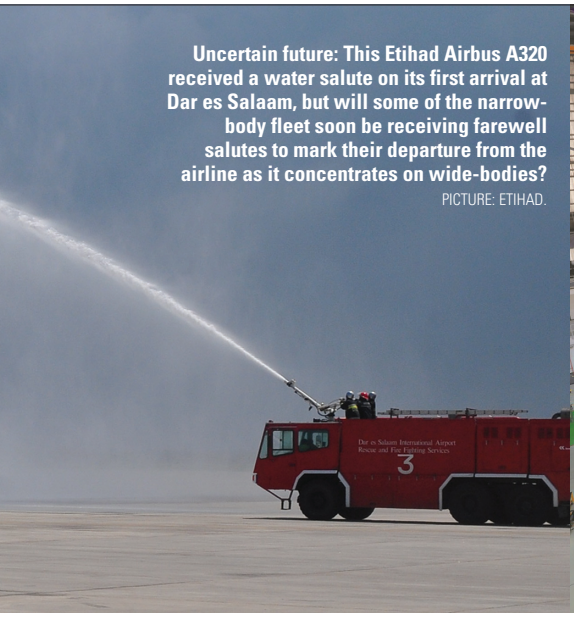
GULF AIR'S HISTORIC MoU WITH EL AL

PICTURE: GULF AIR

There were smiles all round as Gulf Air and El Al Airlines signed a memorandum of understanding (MoU) to launch an historic collaboration.

The comprehensive agreement sets the foundation to discuss potential joint codeshare operations between Manama and Tel Aviv, as well as on the global flight networks beyond the two carriers' hubs. It also contains plans for greater commercial cooperation in the fields of loyalty, cargo, engineering, travel technology and any area that can benefit both airlines and their customers.

The agreement was signed at the Hilton, Tel Aviv, by Gulf Air's chairman, Zayed R Alzayani, and EL AL chairman David Brodet.



Uncertain future: This Etihad Airbus A320 received a water salute on its first arrival at Dar es Salaam, but will some of the narrow-body fleet soon be receiving farewell salutes to mark their departure from the airline as it concentrates on wide-bodies? PICTURE: ETIHAD.

they will return to service, given predictions of a slow return of long-haul routes.

If, however, Etihad intends to concentrate on wide-body aircraft in future, what does this mean for its substantial fleet of 30 Airbus A320s and A321s? Might some of them be disposed of, with its new codeshare partner airline, Air Arabia Abu Dhabi (AAAD), taking over some of its short-haul routes?

AAAD begun operations in the second quarter of 2020, and will operate independently, complementing Etihad's network of routes from Abu Dhabi. Etihad declined requests for an interview for this article.

Super-connector

The airline is clearly moving away from its former 'super-connector' role. In December 2020, it announced that it was adding a new string to its bow by launching charter and special flight services.

In an effort to find a new revenue stream, the airline said that it would be offering 'fully customisable' flights for business and leisure passengers, as well as for cargo flights – although how the latter would differ from its existing freight operations was not spelled out.

During the continuing pandemic, "charter flights provide a convenient alternative to travel, providing customers with the flexibility to choose the departure time, destination and routing", the airline said. This suggests that Etihad is aiming at wealthy customers from the region.

But its days as a member of the 'ME3' are apparently over. Saudia is the new de facto member of the trio. ■

New possibilities: Etihad Engineering's Abu Dhabi maintenance facility could be handling El Al aircraft if a deal between the two airlines goes ahead. PICTURE: ETIHAD ENGINEERING.

Etihad's expanding engineering division could notch up a new customer in Israeli carrier El Al? **Alan Dron** *looks at the possibilities.*

DIPLOMATIC BREAKTHROUGH PAVES WAY FOR ETIHAD-ISRAELI MRO DEAL

Etihad Airways Group and El Al are in discussions over the Abu Dhabi-based airline taking on maintenance, repair and overhaul (MRO) duties for the Israeli carrier.

The move follows last autumn's sudden breakthrough in restoring diplomatic relations between Israel, on the one hand, and the UAE, Bahrain and Sudan on the other.

Etihad is scheduled to start daily flights to Tel Aviv in March 2021, although the Israeli carrier has not, as yet, announced services to the UAE's federal capital.

El Al and Emirates Airline will start flights between Dubai and Israel's main commercial hub.

As part of a memorandum of understanding (MoU) signed in November, both carriers said that their engineering divisions would begin talks about greater cooperation. These discussions will include optimising MRO opportunities.

The MoU also promised cooperation on code-sharing, reciprocal opportunities for members of their respective frequent flyer schemes, plus ways to increase volumes of freighter traffic flowing into and out of Abu Dhabi and Tel Aviv, and across the carriers' combined networks.

Cooperation in training for flightdeck and cabin crews is also being discussed.

Talks on the engineering part of the MoU were still at the exploratory stage at the time of writing, but all aspects of maintenance were being explored.

"Staff are looking at how and what they can do together," said El Al's acting director of international affairs, Stanley Morais. "What the issue is, how we can work together in partnership and from a logistics point of view. We can do things for them, perhaps, in a more efficient way, or vice versa."

El Al has said it does not intend to establish its own line maintenance stations in the UAE. "Our approach will be to see who is there and who can provide services for us," said an El Al spokesman.

Any cooperation on the maintenance front will be made easier by the fact that the two airlines operate the same type of equipment. Etihad's fleet contains Boeing 787-9s and -10s, plus the 777-300ER, while El Al flies the 787-8 and -9 and the smaller version of the 777, the -200ER.

With each airline having the appropriate stocks of parts for the different aircraft types, that gives possibilities for the two companies being able to coordinate maintenance activities – perhaps, for example, if one company finds itself with a lack of capacity due to unforeseen demand in its maintenance workshops.

Costs, inevitably, will play a part. It may be that one company can undertake certain types of work more cost-effectively than the other.

■ **Meanwhile, Etihad Aviation Training (EAT) is to provide full-flight simulator (FFS) training for Israir Airlines' Airbus A320 pilots. Israir will dry-lease EAT's FFSs in Abu Dhabi, with the training being conducted by Israir instructors.**

Israir CEO, Uri Sirkis, said that a meeting with Etihad Aviation Group CEO, Tony Douglas, and EAT managing director, Captain Paolo La Cava, "revealed to me a rare opportunity to use the EAT simulator facility, just a three-hour flight away from Israel.

"Beyond the economic and professional benefits, I believe that the more meeting points we find between the countries, the stronger the tourism movement will be. This is the true peace." ■

Airspace deal

Jordan and Israel have agreed that flights will be able to cross both nations' airspace, shortening journey times in and through the region.

Airlines have historically flown around Israel when going east/west over the Middle East. The new direct routing will, on average, cut 106km eastbound and 118km westbound on flights operating from the Gulf States and Asia to destinations in Europe and North America. It will also typically lead to a reduction of around 20 minutes in flight time. ■

Two major studies predict that the Middle East airline industry will rebound from Covid-19, but their tone is cautious and some passenger habits are likely to change permanently. **Alan Dron** *reports.*

Dawn of a revival ...or more clouds on the horizon?

Will airlines ever fully recover from the global pandemic? The answer in the Middle East is almost certainly 'yes', but with lower growth rates over the next decade.

That was the prediction from Boeing in its 2020 commercial market outlook (CMO), issued late last year. But, whereas previous CMOs have been almost uniformly positive, the most recent edition strikes a more careful note.

Similarly, a major survey of almost 10,000 airline passengers from across the globe found that most will change their flying habits in the aftermath of the crisis.

The Inmarsat passenger confidence tracker found that, while most travellers wanted to get back into the air, they expressed concerns about the risk of infection at certain 'touch points', such as aircraft toilets. Almost one-third (31%) of respondents said they intended to travel less in future.

Those sentiments may change as vaccines are rolled out across the world, but in the short term, at least, they indicate that airlines' recovery from the slump in travel is likely to be slow and stuttering.

There is now little doubt that the pandemic has caused, not just a major blip in the airline industry, but a full-scale reset, with analysts predicting that the airlines of the 2020s will be smaller, serve fewer routes, and may charge more for tickets as they start to rebuild their balance sheets.

2024

The year a full return to 2019 levels is possible

As Willie Walsh, former CEO of International Airlines Group and incoming head of the International Air Transport Association (IATA) said last year: "Anyone who believes that this is just a temporary downturn and, therefore, can be fixed with temporary measures, I'm afraid seriously misjudges what the industry is going through. This will represent a structurally changed industry."

In the short to medium term, IATA said late last year that 2020 passenger numbers to, from and within the Middle East would reach only 30% of 2019 levels. That was a further, significant, drop on the figure of 45% it had projected in July last year.

In absolute numbers, the Middle East would see 60 million travellers in 2020, compared to 203 million in 2019, it said.

In 2021, IATA predicts that demand in the Middle East will strengthen to 45% of 2019 levels, reaching 90 million travellers to/from/within the region. It adds that a full return to 2019 levels is not expected until late 2024.

Boeing's projected global demand for 18,350 commercial aircraft in the next decade is 11% lower than the 2019 forecast and an indicator of the shock to the industry.

143million

The number of FEWER travellers in 2020 compared to 2019

In the longer term, however, Boeing predicts that key industry drivers will remain stable and that the world's commercial fleet will return to its growth trend.

In the Middle East, the manufacturer forecasts that passenger growth over the next 20 years will average 4.3%, compared to a 4% figure globally, an indicator that the region will continue to be a significant player in the sector.

Indeed, Boeing forecasts that the Middle East commercial fleet will reach 3,500 aircraft, more than double the 2020 figure of 1,510 airliners.

That growth will be led by narrow-body aircraft, whose numbers in the region are predicted to almost triple by 2039. That underscores analysts' beliefs that smaller, more economical aircraft will lead the recovery as airlines downsize their fleets. It may also be an indicator that the low-cost carrier market in the region will continue to grow steadily.

31%

Almost one-third of respondents said they intended to travel less in future

The prediction for 1,280 wide-body purchases, meanwhile, "reflects challenges to long-haul markets that are both typical to air-travel shocks and specifically due to the pandemic's impact on international travel".

Hope on the horizon: Surveys from both Boeing and IATA predict that the sun will rise again on the aviation sector post-pandemic, but warn that growth has taken a knock.
PICTURE: THALES.

Growth will return in the medium to long term, the CMO suggests and, in a sign of the Middle East's continuing economic strength, the region's demand for replacement wide-bodies will actually account for a growing share of global demand for twin-aisle types.

Saj Ahmad, chief analyst of UK-based StrategicAero Research, who follows Middle East airlines closely, believes that Boeing's figures for future purchases are "realistic".

He said he believed that budget carriers, such as Air Arabia and Flydubai, will continue to make inroads into the younger market sector and, while he did not foresee a surge of returning travellers as the pandemic slowly recedes, he believed it would be "more pronounced than many sceptics have suggested".

Ahmed added that airlines will have to "be really careful about how they price their fares" in the near future. While Middle East carriers are obviously keen to get travellers back on board: "If airlines are pricing tickets just to put bums on seats, nobody will make any profit."

On the other hand: "They can't price them too high to force yields up when everyone else will potentially be lowering fares to entice people back on board." A careful balancing act will be required, he suggested.

Elsewhere in the Middle East, he said, airlines will continue to struggle. Many north African carriers fell victim to corruption and red tape, even in good years, and would face particularly hard times in the near future. Even some of the better carriers, such as Royal Air Maroc and Air Algérie, that have invested in modern equipment such as the Boeing 787 and 737 MAX, would find the going tough, he suggested.

83%

The number of airline passengers not expecting to return to their previous travel routines

On the passenger side, meanwhile, Inmarsat's survey, which questioned 9,500 passengers from 12 countries, found that flying habits are set to change drastically for the long-term, with eight in 10 airline passengers (83%) not expecting to return to their previous travel routines once the pandemic is over.

The global mobile satellite communications provider found that, while 60% of passengers were satisfied with the aviation industry's response to Covid-19, airlines would have to work hard to encourage passengers back into the skies.

"With safety and reputation becoming even more important to today's flyers, there is a clear need for airlines to differentiate themselves in order to encourage passengers back on to their flights," said Philip Balaam, president of Inmarsat Aviation.

Minimising critical touchpoints in passengers' journeys will be vital in improving confidence, he said. Perhaps unsurprisingly, given Inmarsat's role in providing on-board connectivity, he added that keeping passengers connected and entertained would also be crucial.

Only one-third (34%) of passengers surveyed had taken a commercial flight since the pandemic began, the survey found, and this appeared to have sparked a shift in attitudes to flying. Four in 10 passengers (41%) expected to travel less by any means and one-third (31%) planned to fly less.

Despite this however, the survey found that there were early signs that travellers were beginning to feel confident about flying again; almost half (47%) of those surveyed said they expected to feel ready to fly within six months.

Part of the reason for this reappearance of confidence is because passengers are apparently more scared of catching the virus abroad than on an aircraft. Many of those surveyed thought they were at a greater health risk in other environments, such as the gym and public transport.

One of the countries surveyed by Inmarsat was the UAE, with more than 90% of the 500 Emirati respondents telling the interviewers that they would change their flying habits post-pandemic. Slightly more than half (52%) said that reputation would now be a more significant factor when choosing an airline and more than 25% said they would only fly with an airline they trusted.

If these sentiments persist, it will put a premium on visible, confidence-building measures, such as cleanliness on board aircraft, and on features that reduce interaction with staff, such as pre-ordered catering and contactless payments. These measures are likely to increase costs for airlines, but it may be a price – at least in the near term – that they have to pay. ■

4.3%

Predicted average passenger growth over the next 20 years

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Bombardier's Casablanca site was one of the assets acquired when Spirit AeroSystems swooped in to buy parts of the Canadian company's aerostructures and aftermarket services business in October. **Vincent Chappard** *looks at why this is a good deal for Morocco.*

Casablanca site brings new Spirit to Morocco

World-class: The Casablanca facility is key to delivering competitive costs. PICTURE: SPIRIT AEROSYSTEMS.

Moroccan authorities had been working with Spirit AeroSystems for about a year before the US company announced it had bought the Casablanca site. Also included in the deal was Bombardier's Belfast (known as Short Brothers) and Dallas plants.

According to Moulay Hafid Elalamy, Morocco's minister of industry, trade and green and digital economy, this new agreement is a good omen for the future and strengthens the attractiveness of the aeronautical ecosystem set up in the country – particularly after the pounding it had taken in the wake of the coronavirus pandemic.

The Bombardier acquisition is highly strategic to Spirit's plans in terms of growing Airbus content (work package for the A220 wing manufacturing processes), technologies (advanced composites), and regional business jet platforms. It will also double the company's global world-class aftermarket services business.

"With the Casablanca site acquisition, Spirit becomes a much bigger player in the business and regional jets market," said a spokesperson for the Wichita, Kansas-based company. "It is a world-class facility and it is key to delivering competitive costs for us.

"Morocco offers internationally competitive manufacturing costs, as well as low shipping and transportation costs. "

PICTURE: GIMAS

"We have put in place a recovery plan."
KARIM CHEIKH

Wing components

Work currently being carried out at the Casablanca facility includes wing components and nacelles for Bombardier's CRJ regional aircraft; fuselage, fuel cell and emergency doors for the Bombardier Learjet 70/75; and floors, doors, and minor sub-assemblies for Bombardier Challenger 350/605 and Global 5000/6000 aircraft. The site is also certified to provide maintenance, repair and overhaul (MRO) services.

"The Moroccan aerospace industry is solidly rooted in the global value chain and it is booming," added the spokesperson. "Our presence in Morocco will enable us to develop and expand our manufacturing capacity and capabilities and improve our competitiveness for structural aircraft components."

This is good news for the Group of Moroccan Aeronautics and Space Industries (GIMAS), as the air transport segment has been severely affected by the Covid-19 pandemic.

Before the coronavirus outbreak, the Moroccan aeronautical and space industry had recorded a growth of more than 20% over two consecutive years. It had in excess of 140 companies in the aerospace sector, 17,500 qualified jobs, including 42% women, and a local integration rate of 38%.

The export turnover in 2019 was $1.9 billion and the initial goal had been to reach $2.6 billion in 2021.

Drop in aeronautical activities

However, the coronavirus crisis hit hard. By the end of September last year, there had been a 23% drop in aeronautical activities, with around 10% of jobs cut. It is estimated that getting back to pre-Covid levels could take until 2023.

According to GIMAS president, Karim Cheikh, Morocco's aviation industry is more resilient than other regions. "We have put in place a recovery plan, which consists primarily of safeguarding jobs and orienting our activities more towards new professions, with an emphasis on innovation, research and development, and technologies linked to Industry 4.0. Digital transformation is at the heart of our strategy."

As a proactive way to bounce back quickly during the upturn, GIMAS has set up a training programme within the Institute for Aeronautical Sector Employment (IMA) to provide new qualifications or strengthen technical skills for personnel who have lost their jobs.

GIMAS is also targeting new markets in Germany, the UK and North America. ■

OMAN DUO LINK UP TO CRACK THE CODESHARE

Oman's budget airline and national carrier are getting closer, writes **Alan Dron**.

A codeshare between Oman Air and low-cost carrier (LCC), SalamAir, seems likely to be the first step in more extensive cooperation between the two companies.

The airlines began codesharing in autumn 2020 and, according to SalamAir CEO, Captain Mohamed Ahmed, the early stages have gone well.

Oman Air declined to comment on the development.

Codeshare negotiations had been under way for some time, explained Ahmed, but were complicated by the fact that LCCs and full-service carriers tend to be very different animals. The main issue is that SalamAir is not on GDS, the computerised systems that enable transactions between travel industry providers such as airlines, hotels and car rental companies.

"We've never believed in being on GDS. We think it's an extra cost that passengers shouldn't pay. We're an online platform and that makes it a bit difficult, but both our IT teams have worked very hard," said Ahmed.

"We know we can complement each other. We fly a lot of routes that they don't and we don't have long-haul, so our reach can expand."

Win-win: Oman Air's long-haul services complement SalamAir's routes to the Indian subcontinent.

PICTURES: OMAN AIR AND SALAMAIR.

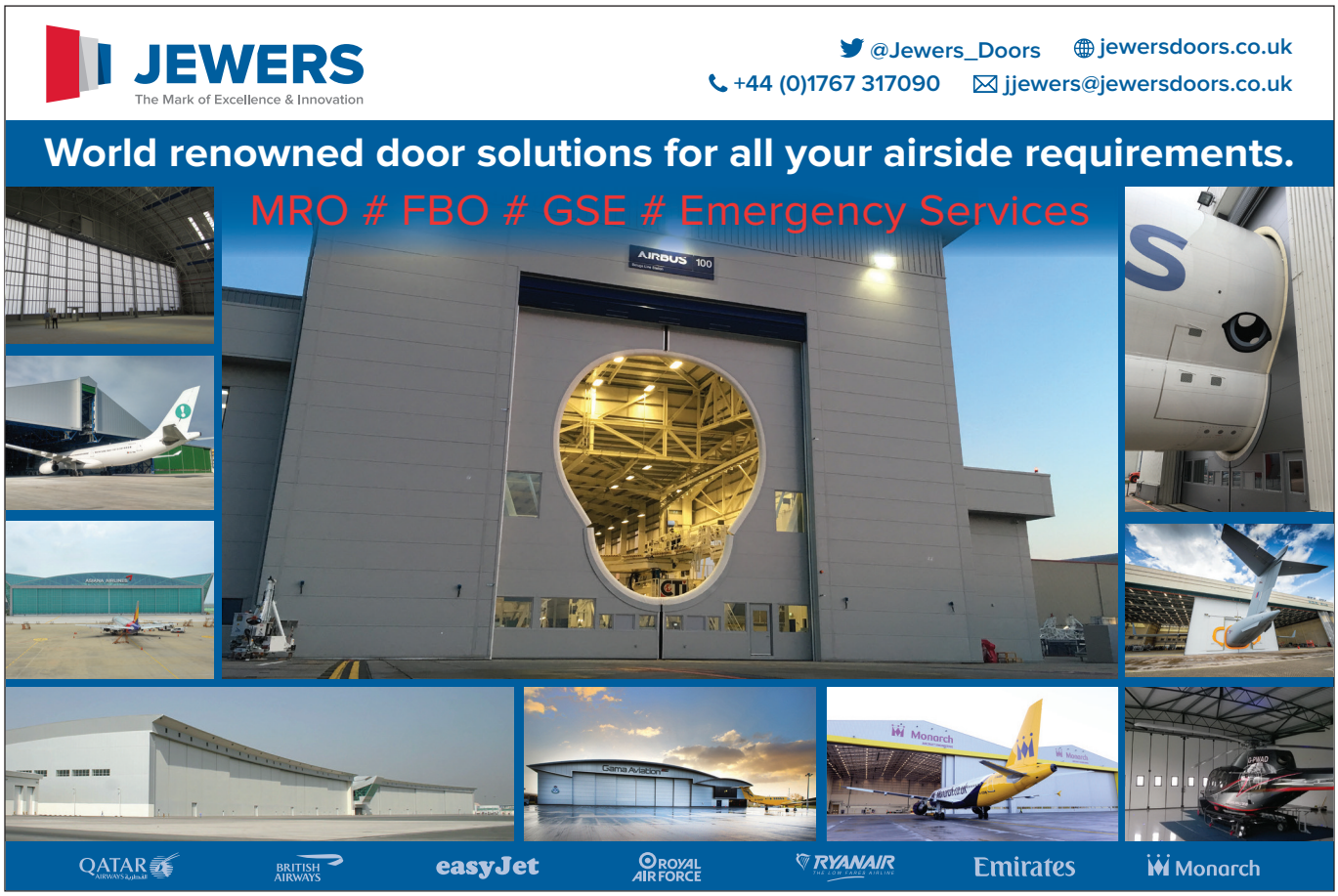
At present, the codeshare traffic is in one direction, with Oman Air putting its codes on several SalamAir services. However, early 2021 is expected to see the LCC gaining the necessary tools to put its codes on Oman Air flights.

"It's been very smooth so far, we've had no issues," said Ahmed. "In fact, the number of passengers is more than what we thought we would have."

Most of the passengers using codeshared flights have come from the Indian subcontinent, transferring to Oman Air services in Muscat for onward flights.

Given the pandemic, load factors are not as high as usual, but yields are much better than they usually are because of capacity limitations, said Ahmed.

SalamAir is already looking at wider cooperation with Oman Air, notably in crew training, where the LCC could utilise Oman Air facilities. Additionally, SalamAir may be able to share Oman Air's extensive engineering set-up. ■



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Right time for RightJet

A new aviation company launched into the Middle East's private jet market on January 1. **Jill Stockbridge** *reports.*

PICTURE: RIGHTJET

Offering aircraft charter brokerage, sales, leasing, consultancy and management supervision services from its Dubai International Airport base, RightJet is led by CEO Mark Hardman.

He's a familiar face in the industry, having worked with a number of private jet operations regionally over the last 10 years, including Qatar Executive, ExecuJet, Flying Group and Dubai South.

It seems a challenging time to launch a new business aviation company, but Hardman is convinced that RightJet has the right offering.

"We have already formed several strategic partnerships and this, in part, will give us a distinct advantage as the world comes out of Covid," he said.

"We are already seeing strong interest in long range multi-leg charter flights for when the world starts its journey to what I would call 'Covid normal', rather than 'post-Covid'. There is also significant interest in purchasing pre-owned private jets from new-to-the-industry clients.

Need for social distancing

"What I have always found interesting is that only 10% of people who have the means to fly private are doing so. Given the lack of airline connectivity for the next two-to-three years and the need for social distancing, private aviation will certainly bounce back quickly.

"RightJet has exceptionally strong relationships across the Middle East and Asia and we believe these regions will lead the way in the global recovery."

In practical terms, Hardman assures potential clients that they can expect super clean aircraft, crew to wear PPE, and sanitation at every touch-point. He added: "The fact that the number of touch-points in an FBO is more than 10 times less than in a commercial terminal also helps."

> **"For the next two to three years the lack of airline connectivity will drive the private aviation business."**
> MARK HARDMAN

The company ethos is based on providing quality air charter and aviation services at remarkable prices, with a focus on environmental concerns. Hardman said: "RightJet is an exceptionally environmentally conscious company. We will include carbon off-set options with every flight and will promote the use of newer more fuel-efficient aircraft.

"As far as I am aware, RightJet is the first charter broker to actively promote the removal of single-use plastics on-board our charter flights. We will also instruct our partner operators to use recyclable items where possible. We will be requesting that catering items are sourced from local farmers, where possible, as standard. Given there are no additional costs involved, it really makes great sense to all parties."

Another focus will be in supporting aircraft operators in reducing positioning. Hardman said: "It is our belief that the next generation of flyers will want to use modern, fuel-efficient aircraft that respect the environment and provide sustainable transport solutions. It is with this in mind that we specialist in empty legs and point-to-point flying. This increases utilisation and reduces aircraft positioning and, in turn, cost.

Win-win scenario

"This really is a win-win-win scenario, as it increases operator yields, reduces client costs and lessens the impact on the environment. For some major private jet operators, reducing positioning by just 1%, can save $500,000 a year, and this is an area where RightJet can offer its consultancy services."

RightJet offers a full online payment platform and an online enquiry service. However, Hardman believes that the benefits of the boutique service are best delivered in person. He said: "There are often cost-reduction options available and it is important these are discussed early on. An example of one of these options may be in utilising an alternative London airport, such as Biggin Hill, where the client may make a significant saving on the trip. In turn, if the operator was planning on repositioning, then there is an environmental saving too."

Dubai Airports saw a major increase in private aviation in the last six months of 2020, and Hardman believes that this will continue and underwrite the success of the new company.

"My personal view is that, for the next two to three years, the lack of airline connectivity will drive the private aviation business. After this, the question is will the new entrants go back to flying commercial? Openly speaking, I believe some people will return to the airlines, at least in part. However, many will appreciate the time saving, personal space and the freedom our industry provides. The future of private aviation is, in my opinion, (and that of RightJet's investors) super bright."

The receipt of two new AW169 helicopters and plans to expand its maintenance operation means Abu Dhabi Aviation (ADA) has big ambitions for the future. **Marcelle Nethersole** *reports.*

Mark Pierotti: "We are dynamic and we are moving fast."

Top: In November last year ADA took delivery of two new AW169s.

PICTURES: ADA

Home-loving ADA targets offshore expansion

Business for Abu Dhabi Aviation is still going strong as it remains the largest helicopter airline operations centre and maintenance, repair and overhaul (MRO) company in the MENA region.

A large part of the company's business provides aviation offshore oil support and other services worldwide, as well as for Abu Dhabi's own oil and gas production companies.

"We are dynamic and we are moving fast," said commercial director, Dr Mark Pierotti.

"We are watching where all the oil and gas finds are; where all the tenders are being issued; and forming close relationships with the big oil and gas companies and the countries with oil fields that need reliable and safe helicopter services to their rigs and locations.

"This is a big part of ADA's future, but we still understand that the UAE is our home and our local customer remains very important to us, so we make sure any expansion is with the continued service level our Abu Dhabi customer deserves."

The company also provides VVIP passenger transportation, emergency medical services, search-and-rescue for the UAE, crop spraying, aerial construction, seismic support, firefighting and third-party maintenance support.

"We can do pretty much everything with a helicopter," said Pierotti.

The company currently operates and manages a helicopter fleet including 17 AW139s, 22 Bell 412s, 12 Bell 212s, plus EC-135 and seven Bombardier Dash-8 series turboprop transport aircraft.

"In November we took delivery of two new AW169s that will enable us to offer an elevated service to the industry and its clients," said Pierotti.

The company is also expanding its maintenance field, servicing both helicopters and fixed-wing aircraft – both in-house and as a significant provider of third-party maintenance services.

It has fixed and rotary-wing contracts for heavy maintenance and the modification of some of region's major helicopter fleets, as well as several maintenance support contracts with the UAE armed forces. ■

HYGIENE BOOST FOR LUXAVIATION GROUP

The Luxaviation Group has secured the FlySkills hygiene certification (FHC) across its regional operators, as well as its fixed-base operations managed by ExecuJet, including at facilities in Dubai and Istanbul.

The Luxembourg's company has been tailoring private travel experiences for more than 50 years.

The FHC programme allows FBOs, aircraft owners and operators to demonstrate defined and accredited hygiene standards that have been implemented and are subject to regular compliance auditing.

Its other ExecuJet FBO facilities certified by the FHC programme include Melbourne, Sydney, Cape Town and Johannesburg, as well as various European cities.

Robert Fisch, co-president, aviation services, Luxaviation Group, said: "More than 1,300 employees work in an around-the-clock operation on five continents, delivering stellar service in the areas of aircraft management for private and commercial aircraft, private air charter services, and the management and operation of VIP passenger terminals in 26 airports around the globe.

"As we hope and plan for private jet flight demand to surge again in 2021, we are doing everything we can to guarantee our clients the safest possible travel experience, in the air and across our FBOs." ■

Up to standard: Luxaviation has been tailoring private travel experiences for more than 50 years. PICTURE: LUXAVIATION GROUP.

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DASSAULT'S VIRTUAL ROLL-OUT OF THE 6X MAKES HISTORY

Proud: The Dassault team at the roll-out. PICTURE: DASSAULT AVIATION, A DASTE.

Dassault Aviation unveiled its newest business jet – the ultra-wide-body Falcon 6X – in Bordeaux-Mérignac, France, late last year. Because of the pandemic, it was the first virtual roll-out in the company's history.

The Middle East could have a big part to play in the success of the Falcon 6X, with Dassault Aviation chairman and CEO, Eric Trappier, describing the aircraft as "an entirely new flight experience".

"The Falcon 6X represents a major step forward for large-cabin business jet operators. It's award-winning cabin is the tallest and widest in business aviation, and provides levels of spaciousness, comfort, productivity and safety that will set a new benchmark in the long-range segment," he enthused.

With a 5,500nm (10,186km) range and top speed of Mach .90, it can connect passengers to major business centres far and wide – Paris to Tokyo, Los Angeles to Moscow or Beijing to San Francisco.

The 6X has many military-inspired technologies for enhanced performance and safety. The digital flight control system, for example, commands all flight control surfaces automatically, ensuring efficiency during the entire journey.

It also features the business jet world's first combined vision system – the Falcon Eye – which gives better situational awareness during all weather conditions. This adds a significant margin of safety during airport operations, especially at challenging airfields.

Powered by Pratt & Whitney Canada PW 812 D engines, the 6X sets new standards in performance, fuel efficiency and sustainability, according to the company. It has an advanced low-noise design, which facilitates maintenance and creates less downtime.

The manufacturer has completed engine ground and flight-tests and Maria Della Posta, president Pratt & Whitney Canada, said: "We feel very confident that all expectations will be met."

Trappier said there are good prospects for the upmarket jet. Yet, he remains "cautious due to the current complicated context".

Concerning the Middle East market, which seems to be the new focus, Trappier said Dassault business jets already fly in the region but he was optimistic that "the market must still grow".

The aircraft is now completing the ground-test programme and extensive systems checks before the maiden flight scheduled for early this year. Entry into service is expected in 2022.

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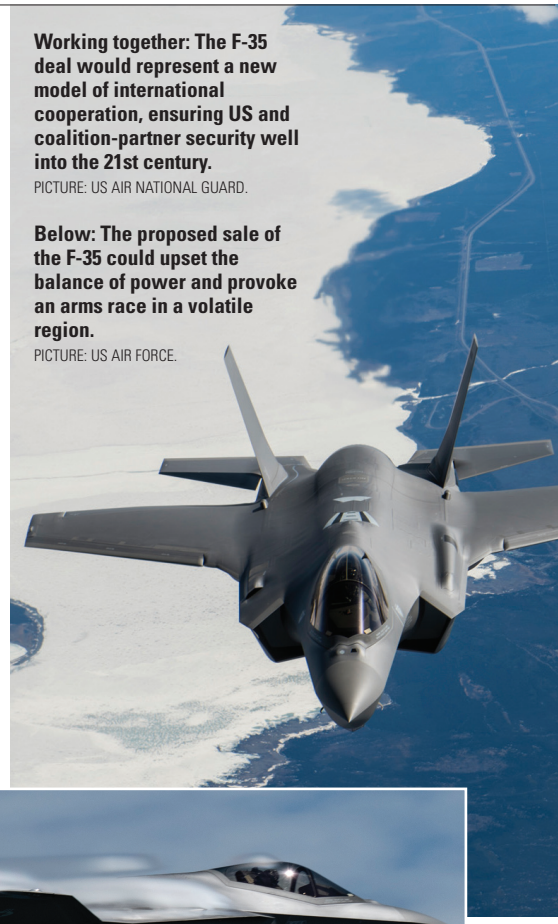
The UAE hopes to finalise a deal to acquire 50 Lockheed Martin-made F-35 fighters ahead of the 50th anniversary of the country's independence this year. **Jay Menon** *reports.*

F-35 deal could trigger arms race



Working together: The F-35 deal would represent a new model of international cooperation, ensuring US and coalition-partner security well into the 21st century.
PICTURE: US AIR NATIONAL GUARD.

Below: The proposed sale of the F-35 could upset the balance of power and provoke an arms race in a volatile region.
PICTURE: US AIR FORCE.

The UAE stands poised to become the first Arab state to acquire the F-35 fighter aircraft from the United States. It has been looking to upgrade its ageing fighter fleet since it pulled the plug on a Typhoon Eurofighter deal with the UK Government and failed to finalise a proposal to buy the Rafale from France.

Its Minister of State for Foreign Affairs, Anwar Gargash, said recently: "Our existing F-16 jets are now almost two decades old and it is time to renew them... We ought to get them (the F-35 fighters). The first time we made this request was six years ago."

On December 9, the US Senate endorsed the Trump administration's last-minute effort to sell a $23 billion arms package, including 50 F-35 jets, 18 armed MQ-9 Reaper drones, and armaments, to the Emirati military.

The UAE's ambassador to the US, Yousef Al Otaiba, who lobbied senators in the days leading up to the vote, said the F-35 would become the "frontline defence" for the UAE, US and partners. "It improves US-UAE interoperability and allows us to be more effective together. It makes us all safer."

According to Dr Emma Soubrier, a visiting scholar at the Arab Gulf States Institute in Washington: "The UAE's desire to acquire the F-35 is coherent with the state's militarised nationalism and its track record of high-tech armament acquisitions for international branding purposes, in addition to building national pride."

Military observers say the United Arab Emirates Air Force (UAEAF) operates a fleet of more than 60 Mirage 2000s and about 80 F-16E/F Desert Falcons.

Air power development

"Air power development has always been a priority for the Gulf states and is increasingly evolving in line with two key ambitions – power projection and economic diversification," Soubrier noted. "The new regional context since 2011 has presented challenges and opportunities for the UAE, Qatar, and Saudi Arabia and, indeed, pushed them to become increasingly active and assertive on the Middle Eastern stage.

"There is, indeed, value for Abu Dhabi in being able to claim that the UAE could be the first Middle Eastern country, other than Israel, to be considered a sufficiently reliable and credible military partner by the US to be allowed to purchase the coveted F-35," she added.

The proposed deal was made possible after the UAE and Israel announced that they would normalise relations, and particularly since they signed the Abraham Accords peace agreement.

While announcing the proposed sale on November 10, US Secretary of State, Mike Pompeo, said the deal "will make the UAE even more capable and interoperable with US partners in a manner fully consistent with America's longstanding commitment to ensuring Israel's qualitative military edge (QME)".

Because of the QME restriction, the Lockheed Martin-made F-35 has, so far, been denied to Arab states, while Israel has more than 25 of the type.

Saudi Arabia and Qatar have also expressed interest in these aircraft.

Turkey had been a partner in developing the F-35 but was expelled from the programme after concerns relating to Ankara's history as a client of Russia for acquiring the S-400 Triumf anti-aircraft missile system.

The F-35 is an upgrade to the US-supplied F-16 that President Bill Clinton first approved for sale to the UAE in 2000.

From the perspective of the US, an F-35 deal with the UAE presents opportunities in deterring Iran's more aggressive military posture in the Gulf. As Pompeo said: "This is in recognition of our deepening relationship and the UAE's need for advanced defence capabilities to deter and defend itself against heightened threats from Iran."

The US intelligence community estimates that Tehran's missiles are likely to keep growing in both power and technical sophistication, thus creating new strategic challenges for the UAE, the US, Israel and other partners.

However, the sale of the F-35 to the UAE is not without controversy.

The air power procurement in the Gulf will have notable impacts on the global arms trade and the power dynamics associated with it.

In fact, the US Defense Security Cooperation Agency reported "the proposed sale of this equipment and support represents a significant increase in capability and will alter the regional military balance".

With Pompeo warning that Iran could buy high-end non-stealth fighters, such as Russia's Su-30SM and China's J-10, and Tehran's interest in Russia's S-400 air-defence system, there could be a spur in regional demand for the stealth fighters.

"What we risk doing here is fuelling an arms race. Today we may be selling the F-35s and the MQ-9s to the UAE, but the Saudis are going to want it, the Qataris have already requested it, and it just fuels Iran's interest in continuing to build up its own military programming," warned US Democrat Senator Chris Murphy.

The UAE's alleged war crimes in Libya, as well as its oversight of torture facilities in Yemen, have raised ethical challenges to the proposed deal, and international human rights groups have called for a halt to the planned sale.

"The US must resolutely refrain from

> The air power procurement in the Gulf will have notable impacts on the global arms trade and the power dynamics associated with it.

supplying weapons that could be used in the conflict and not transfer weaponry to the UAE, or risk complicity in likely war crimes in Yemen," said Philippe Nassif, the advocacy director for the Middle East and North Africa at Amnesty International USA.

The country's tightening relationship with Russia and China has provided further grounds for criticism.

The New York Center for Foreign Policy Affairs (NYCFPA) has filed a complaint in the federal court in Washington against Pompeo for "rushing" the deal without proper oversight or justification. "The UAE's evident relations with China and Russia will put our military intelligence advantage at risk if such a deal is approved. There is no guarantee or provision that prevents them from sharing this proprietary knowledge," the group said in its complaint.

However, assistant secretary for political-military affairs, R Clarke Cooper, said the effect of the sale on the humanitarian crisis in the region was an ongoing consideration, but noted that the UAE "have proved themselves over and over again" to be a "partner that we could count on".

Cooper added: "The United States definitely takes these obligations seriously. We expect all recipients of US defence equipment to abide by terms of the letters of offer and acceptance, which again goes back to not just end-use, but also the protection of the technology and making sure that the equipment is not transferred, at least without our awareness or clearance, to third parties without our authorisation."

Ambassador Otaiba also pointed out: "The UAE has purchased and operated some of the most advanced US defence systems, including F-16s, Patriot and terminal high altitude area defence (THAAD) technology. The USAF F-35 squadrons are based in the UAE. The UAE has never compromised or shared this technology with an adversary or without US knowledge and approval."

Resolutions of disapproval

As a result of these numerous concerns, four bipartisan resolutions of disapproval were submitted before the Senate. Two of these were put to the floor, but votes fell short, notably failing to block the possible F-35 sale.

There remains the question of what the incoming Joe Biden administration can, or wishes, to do with regard to this sale. Tony Blinken, Biden's nominated secretary of state, has said the new administration will take a "hard look" at the deal, given the concerns voiced by lawmakers.

Then, in late January, President Biden announced that he had "temporarily paused" the sale in order to re-evaluate the decision made by the previous administration. Ambassador Otaiba said this move had been "anticipated".

Waiting for the letters of offer and approval and on the new administration choices, there still lingers a distant possibility that the UAE's F-35 oasis could turn into a mirage. ■

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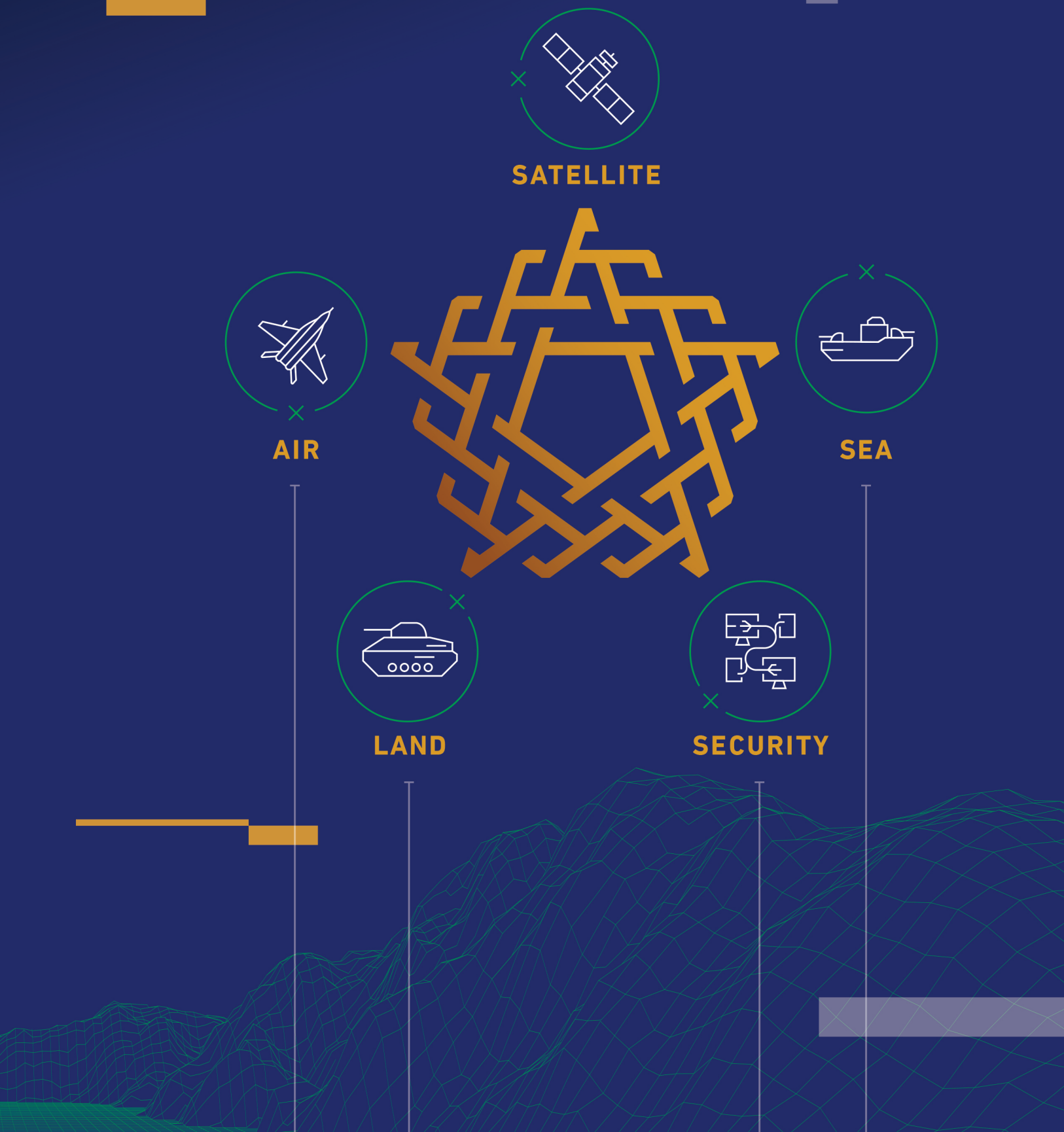

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Increasing interest: Of the 11 sectors on Saudi's critical list of priorities is building an indigenous UAV business on a much larger scale. King Abdulaziz City for Science and Technology (KACST) has developed several versions of its Saker family of drones.
PICTURE: ALAN WARNES.

PASSION, COMMITMENT AND LOYALTY… GAMI LAUDS ITS EMPLOYEES

MIRACLE WORKERS

The General Authority for Military Industries (GAMI) was launched in 2018 to catapult Saudi Arabia's military aerospace ambitions into 2030. Now, 30 months on, **Alan Warnes** *talks to the organisation's governor, His Excellency Ahmed Al-Ohali.*

When, in 2017, Saudi's Crown Prince Mohammad bin Salman launched his 'Saudi Vision 2030' strategy, he acknowledged that the country's oil wouldn't last forever. The need to reduce the country's dependency on oil meant a major restructuring of other industries in a bid to achieve diversity.

GAMI was formed in mid-2018 to regulate and boost the military sector. Its objective is to localise 50% of Saudi's military equipment and services.

To meet that goal, the organisation has big ambitions – oversee the development of industries, facilitate research and technologies, develop the workforce, enhance exports through the long-term planning of military purchases, and provide incentives to local manufacturers.

A top priority is boosting the domestic military industry sector, ensuring it becomes a key component in the economy.

Five national priorities are to be served. They include increasing military readiness, enhancing strategic autonomy, enhancing interoperability within and across entities, developing a local military

Continued on Page 30

CONTINUED FROM PAGE 29

industries sector, and increasing transparency and efficiency of expenditure.

So how are things progressing?

"Since the inception, we have built GAMI's internal infrastructures – the corporate structure, policies, strategies, procedures, and established the right connections with the stakeholders. We are now in operational mode," said Al-Ohali.

He believes his biggest achievement so far is employing people who understand their mandate and are fully committed, loyal, and passionate about the job. "Such a group will work miracles," he said.

As the industry regulator, GAMI is a public organisation, overseeing industry as well as research and development. "We are now looking for assistance from the champions of industry to create thousands of small and medium-sized businesses in either the kingdom's private or government sectors," explained Al-Ohali.

He pointed out that GAMI would provide the guidance, licencing and regulation to assist start-ups. Hopefully, in the future, it could also provide expert advice.

Dynamic sectors

Discussing the wide-ranging scope of the organisation's remit, he pointed out: "We are working with some very dynamic sectors – military operators, security services and ministries in Saudi Arabia. Then there are the foreign governments, with their armaments and technologies, and the original equipment manufacturers (OEMs), both international and local, that already cooperate or are interested parties in working with GAMI. We are in the middle of all that."

His Excellency definitely looks upon people as one of the major enablers to a successful military industry. "Our vision is to localise more than 50% of our armament expenditure and services by 2030. You cannot do this without the right human capital serving the whole industry, and solving the needs of research and development in Saudi Arabia. This is one of the key issues we are addressing, by establishing relationships with education institutions and research centres, both in the kingdom and globally."

Many local companies attending the Saudi International Airshow in 2019 wanted to bring more work in-country, like overhauling military helicopters and setting up flying training centres.

"Back then we identified 11 platforms in the industry that were critical to Saudi Arabia from a security and industry support point of view," explained the governor. "Fixed-wing MRO is one of them, as we work on establishing an industry that could be worth more than 30 billion riyal ($8bn) over the next decade.

"We have established a clear programme on localising each segment of these 11 platforms over the next 10 years. There is massive potential in what we are trying to build. We are looking to employ 40,000 people directly and another 60,000 indirectly. It's a big market and will be a huge contribution to our gross domestic product (GDP) by 2030."

PICTURE: GAMI

> **"Our vision is to localise more than 50% of our armament expenditure and services by 2030."**
>
> HIS EXCELLENCY AHMED AL-OHALI

Included among the 11 sectors are fixed-wing aircraft, helicopters, and UAVs, which will all require, for example, electronics, and maintenance repair and overhaul (MRO) facilities.

Al-Ohali believes UAVs are a key advanced technology, requiring mechanical parts, electronics, and possibly a radar, in addition to a payload. He wants to develop all these needs, and build an indigenous UAV business.

"What we want, within the mandate of GAMI, is to provide conventional and advanced military industries. However, they cannot be sustained without the proper technology transfer, intellectual property (IP) rights, and human capital. Without these three elements, the industry cannot be sustained," he said.

"Interoperability between various Saudi defence and research institutes is a must, as is creating a supply chain within the kingdom. At the same time, building relationships with other countries and international OEMs to access technologies and transfer of production capabilities is also important. The biggest challenge is putting all this together and building a strong plan at the same time.

"The 11 sectors identified as strategic are the most critical as we look to the next decade. We have seen several countries in the past seven or eight decades build up their military aerospace businesses, although our plans are more ambitious."

One example of a so-called industry champion is Saudi Arabian Military Industries (SAMI), which was established to kick-start the sector within the kingdom. It is one of 68 Saudi companies that have received a licence.

Funded by the kingdom's public investment fund (PIF), it is a manufacturing company, licensed by GAMI, and being supported with contracts.

But what about other key stakeholders and long-term partners, like BAE Systems and Boeing. Where do they fit into the GAMI strategy?

"We have strong relationships with these companies; they have been in Saudi doing great business for more than five decades," said Al-Ohali. "But I think now is the time for a better exchange of benefits between these OEMs and Saudi Arabia.

Include the exchange of IP and innovation

"Once the transactions were equipment for money; now I think it needs to include the exchange of IP and innovation, as well as investments across the country. That will be a win-win situation for all of us.

"We have established a very good industrial participation programme, which in the past was called the offset programme. We have changed it; we have built it in a way that OEMs can transfer technologies and operations to local companies, which allows OEMs to have better access to the Saudi market."

Last year, GAMI announced the World Defense Show (WDS), which will take place in Riyadh from March 6-9, 2022. Undoubtedly, this will help foster new relations with businesses in the future, as well as marketing GAMI's bright new world.

Al-Ohali believes WDS is coming at the right time, both for the kingdom and the global industry [with COVID-19 hopefully banished or in serious retreat].

"Saudi Arabia is one of the largest purchasers of armaments in the world. It is also one of the G20 economies and is situated in the centre of three continents. Coupled with its need to establish a presence in the military industry, WDS will be a global platform for our aspirations. It will bring all of Saudi's related parties, all the stakeholders from government entities, industry, business development, education, as well as their international counterparts, under one roof.

"It's an opportunity for the OEMs and foreign governments to exhibit their products or industries, while our existing, and interested, businesses can showcase their local capabilities for the supply chain. I think it's going to open a great opportunity for both sides," he concluded. ■

جسد واحد، روحان

تعتبر المقاتلة ايرماكي M-346 ذات التكلفة الفعالة من مقاتلات الجيل القادم المتقدم وصاحبة الريادة في مجال التدريب الجوي القتالي بالإضافة إلى قدرتها العملياتية المثبتة من قبل القوات الجوية الكبرى على مستوى العالم

كما تعتبر المقاتلة M-346 ذات الإصدار الهجومي من المقاتلات الهجومية الخفيفة التي تمتاز بالأداء العالي والتي تعتبر مناسبة لسيناريوهات العمليات الجوية الأرضية مع ذخيرتها الموجه بدقة بالإضافة إلى عمليات الإستطلاع الجوي التكتيكي

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SAMI CEO, Walid Abukhaled, has major aspirations for both his company and his country, as **Alan Warnes** *found out when the pair discussed strategy and future possibilities.*

THINKING GLOBALLY BUT ACTING LOCALLY

Saudi Arabian Military industries (SAMI) is set to harness the requirements of both the Saudi Government and its military.

Created in May 2017, to serve the goals of 'Saudi vision 2030', SAMI will localise at least 50% of the defence business, supporting the employment of around 40,000 people by 2030.

That's a considerable increase on the current 3-5% of locals being employed.

The Saudi Government knows that its oil will not last forever and is preparing for that eventuality by increasing its domestic industries, including defence. It means Walid Abukhaled, SAMI's CEO, has a huge task ahead of him. However, his background suggests there probably isn't a better man in the desert kingdom to take on the challenge.

Having served in senior management, with international companies like Northrop Grumman, General Electric, and BAE Systems, he knows the ropes.

"My strategy is simple; to establish a national defence champion in the kingdom that has never existed before," Walid explained.

Big splash: The first of five Avante 2200 corvettes, built for the Royal Saudi Naval Forces, is launched by Spanish shipbuilder, Navantia. SAMI and Navantia SA announced a joint venture – SAMI Navantia Naval Industries – in 2018.

Defence champion

"In the UK there is BAE Systems; in the US, because of its huge size and budget, there are four or five; Singapore has ST Engineering, and so the list goes on. However, there has never been a defence champion in Saudi – even though we were, until recently, the third biggest purchaser in military equipment. Now, we have SAMI."

Catering to all defence sectors – naval, land, aeronautics, weapons and missiles, defence electronics, and emerging technologies – SAMI is owned 100% by Saudi's Public Investment Fund (PIF).

Walid continued: "Although we are 100% owned by the government, we behave like any commercial company – if the business case doesn't make commercial sense, we will not pursue the business."

The Saudi market is undoubtedly an attractive proposition for any defence original equipment manufacturer (OEM) and, with one of the largest defence budgets in the world, it's easy to see why.

"So, my simple strategy is to establish strategic partnerships with the best-in-class globally, including the likes of Lockheed Martin, Northrop Grumman, Raytheon, Thales, L3Harris, and BAE Systems, among others.

> **"SAMI will localise at least 50% of the defence business, supporting the employment of around 40,000 people by 2030."**

"We have already established strategic joint ventures with some global players that we will announce at IDEX [the International Defence Exhibition to be held in Abu Dhabi from February 21-25]. These will provide us the global outreach needed for Saudi capabilities, where SAMI will deliver on its commitment to vision 2030, by localising 50% of the military spend, and by 2030, be among the top 25 military industries companies in the world."

Most international defence companies are aware of the transformation now taking place in the desert kingdom. They understand how SAMI will be a key strategic player if they want a part of the huge defence business there.

Walid explained that the management team has a 10-year strategic plan in place, up to 2030, that covers the requirements from each partner to deliver the key needs. He revealed that most joint ventures and acquisitions would be in place by the end of 2023.

On March 30, 2018, SAMI signed a memorandum of agreement with Boeing, which could be one of its biggest partners. A proposed joint venture, aimed at localising more than 55% of the maintenance, repair and overhaul (MRO) services for fixed and rotary-wing military aircraft in Saudi Arabia, has not yet been completed, according to the SAMI CEO, although discussions are still on-going.

On BAE Systems, Walid said: "They have been here for around 60 years and discussions with them over collaborations are ongoing. There's interest from both parties to find the right opportunity to take our relationship to a new strategic level."

Could Saudi Arabia join BAE Systems and become part of the UK-led Tempest Future Combat Air System (FCAS)? "Well, that has to

PICTURE: SAMI.

> My strategy is simple; to establish a national defence champion in the kingdom that has never existed before.
>
> WALID ABUKHALED

be a government-to-government decision, and is not up to me – I will always look to our leadership for direction, but anything that advances and accelerates the achievements of our objectives would be considered," he said.

It's obvious that many of the strategic partnerships will come from the needs and acquisitions of the Saudi military. "Once we have established what we are going to buy, then we will work with the companies to see how we can transfer the right capability to the kingdom, start putting it into our facilities, and feed our subsidiaries."

Strengthening local capabilities

Acquiring and then strengthening Saudi's local capabilities is a top priority if the country wants to attract the best technologies. SAMI has already started on this journey with the purchase of Advanced Electronics Company (AEC) in late-December, considered to be the 'crown jewel' of Saudi's military industries.

"Acquiring AEC is a prime example of how this will work. It has more than 2,200 employees, three factories, seven production lines, and 59 products, and is undoubtedly the best defence electronics company in the region."

Walid is excited about AEC and how it will build SAMI's future, but what can his organisation do for AEC?

"Our plan is to move it from being a great company to an even greater company with the help of our strategic partners, by transferring knowledge and know-how into AEC," he explained. "By feeding them projects and business that SAMI and its partners win, AEC will not only deliver capability to the kingdom's military, but become a global company within our strategic partners supply chain."

For example, AEC has been providing a system to a US-built platform that the CEO wouldn't disclose. The Saudi Government doesn't use it and the US does [and exports it]. "It means they are supplying parts, and with SAMI being the national defence champion with global strategic partners and the capability to strengthen the local defence ecosystem, AEC will become a bigger part of the global supply chain."

Being focused on its core strategy of merger and acquisition, more Saudi companies are coming under the SAMI spotlight.

Negotiations and discussions to acquire Alsalam Aerospace Industries Company (AAI), the company set up by Boeing as an offset, with its MRO facilities, have been ongoing for a while now. "We are going through the due diligence and, as soon as we complete this, we will make a decision to proceed or not," said Walid.

"MRO is a definite requirement of our customer and it is keen to have such a capability."

With so many helicopters being operated by all the militaries and civilian companies in Saudi Arabia, there is an urgent need for helicopter MROs. "It's a requirement and its part of the SAMI strategy to bring that capability to the kingdom. So it's progressing and we are working on it.

Another company is Taqnia, also now owned by the PIF, which had huge aspirations to build UH-60s in the future. "It's a sister company, and we work with them to complement their capabilities.

Defence champion

"You won't be surprised to learn that we also want to build our own helicopters here to cater for the needs of the land forces, air force, naval forces, national guard, and others, which have huge requirements. We are in discussions with several OEMs – Airbus, Boeing, Lockheed Martin and Leonardo – to set up production facilities in country. We need to be realistic, the best place to start is MROs, then we will move towards getting into helicopter design and then into production."

UAVs is another area that Walid believes SAMI can move into. "We know it's the future and, with new generation fighters likely to be unmanned, we need to be there," he said.

And, talking of the future, I asked him about exporting all the new products he is hoping to launch.

"My focus is delivering to our key customer, which is the Saudi Arabian armed forces. When they are satisfied and we have delivered what's required, we will then look at the export markets. But that could be some way ahead."

The SAMI CEO concluded: "These are inspiring times and, with a new generation of Saudi youngsters, both male and female, who want to be a part of advanced technologies, we will have an outlet for their skills." ■

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Lebanon's air force has increased its use of helicopters to provide offensive capability and the element of surprise. **Alan Warnes** *reports.*

Lebanon turns support into attack for the battle against terrorism

Lebanon has faced its fair share of problems in recent times. Civil wars and continued external interferences have made it a difficult place in which to operate.

Over the past 20 years, with the burgeoning threat from Islamic terrorists, the Lebanese Air Force (LAF) has had to rise to the occasion by shifting veteran helicopters from the support role to the offensive.

LAF commander, Major General Ziad Haykal, provided more detail at the virtual Manama Air Power conference in Bahrain, late last year. "We have used helicopters increasingly, over the years, to strike back at the terrorists, not only providing us with an offensive capability but also an element of surprise," he revealed.

The commander, a helicopter pilot himself, told how LAF Hueys were used to insert special operations troops behind enemy lines, fighting for eight days during what is known as the El-Donniyyi clashes in 2000.

Bomb surprise: Incredibly, a LAF Huey was loaded with a 400lb bomb to rout terrorists at the Al Bared refugee camp. PICTURE: LAF.

Seized a Lebanese army base

During another confrontation, in 2007, militants from the Al Bared refugee camp seized a Lebanese army base close by, killing 27 soldiers. To hit back, Hueys were loaded with 250kg bombs, and one even dropped a 400kg bomb!

Amazingly, the helicopter was put on two concrete blocks and the big bomb from one of the LAF's old Mirages was loaded between the skids. It worked well, according to the chief, with the Huey dropping the bomb on insurgents who had earlier taken hostages.

"The challenge was to hit targets on one side of the refugee camp, where their hideout was, without hurting friendly forces who, in some cases, were just 50 metres away. It's highly unusual to drop unguided [250 and 400lb bombs] but it was a priority and the risks were acceptable," he said.

In more recent times, the LAF has also converted several of its IAR 330SM Puma utility helicopters into the attack role.

From 2013-17, the Lebanese armed forces faced countless confrontations with Islamic State and its terrorist affiliates along Lebanon's eastern border with Syria. In one instance, the terrorists captured 14 soldiers and, sadly, executed them.

"The Puma weapons upgrade included two 30mm Aden cannons and two 68mm SNEB rocket launchers. Under the cover of darkness, with the pilots using night vision systems, the helicopters attacked targets illuminated by an armed Cessna 208B Caravan," the commander revealed.

The LAF's role to maintain security often finds the helicopters working with soldiers to track down people smuggling narcotics and other banned goods. "These criminals and terrorists hide among the civilian population, so we make avoiding collateral damage a top requirement," said Haykal.

Limited capabilities

The Lebanese experience has relied on surprise to make up for the limited capabilities of its available assets. New tactics also saw the LAF's AC 208 Caravans designate targets for guided copperhead missiles when surgical precision attacks on the enemy were needed.

Against the backdrop of a long-lasting economic crisis, the US has backed Lebanon and its fight against terrorism in recent years. This led to the US Department of Defense funding the LAF's purchase of six Sierra Nevada/Embraer A-29Bs, along with the training of personnel. The counter-insurgency turboprop aircraft are armed with precision-guided munitions (PGMs) and BAE advanced precision kill weapon systems (APKWS) laser rockets. The first pair were delivered in October 2017 and the remaining six the following May.

Haykal is now looking forward to receiving six MD530F+ light-attack helicopters. "They, too, will be equipped with the APKWS and, in parallel, we have recently established a joint terminal air controller (JTAC) training unit to ensure the proper integration of capabilities to meet the needs of the ground units," he explained. "The tactics we have developed mean the small helicopters can fire smart weapons suitable for asymmetric warfare against terrorism." ■

Upgraded: The LAF refitted its utility IAR 330SM Puma helicopters to fire 30mm Aden cannons and 68mm SNEB rockets against Islamic State. PICTURE: LAF

Under fire: Libyan Air Force Mi-25 854 was captured by Free Libyan Air Force and shot down by pro-Gaddafi forces in April 2011.
PICTURE: ROB SCHLEIFFERT.

Golden Hind's long voyage

It is almost 50 years since the Mil Mi-24 assault helicopter entered service, beginning in 1972 with the Soviet Air Force. Given the NATO reporting name Hind, its first operational use was in the 1979-1989 Soviet-Afghanistan War, when it was christened the 'Devil's Chariot' by the Mujahideen guerrillas. Today, as **David Oliver** *reports, the Hind is being used in the civil wars in Syria and Libya, and by Algeria against jihadist militants.*

Algeria took delivery of 20 Mi-25s – the export version of the Mi-24D – in 1980, plus a similar number of Mi-24Vs, which operated against various Islamist rebel groups during the 1991 to 2002 civil war.

A total of 30 were extensively upgraded to SuperHind Mk.IIIs by the South African company, ATE, now part of the Paramount Group. They were equipped with modern western avionics, countermeasures and electro-optical/infrared (EO/IR) sensor systems.

Recently, they have been in action against the Nusrat al-Islam fighters affiliated to Al-Qaeda in Mali.

More than 40 Mi-25s were delivered to Syria during the 1980s and, in June 2011, Syrian Arab Air Force Mi-25 crews were among the first to participate in the Syrian Civil War, when they were ordered to attack defecting army units in Idlib province. Losses soon mounted.

In 2020, less than 20 Syrian Mi-25s were believed to be operational, with 766 Squadron at Dmeyr and 765 Squadron of the 30th Helicopter Brigade at Almazza. There's another unit based at Blei Air Base, while several are permanently detached to other air bases.

Russian combat operations in Syria, following a request by the Syrian Government for military aid against rebel groups, began in September 2015, with more than a dozen Hinds deployed to Humaymim Air Base.

A Russian Air Force Mi-35M, the latest variant of the Hind, crashed in July 2016 during a rocket attack against Islamic State in Syria and the Levant (ISIL) positions near Palmyra, and a Russian Mi-24P crashed in December 2017, when it hit power lines in Hama province.

Five years later, the Russian Air Force is still operating in Syria. In September 2020, two US Army AH-64 Apache helicopters were shadowing a Russian military police convoy when it was reported that a Russian Mi-35M and a Mi-8 helicopter intervened, forcing the Apaches to retreat.

Top-notch: Algeria operates a fleet of SuperHind Mk.IIIs, Mi-24s upgraded by the South African company, ATE, now Paramount.
PICTURE: DAVID OLIVER.

The final few: Surviving Syrian Arab Air Force Mi-25s are being used against rebel forces in the ongoing civil war.
PICTURE: DAVID OLIVER.

Some 40 Mi-25s and 12 Mi-35s were delivered to Libya between 1982 and 1983 and the Libyan Air Force used them during its numerous interventions in Chad's civil war.

The Hinds were first used in October 1980 in the battle of N'Djamena, where they helped the People's Armed Forces seize the capital. Six were lost over Chad during the next five years.

The Libyan Air Force Hinds were used by both sides to attack enemy positions during the 2011 Libyan civil war. A number were captured by the rebels, who formed the Free Libyan Air Force.

During the battle for Benina Airport in February 2011, one Mi-35 was destroyed on the ground and another was captured by the rebels.

Two Mi-35s operating for the pro-Gaddafi Libyan Air Force were destroyed on the ground in March 2011 by French aircraft enforcing the no-fly zone during Operation Unified Protector.

One Free Libyan Air Force Mi-25D violated the no-fly-zone in April 2011 to strike loyalist positions in Ajdabiya. It was shot down by ground forces.

After the overthrow and death of Gaddafi, the Libyan National Army and Air Force were disbanded but re-established in 2012. However, by 2015, Libya's military had split into two factions, the self-styled Libyan National Army (LNA) and the UN-backed Government of National Accord (GNA).

The country slid into a second civil war with the two factions operating their own emasculated air forces with, between them, no more than 30 serviceable aircraft, including a few Hinds. These aircraft are largely flown and maintained by mercenaries.

Three Mi-24Ps were bought by the UAE from Belarus and delivered to the LNA at Marj in April 2015.

In April 2019, the eastern-based LNA attacked the stronghold of the internationally recognised GNA in Triploi. However, that action failed.

In April 2020, an LNA Mil Mi-35 was shot down near Misrata and another Mi-35 was captured when GNA forces took the LNA's strategic al-Watiya Air Base in May.

In September 2020, an LNA MiG-29 was shot down by GNA forces and its Russian mercenary pilot was rescued by an LNA Mi-24 Hind. A few days later, another LNA Mi-24 crashed near Al-Jufrah Air Base, killing four Russian mercenaries on board. ■

With the global pandemic showing little sign of abating, many defence industry experts will be hugely interested in events happening at the International Defence Exhibition (IDEX) and Naval Defence Exhibition (NAVDEX) taking place at the Abu Dhabi National Exhibition Centre (ADNEC) from February 21-25. **Alan Warnes** *reports.*

GREAT IDEXPECTATIONS

The organisers have been adamant for months that the biennial event will go ahead, making it the first major show in the sector since Singapore in February 2020, which took place just as Covid-19 was starting to gain a foothold.

All international participants are exempt from the usual quarantine restrictions when they show their event pass on arrival at the airport. However, there will still be a need for a negative Covid-19 test before travel and then another upon arrival, followed by a day in self-isolation waiting to receive the results.

The usual precautions, like sterilising points and social distancing, in addition to thermal checks, will continue when the floor is open.

However, the precautions should be worth it as there will be plenty to marvel at.

Abu Dhabi's Edge, the exhibition's strategic partner, will boast its largest presence at a key Middle East defence exhibition, with at least 10 new products to be launched.

Strengthen defence needs

The business, established in November 2019 to strengthen the country's defence needs, is set to exhibit more than 50 core capabilities in platforms and systems, missiles and weapons, cyber defence, electronic warfare and intelligence, and mission support.

In December last year, Edge was highlighted by the Stockholm International Peace Research Institute (SIPRI) think tank as being one of the top 25 defence businesses in the world.

Another UAE business, Calidus, will probably also display its B-250 turboprop trainer/light attack aircraft, which was unveiled at the Dubai Airshow in 2017.

The UAE Air Force and Air Defence (UAEAF&AD) announced its intention to acquire 24 B-250s, in a deal worth AED 2.274 billion ($620 million), at 2019's Dubai Airshow, although no delivery details were given.

Since then, design flaws have allegedly surfaced with the aircraft, which the company has spent much of the past year rectifying.

There has also been speculation of a bigger B-350 version being launched but Calidus has, to date, made no comment on this.

Elsewhere in the region, we are likely to see plenty from Saudi's General Authority for Military Industries (GAMI), now tasked with regulating and boosting Saudi's military industries as part of the 'Saudi Vision 2030'.

GAMI announced next year's World Defense Show last July, and is likely to be officially launching that event at IDEX.

Saudi Arabian Military Industries (SAMI) will also be present, and probably Alsalam Aerospace Industries as well. It will be particularly interesting to find out how Alsalam, jointly owned by Boeing, sits with SAMI under the GAMI vision.

In the international arena, US giants, Lockheed Martin and Boeing, will be taking up a lot of stand space. With so much speculation about the UAE purchasing up to 50 F-35A Joint Strike Fighters, there is bound to be a lot of media interest on the topic – we might even see an announcement!

Dazzling: One of the event highlights will be the air power demonstration. In 2019, a UAEAF&AD C-17 made this spectacular departure, jettisoning flares from the rear. PICTURE: ALAN WARNES.

Speculation coming out of Washington, now that Israel and the UAE have signed a peace deal, is that the Emirates will sign a deal soon.

Boeing will undoubtedly have lot to say too, particularly about the new US Air Force F-15EX, the latest enhanced version of the multirole Eagle.

Technologies and capabilities

This latest variant builds on the technologies and capabilities of the F-15QAs that are set to be delivered to Qatar, with the first expected in-country during March.

The new T-7A Red Hawk jet trainer is also expected to gain a lot of attention, as the Middle East looks to enhance its future flying training needs – another option for the UAEAF&AD.

The jewel in Saab's marketing crown in the UAE is, of course, the GlobalEye airborne early warning and control (AEW&C) jet. With two delivered last year, of three on order, the UAEAF&AD signed a $1.08 billion deal with the Swedish aerospace giants on December 30 for two more aircraft.

Leonardo will be marketing both its M-345 basic jet trainer, the first pair were delivered to the Italian Air Force at Lecce-Galatina in December, and its sister M-346 advanced jet trainer, currently serving the air forces of Israel, Italy, Poland and Singapore, and the International Flight Training School. ■

PICTURE: UK PARLIAMENT 2021

Jeremy Quin, *UK Minister of State for Defence Procurement, discusses the importance of both IDEX and the relationship between the UK and the UAE.*

UAE-UK LINK MORE VITAL NOW THAN EVER

IDEX is one of the most important events on the global calendar for the UK defence industry and the 2021 event is, arguably, the most important to date.

This year the UAE celebrates its 50th anniversary and I offer my sincere congratulations on this important anniversary. I am delighted that our governments and industries are strengthening our relationship to make the next 50 years an even greater success for our two nations.

The UK's themes at IDEX 2021 focus on:

- Innovation;
- Partnership; and
- Opportunity.

These underpin many of our relationships across the region as, together, we develop capabilities to respond to regional and global issues.

Covid-19 has presented a unique challenge in the past year, making it a difficult and uncertain time for the world. However, I am proud of the exceptional way in which the UK defence community has risen to the challenge, be that through maintaining supply chains or keeping a high operational tempo.

Some of the companies who have contributed to the national and global Covid-19 effort will be at IDEX. These include BAE Systems and QinetiQ, who helped to manufacture medical ventilators and personal protective equipment (PPE) and have demonstrated that the UK can innovate to respond to new challenges, while simultaneously ensuring that supply chains were resilient, reinforcing our credentials as a reliable and trusted partner.

The pandemic has proven that partnership and trust between government and industry can achieve significant success and we are keen to ensure that defence and security innovation is at the forefront of the global effort to bounce back from the devastating impacts of Covid-19.

Innovation is at the heart of the UK's defence and security industry. The UK stand at IDEX will showcase and promote the very best of British innovation and achievement and I hope this event will be an opportunity to facilitate new industrial partnerships and promote the opportunity that the UK presents for new and existing partners.

Best of British: The UK's future combat air system (FCAS), which includes the Tempest concept aircraft.
PICTURE: BAE SYSTEMS.

The UK's investment of around £2 billion ($2.73bn) in the future combat air system (FCAS) demonstrates our commitment to our combat air industry and staying at the cutting-edge of future technology through research and development.

Our FCAS programme will continue to deliver ground-breaking technologies and capabilities to meet future threats through a radically transformative acquisition programme. It will play a crucial role in the security and prosperity of the UK for decades to come, sustaining vital skills to drive our world-leading industries and deliver our next-generation combat air capabilities.

Space is one exciting example of where the UK excels in innovation and where it is keen to seek new partnerships. Last year's launch of the UAE's Mars Hope probe is an incredible demonstration of the vision and ambition that exists in the region, creating opportunities for further exploration and partnership.

The UK has been a world-leader for many years in secure and jam-resistant global satellite communications, and we have recently placed an order for the first in the next-generation SKYNET6 satellites with Airbus Defence and Space (UK).

The UK Ministry of Defence is also investing more in cutting-edge British space technologies, building on the success of the Carbonite 2 spacecraft, which achieved a world-first in returning HD colour video from a commercial satellite in low-Earth orbit. You can see an example of the Surrey Satellites Carbonite 2, and the imagery it relayed, on the UK Pavilion.

Visitors to the event will find it hard to miss the presence of the Royal Navy and I am delighted to welcome them alongside at NAVDEX.

The Royal Navy plays an important role in the security of the Gulf, protecting our maritime interests and helping to ensure freedom of navigation through the Strait of Hormuz and beyond.

Our success in the maritime domain, and recent Type-26 partnerships with Canada and Australia, positions the UK for future agreements.

Finally, 2021 marks the 30th anniversary of the liberation of Kuwait, an event that serves as a reminder of the importance of a strong and united Arabian Gulf region. As we all emerge out of Covid-19, we in UK Defence honour the sacrifices made by those who gave their lives to secure the liberation and freedom of the Kuwaiti people.

I am delighted the UK will have a strong presence at one of the pre-eminent events on the global defence stage. We are coming to IDEX 2021 to show our commitment to the exhibition and to listen and learn from our allies and friends, while working together for a safer future where industrial collaboration is at the heart of success. ■

With so many international events cancelled or postponed last year, IDEX has taken on a new importance for the post-Brexit British. **Alan Warnes** *and* **Steve Knight** *look at the UK involvement.*

A big deal: In 2019 IDEX attracted 1,300 defence companies and contracts worth $5.5 billion were agreed.
PICTURE: ALAN WARNES

UK'S SHOW OF STRENGTH

Two years ago, contracts worth a whopping Dirham (Dh) 20.5 billion ($5.5bn) were announced at IDEX. That's huge money and, if replicated this time, offers one of the biggest commercial opportunities of the year to the UK contingent heading for the Abu Dhabi National Exhibition Centre (ADNEC).

UK trade association, ADS, is supporting British business by hosting the UK pavilion. "IDEX cuts across land, sea and air. It's our biggest event in the Middle East," said ADS head of event operations, Christine Gomm.

Covid-19 has, of course, affected many companies who might normally have attended. However, UK companies from right across the military spectrum will still be there showing off an impressive array of high-tech products in the UK pavilion.

They include the likes of: Allen-Vanguard, Cambridge Pixel, David Brown Independent Forgings & Alloys, Leonardo, MDH Defence, Pearson Engineering, PW Defence, QinetiQ, Qioptiq, and Silent Sentinel.

Small satellite company

Surrey Satellite Technology Limited (SSTL), the world's leading small satellite company, will also be at the show displaying details of its Carbonite-2 technology demonstration mission on the UK Defence & Security Exports stand.

Headquartered in Guildford, UK, SSTL is part of Airbus. Since 1981, it has built and launched more than 60 satellites for 20 international customers, as well as providing training and development programmes, consultancy services, and mission studies for the European Space Agency (ESA), the US National Aeronautics and Space Administration (NASA), international governments and commercial customers.

Carbonite-2, launched in 2018, is the second technology demonstration mission in the series and provided the world's first commercial HD colour video from space.

The spacecraft is suitable for a wide variety of commercial, civil and security applications including:

- Change detection;
- Pattern of life assessments;
- Humanitarian and disaster management;
- Global high-resolution situational awareness;
- National security;
- Elevation model generation; and
- Infrastructure and asset monitoring.

A constellation of Carbonite satellites provides extremely high revisit rates over key areas of interest and robustness against weather conditions and target concealment. Imaging at different times throughout the day dramatically minimises the predictability of observations.

In the UK pavilion, not all the companies are household names. However, they have all built up substantial industrial businesses and reputations.

For example, Tewkesbury-based Allen-Vanguard, which has its headquarters in Ottawa, Canada, specialises in electronic warfare. It launched the Ancile counter-drone system in 2017.

In June 2018, the system was deployed to create an electronic shield around the G7 summit in Quebec, to ensure the safety of world-leaders.

With drones becoming a big threat in the Middle East – a Saudi oil refinery was attacked by Iranian drones in September 2019 – the Ancile is undoubtedly attracting interest.

> **"IDEX cuts across land, sea and air. It's our biggest event in the Middle East."**
> CHRISTINE GOMM

Radar technology

Meanwhile, Cambridge Pixel's radar technology is used in naval, air traffic control, vessel traffic, commercial shipping, security, surveillance and airborne radar applications.

Its systems have been implemented in mission-critical applications with the likes of BAE Systems, Frontier Electronic Systems, Blighter Surveillance Systems, Exelis, Hanwha Systems, Kelvin Hughes, Lockheed Martin, Navtech Radar, Raytheon, Saab Sensis, the Royal Thai Air Force, Sofresud and Tellumat.

QinetiQ works across air, cyber, maritime and land domains, and, according to a company spokesperson, "collaborates with partners and customers to enable current and next-generation defence assets to perform at their best in a landscape of asymmetric and unforeseen threats".

The Farnborough-based company won a £5 million ($6.8m) contract with the Royal Air Force in 2019 to help support infrastructure for the UK carrier strike group, which made its first cruise in late-September/early October last year.

Experts from QinetiQ and Inzpire, another ADS member based in Lincoln, have developed the capability to accurately track, control and debrief the upcoming major carrier exercises throughout 2020-21.

MDH Defence Solutions, based in Amesbury, Wiltshire, is a world-leader in the provision of chemical, biological, radiological and nuclear (CBRN) collective protection, fresh air filtration and environmental control for military platforms.

The company can draw upon 50 years of experience to provide extremely flexible but affordable and reliable solutions. ■

C-390 MILLENNIUM
SUCCESSFULLY ACCOMPLISHING MISSIONS
The C-390 Millennium multi-mission aircraft is in-service with Brazilian Air Force delivering exceptional performance and fulfilling all expectations, most notably with support during the Covid-19 pandemic. The C-390 is also the aircraft of choice for Portugal and now Hungary too. Both these air forces have selected the C-390 to meet their own unique and demanding operational requirements. By combining state-of-the-art systems and proven technologies with a worldwide network of reputable suppliers, the C-390 Millennium is a versatile addition to any air force. The C-390 is the most reliable, easy to operate and efficient aircraft in its class.
#ForADifferentWorld
C-390 MILLENNIUM
EMBRAER
LAUREATES AWARDS
DEFENSE SEGMENT
GRAND LAUREATE
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c-390.com
Photographic record made by the Brazilian Air Force on one of the missions to combat COVID-19 in Brazil.

Waiting for take-off: The demonstrator Rhaegal-A aircraft, based in California, was preparing to fly as *Arabian Aerospace* was going to press.
PICTURES: SABREWING AIRCRAFT.

ENTER THE DRAGON

A Saudi Arabian company has placed an order for more than 100 examples of the world's first heavy-lift unmanned freighter. **Alan Dron** *reports.*

In recent years, the idea of using unmanned vehicles to deliver urgent cargoes has taken hold in people's imaginations.

The initial machines used for this have been small, delivering even smaller packages.

Now, however, the Riyadh-based Arabian Development & Marketing Company (ADMC) has placed a major order for the world's largest unmanned freighter. Assuming certification proceeds as planned, deliveries are slated to begin as early as autumn this year.

The aircraft, the US-developed Sabrewing Aircraft Rhaegal-B ((Rhaegal is the name of a medieval English dragon), will deliver up to 4,500kg at ranges of up to 1,800km. Significantly, it will be designed to carry standard airline cargo containers – two LD1s or LD3s, or three LD2s.

A prototype has already been built, said Sabrewing CEO, Ed De Reyes. This Rhaegal-A will be a development platform for the full-scale Rhaegal-B.

First flight of the Rhaegal-A was scheduled for last June, but the global pandemic delayed the programme.

However, the company still hopes that the first Rhaegal-B will be delivered to Saudi Arabia around mid-2021, for certification by both Saudi and US regulators.

Power train

ADMC's senior aerospace/defence advisor, Steven Chikos, whose previous career highlights include designing the head-up display for the US Space Shuttle and the cockpit of the Northrop Grumman B-2 strategic bomber, points to the Rhaegal-B's power train as one of its main differentiators from other unmanned air vehicle (UAV) designs.

"We don't have helicopter-type rotors being driven by a 1,000lb [455kg] bank of batteries. Instead, we have two turbines powering generators that give us thrust to the ducted fans," he explained.

These turbines are Safran Ardiden 3s, which produce 1300-1500kW each. The ducted fans will swivel, allowing either conventional or vertical take-offs and landings. Together with upward-folding wings, these will allow the Rhaegal-B to get in and out of smaller clearings than a helicopter could handle.

In operation, guidance coordinates will be loaded into the aircraft's on-board navigation system. However, US and European regulations demand that aircraft such as the Rhaegal-B must be remotely monitored by an instrument-rated pilot from a command centre, who can change the aircraft's course if necessary via satellite communications, said De Reyes.

ADMC and Sabrewing are aiming for an ambitious certification procedure. This is scheduled for some time in 2021, which is remarkably fast, but is aided by the fact that certification of a cargo vehicle is usually much quicker than for a passenger aircraft, said Chikos.

ADMC will be responsible for sales of the aircraft in Saudi Arabia, the GCC nations and Africa.

Assembly plant

The Saudi company is seeking to build an assembly plant for the aircraft in the Middle East: "The Saudi Government is very keen to have technology transfer, so part of our mission is to train Saudi pilots and mechanics," said Chikos. "This will be part of our proposal."

When it comes to training the necessary pilots and mechanics to fly and maintain the Rhaegal-B, ADMC is in discussions with a major training academy, said company CEO, Ayman Zeibak. The plan is to develop a training facility in Riyadh; a further announcement on this is due early in 2021.

The initial plan is for a pilot to control a single Rhaegal-B but, as experience builds up, it is possible the pilot could simultaneously control up to four UAVs, said Zeibak.

An important part of Rhaegal-B's avionics fit will be 10 'detect-and-avoid' sensors, not only to recognise nearby aircraft but also to check that a remote landing zone is clear of obstructions. ■

A giant amongst unmanned vehicles

The Rhaegal-B is an unmanned cargo vehicle, powered by two Safran Ardiden 3 engines via four ducted, swivelling fans that allow the aircraft to take off and land conventionally or vertically.

It is designed to lift substantially more cargo than earlier-generation designs.

Rhaegal-B will lift up to 4,500kg in conventional take-off mode, or 2,454kg when employing vertical take-off.

It is 14.6 metres long, 4.6 metres tall, has a 17 metre wingspan (the wings fold upwards for vertical landings in confined spaces) and will have a cruising speed of 405kph/220ktas at altitudes of up to 6,700m, with a range of 1,800km/1,000nm. ■

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As lead operator of the new Boeing 737-700 FlexCombi freighter conversion, Bahrain-based Texel Air is looking towards more distant horizons, as **Alan Dron** *reports.*

COMBI UNLOCKS TEXEL'S LOADS OF POTENTIAL...

It was a not infrequent, but always frustrating, experience for Texel Air. A potential customer would contact the small freight airline's Bahrain International Airport base seeking a quote to move a cargo between the Gulf and Europe. "No problem," Texel Air would reply… "but we'll have to make a technical stop en route to refuel because of the range."

That would add both time and cost to the service. At which point, the client would look elsewhere.

That situation is now much less likely to occur, as Texel Air beds in the first of two Boeing 737-700 FlexCombi freighters, fresh from its makeover by Florida-based specialists Pemco Conversions.

The FlexCombi is based on the 737-700, a generation newer than the two 737-300F 'Classics' that Texel has used until now.

That immediately gives the airline a much-improved range/payload capability – typically, the ability to haul a 10- to 12-tonne payload for 6.3 hours against headwinds. The 737-300 would only be able to carry nine tonnes and have to make a refuelling stop in order to complete the same trip.

Apart from its improved performance, however, the FlexCombi – as its name suggests – is a more flexible aircraft than the older pure freighters. A movable bulkhead means that the aircraft can be used either as a straightforward cargo-hauler or carry 12 or 24 passengers on the main deck in addition to freight.

In addition, it has a batch of other features not previously found on 737 cargo-carrying variants. These include a head-up display for the pilots, linked to a second-generation enhanced flight-vision system (EFVS) that gives the pilots visibility through cloud, fog or darkness, and which is particularly useful when the aircraft operates into small secondary or tertiary airports that do not have an instrument landing system.

"The decision behind that is connected with the longer range of this aircraft," explained George Chisholm, CEO of Texel's parent company, Chisholm Enterprises. "With the Classics, we were only three hours or less airport-to-airport, so it was pretty easy to judge the weather. But, once you start going on these longer routes, the weather can change while you're in the air."

The FlexCombi also has a flexible, retractable airstair at the rear fuselage door, for when the aircraft flies into small airports lacking stairs to roll up to the aircraft.

The US Federal Aviation Administration (FAA) granted the modified aircraft supplemental type certification last summer.

"The FlexCombi has been a great addition," Chisholm said. "The Classic is still a good aircraft, but they need a lot more care and attention.

"Pilots love the new aeroplane. They tell me they love sitting at 41,000 feet, which the Classics can't do. It takes them out of the weather."

Texel has always received a lot of requests for high-priority, high-value charters. "Now we can win a lot more of these charters because of the FlexCombi's extended range," enthused Chisholm.

"Between the Middle East and Europe, we would normally have to make a technical stop, usually in Cairo, due to prevailing headwinds. With that requirement now gone, it changes the dynamic of our operations. We can look at more

A CONVERSION THAT WAS WORTH THE WEIGHT

Creating the Boeing 737-700 FlexCombi was a significantly more complex task than other 737 conversions carried out by Pemco, according to the company's director of cargo conversions, Mike Andrews.

As with other freighter conversions, the aircraft's main deck flooring had to be beefed up to allow for different weight configurations. A new, large upward-hinging cargo door also had to be installed into the front fuselage.

However, the main point of difference between a regular freighter and the FlexCombi is that the latter includes a movable partition that allows the aircraft to be used as a pure freighter, or with a passenger compartment of varying size.

That means, for example, that all the overhead bins and passenger service units above the seats have to be mobile, allowing the aircraft to be converted to a new configuration within 24 hours. The rear galley and toilets are also retained.

That partition has to be movable, but also to have a tight seal between the cargo and passenger area so that, in the event of an onboard fire, fumes do not penetrate the division.

The conversion also requires an unusually comprehensive main-deck fire suppression system to be fitted, containing no fewer than seven bottles of halon.

The first FlexCombi was anticipated to take two years from initial design to in-service date. However, a combination of circumstances added a year to this. Apart from delays caused by the pandemic, the crash of two Boeing 737 MAXs brought a greater level of FAA scrutiny and oversight of the programme. Now that approval for the design has been obtained, future conversions should take four months. ■

Spacious: The interior of the newly converted 737-700, when used in full freighter mode.

Left: Texel Air personnel celebrate the arrival of the first 737-700 FlexCombi to the company's base at Bahrain International Airport.

Below: The FlexCombi design has a retractable rear airstair for use at airports with limited facilities. Note the short row of windows at the rear of the fuselage for the passenger compartment.

ALL PICTURES: TEXEL AIR

charters that, historically, we would just not have bothered to bid for.

"For example, we had a request for a flight direct from southern Europe to the Middle East for a six-tonne cargo together with 10 people to escort the load. It was equipment for a show and the engineers who were going to operate it.

"We're slowly rolling out what we can achieve – new airports, new destinations. It all sounds easy, but there's a lot to consider when flying into a new airport."

The aircraft's capability was also demonstrated on its delivery flight from Florida, when its routing included a 6.5-hour sector from Bangor, Maine, in the US to London Stansted, while carrying around six tonnes of cargo.

The demand to move freight during the global pandemic means the FlexCombi has, so far, been used in a pure freighter role. However, Chisholm anticipates that the aircraft's versatility will be a considerable bonus. One duty for which the airline receives requests, for example, is to move racehorses either around the Gulf or between the region and Europe. The expensive animals have to be accompanied by several grooms, who can now be accommodated in airline-standard comfort.

The new aircraft also has a 180-minute extended range twin operations (ETOPS) rating, meaning that it can tackle much longer overwater sectors. "We've had a lot of charter requests from the Maldives, for example," said Chisholm. "As the bird flies from here, the Maldives actually aren't that far, but with the Classics we had to go via Pakistan and India, as we had to stay within 60 minutes of an airfield."

Texel is now awaiting delivery of its second FlexCombi. The 2005-vintage aircraft, formerly used by Dutch low-cost carrier, Transavia, was ferried to Pemco's facility for conversion in November 2020. "The Pemco guys sent me a note saying it's one of the cleanest aircraft they've ever seen come in for conversion," said Chisholm.

It is expected to enter service in summer 2021 and the two FlexCombis are likely to replace Texel's existing two 737-300s, which are undergoing some heavy maintenance now that the first new arrival can take up the slack.

So promising has the first new conversion been that the Bahraini company is already looking at the possibility of a third example. ■

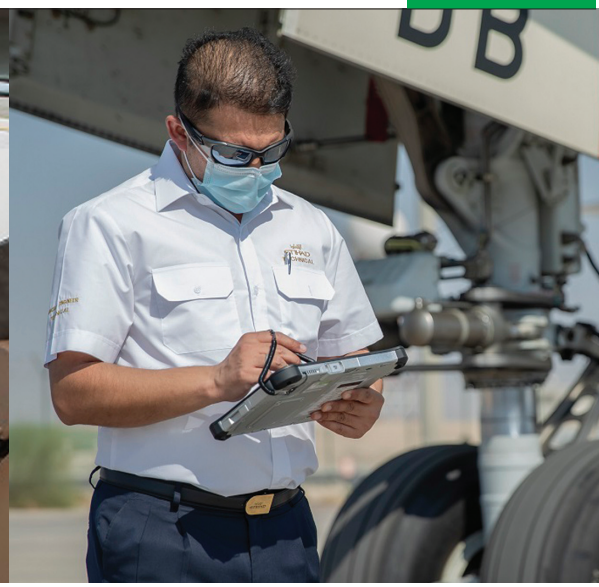
The magnificent seven

The new Boeing 737-700FlexCombi gives its operators the option of seven different internal configurations:

- **'Full cargo', with pallets in eight positions.**
- **Combi 1, with seven cargo positions and 12 economy-class seats.**
- **Combi 2, six cargo positions and 24 economy-class seats.**
- **Combi 3, six cargo positions, 12 economy-class and four business-class seats.**
- **Combi 4, six cargo positions with eight business-class seats.**
- **Combi 5, seven cargo positions with four business-class seats.**
- **Medevac, with six cargo positions, two medical beds and six economy-class seats.**

Other features include a removable smoke barrier, removable overhead bins, forward and aft fully equipped galleys, rear airstairs, an internal security camera system, and a 180-minute ETOPS rating.

The FlexCombi has a payload of 35,000lbs plus 12 seats in the rear of the fuselage, or 42,000lbs in a pure cargo layout. ■



Immediate information: New electronic technical (eTech) logs give Etihad Airways' technicians and flight crew a paperless real-time operational data loop. PICTURES: ETIHAD AIRWAYS.

Digitalisation of the maintenance, repair and overhaul (MRO) industry is slowly gaining pace, but the haphazard manner of its advance and the shortage of common standards mean the full benefits may remain elusive. **Chuck Grieve** *reports.*

The missing digilink

Digital transformation promises significant benefits for MRO, from predictive maintenance to seamless integration of operations, but the aviation aftermarket has been slow to embark on the journey.

Ali Baghchehsara, a specialist in cognitive systems and artificial intelligence (AI), puts it down, at least in part, to a shortage of people with AI expertise in the context of aircraft and aviation, which affects the original equipment manufacturer (OEM) side as well.

"It's still either/or," he said. "People are experts in operations, how the aftermarket business works and the issues they see daily, or they understand AI and know how to code. For transformation to happen, you need that link. This is missing in MRO."

What's also missing are common standards without which, he said, the apps and algorithms being developed independently "will be very difficult to coordinate".

But Baghchehsara, who co-founded the Germany-based LISA Group, is doing something about this in a key area – predictive maintenance.

LISA, which is active in five countries, including the UAE, leads the independent predictive maintenance standardisation committee 2 (PMSC2), working with several airlines and MROs to develop an industry-standard interface.

Supporting that effort is Aviation Giga Hub, a LISA Group spin-off described as a universal data exchange platform that gives users a one-stop shop for managing the whole data pipeline. It hosts more than 150 apps, which provide advanced analytics services through AI, machine learning, e-learning etc.

On the horizon, the use of the secure track-and-trace blockchain tool is said to hold promise of savings, which international professional services company, PwC, estimates at about 5%, or $3.5 billion, in MRO costs globally.

The fledgling MRO Blockchain Alliance, a group of seven organisations covering the MRO supply chain from parts manufacture and repair to logistics and smart contracts, has carried out important proof-of-concept work on key digital thread and digital passport components of the tool.

The digital thread provides the real-time status, chain of custody and back-to-birth track-and-trace of the part. The digital passport – like a human passport – provides the indisputable identity of a part and contains other vital data, such as certification of airworthiness, to prove ownership.

Speaking at a virtual conference in November, Andre Fischer, chief executive of alliance member, FLYdocs, said two trials successfully completed in mid-

Continued on Page 50

Ali Baghchehsara: "People are experts in operations, how the aftermarket business works and the issues they see daily, or they understand AI and know how to code. For transformation to happen, you need that link." PICTURE: ALI BAGHCHEHSARA.

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CONTINUED FROM PAGE 48

2020 demonstrated secure lifetime tracking and change of ownership of aircraft components.

Another blockchain proponent is Tristan Whitehead, chief executive of London-based technology company, Enspan, who believes investing in the effort to create a paperless supply chain would be well worth it. He believes if companies viewed the supply process from the perspective of the part, not their company, a mountain of paperwork could be eliminated.

In conversation with global parts supplier, Satair, Whitehead explained that digital documents automatically generated from transactions, encrypted and digitally signed, would produce greater transparency between trading partners. Multiple companies could store logistical, operational and technical information against the part batch/serial number; access to the information would require the blockchain key.

Martin Lidgard: Aviation has always been "a bit behind the curve" in adopting new technology.
PICTURE: WEB MANUALS.

Gary Vickers: "Often planners are facing situations where there is no right answer; there's no optimal one."
PICTURE: AEROGILITY

Paul Page: "By seeing the operational impact on fuel, and also on the health of the aircraft and various systems, you can really assess the total impact of costs."
PICTURE: HONEYWELL AEROSPACE.

It boils down to trust between supply chain parties, he said. "When information concentrates at organisational boundaries, it cannot be used to solve much more significant 'ecosystem-wide' challenges."

An intermediate step toward blockchain is the digitisation of existing paper documentation and, on this front, a Swedish-American venture called Web Manuals is making a name for itself with an approach that it is promoting as a potential industry standard.

Tidal wave of digitisation

Founder and chief executive, Martin Lidgard, said aviation has always been "a bit behind the curve" in adopting new technology. "As a whole, we've seen a massive tidal wave of digitisation going through pretty much all industries," he said, and the enforced stand-down of Covid-19 gave aviation "the opportune moment to catch up".

As for the company's ambitions, Lidgard says its current customer base – which has jumped by a third in this "very challenging period" to 330 companies – represents at least 50% of the estimated 500-600 operators in the world, who have started digitising their operational manuals with a purpose-designed tool.

Among them is Sharjah-based Alpha Aviation Academy, whose general manager, Captain Nadhem Al Hamad, said the academy has found Web Manuals to be "a great online solution". Its comprehensive approach to document changes "has supported our business continuity activities, which are now speedier and hassle-free".

In Abu Dhabi, Etihad Airways has taken a step toward paperless operations with implementation of electronic technical (eTech) logs across its Boeing 777 freighter fleet.

The digital solution, approved by the General Civil Aviation Authority (GCAA), replaces paper logbooks traditionally used to document flight and maintenance information, creating a closed loop of real-time data capture from flight crew and line maintenance technicians.

Paul Kear, Etihad's senior vice-president technical, said: "The digitalisation of our technical logs will go a long way toward enhancing the operational efficiency and airworthiness of our fleet... a monumental step forward for aviation in the UAE."

The airline plans to introduce eTech logs, supplied by mobile solution provider Conduce, on the rest of its fleet in 2021.

Honeywell Aerospace believes a "holistic approach" will accelerate digitisation, and cites the widespread use of its Forge integrated analytics platform as evidence that it is happening in Middle East MRO.

Paul Page, the company's Dubai-based solution architect, said the platform draws on an information lake filled with data from roughly a third of the total number of operational aircraft around the world – including all the Middle East airlines – to derive "actionable insights" into individual fleet operations.

His personal view is that the caution of airlines and MROs in deploying and relying on such technology derives from previous attempts "where solutions, unfortunately, have not yielded the promised results".

Honeywell Forge is designed to make it easier for customers to automate the collection of their operational data and make sense of it in a secure environment, and then give them the ability to derive "actionable insights" from that data.

For example, Forge's predictive and prescriptive maintenance application can relate the relative costs of landing with less thrust reverser and more braking, showing savings on fuel but adding wear to undercarriage systems. "By seeing the operational impact on fuel, and also on the health of the aircraft and various systems, you can really assess the total impact of costs," said Page.

Short-term strategies

Another point of view on planning comes from Gary Vickers, chief executive of UK-based Aerogility, which combines AI-based planning and predictive analytics software.

He suggests the short-term MRO strategies forced on airlines in 2020 will be part of re-entry into service plans for the foreseeable future. He said his contacts are reviewing their plans "almost on a daily basis" as they grapple with a constant stream of information and the "trade-offs" implicit in decisions they're making.

"Often they [planners] are facing situations where there is no right answer; there's no optimal one. Sometimes, unfortunately, they're just looking for the least-worst option."

A fundamental capability in uncertain times, said Vickers, is agility in the supply chain; that comes from better and more transparent planning and the ability to communicate demands for services across the supply chain.

Aerogility's software is designed to help customers forecast 'what if' scenarios to automatically generate plans, understand the subtle interactions of various factors, and choose the optimal solutions. ■

'Tsunami' of USM demand forecast

Cash-conscious operators are likely to drive a surge in demand for alternatives to costly OEM spare parts as the MRO market slowly rebuilds.

Two key areas highlighted by Oliver Wyman partner, David Stewart, are used serviceable materials (USM) and designated engineering representative (DER) repairs. USM demand is expected to grow at 68% per annum through 2022, when its market can be expected to reach $7.9 billion.

Similarly, demand for DER repairs will grow at around 55% per annum.

"While this is a time of huge uncertainty and risk for those involved in the USM supply chain, a tsunami of demand is on its way in the coming 12 to 24 months," he predicted. "Now is the time to prepare for both the opportunity and the threat."

A period of "significant opportunity" lies ahead for the specialist asset management and USM materials supplier with sufficient financial stability and balance sheet strength. This may necessitate securing the right partnerships now to meet the inevitable future demand.

"In the near term," said Stewart, "the importance of being a 'smart buyer' and having the necessary technical expertise will never be higher." ■

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Aerospace-quality plastics that can be used for major sections of an aircraft's structure are the next stage in Turkey's bid to become a major force in the global aviation industry. **Alan Dron** *reports.*

Plastic fantastic deal for Turkish Aerospace

Turkey's continuing efforts to expand its aerospace sector have taken another step forward with an agreement between Turkish Aerospace and Boeing to develop a thermoplastic manufacturing capability.

Thermoplastics are lightweight, energy-efficient polymers that can be melted and recast almost indefinitely.

The US aircraft giant will provide technical support for Turkish Aerospace to open a manufacturing facility for thermoplastic components that will be able to be used as both primary and secondary structures in aircraft.

A Turkish Aerospace spokesman said it was believed that the 95,000sqm plant, when operational, would be the fourth largest on the planet and would supply about 2% of the world's composite aerospace components.

Remarkably, Turkish Aerospace plans on having the facility – scheduled for construction at Kahramankazan, Ankara – up and running by the end of June this year.

The company said that initial results showed that high-efficiency affordable rapid thermoplastic (HEART) can reduce both production cycles and process costs by around 30%, compared to conventional composites.

The plant will have the ability to take a component from the earliest design stage through to the testing and quality-verification process.

The agreement will see the Turkish company producing parts to designs provided by Boeing but, with thermoplastic composites gaining what Turkish Aerospace describes as "significant traction" within its other business units, the company is open to working with other players in the aerospace sector.

"We're very excited to sign a new cooperation with our strategic partner, Boeing," said Turkish Aerospace CEO, Professor Temel Kotil. He said the company looked forward to being able to continue the drive to create new production technologies in the aviation sector.

As the company that guides and heads up some of Turkey's most important projects, it will make considerable investments in the thermoplastic field and reduce costs by using the new materials in its products, he said.

Boeing said the latest venture added to its long-standing partnership with Turkish Aerospace. ■

Signed and sealed: Boeing Turkey managing director, Aysem Sargin (left), and Temel Kotil sign the agreement setting up the new thermoplastics collaboration. PICTURE: TURKISH AEROSPACE.

Dedicated team: The Strata vertical fin production line includes 47 technicians, inspectors and engineers, of which 40% are UAE nationals. PICTURE: STRATA.

Above: Boeing's 787 Dreamliner. PICTURE: BOEING

STRATA STARTS SHIPPING SHIPSETS

Strata Manufacturing (Strata), marked the delivery of its first 787 Dreamliner vertical fin shipset to Boeing on December 15 with a virtual ceremony and celebration, writes *Jill Stockbridge*.

Strata is an advanced composite aero-structures manufacturing facility wholly owned by the Mubadala Investment Company.

Built at Strata Plus, the dedicated production hall at the Nibras Al Ain Aerospace Park, the 787 vertical fin was the first to be completely assembled outside of Boeing's facilities in the US.

It will be installed on 787 fuselages at Boeing's North Charleston facility in South Carolina this year.

Bernie Dunn, president Boeing Middle East, North Africa and Turkey, said: "Today is a great day for the Boeing Company, Strata and the UAE.

"In 10 short years, Strata has gone from a concept on paper to a Boeing tier-1 composite supplier, and the first in the Middle East.

"Strata is crucial to the UAE's vision of aerospace and, in particular, to the UAE's focus on establishing a manufacturing base. With every success, Strata expands the UAE capabilities in this area, and its global presence."

Mubadala Aerospace's advanced composite aerostructures facility has been a tier-1 supplier since 2011, manufacturing empennage ribs for 777, 777X and vertical fin ribs for the 787 Dreamliner.

The Strata vertical fin production line includes 47 technicians, inspectors and engineers, of which 40% are UAE nationals.

Despite the challenges of 2020, Strata was able to deliver the shipset on time. Ismail Ali Abdulla, CEO Strata Manufacturing, said: "A major production line like this is very complex and requires both operational and training plans.

"We had our engineers and technicians being trained at Boeing facilities in the US. From March onwards, with the pandemic, we had to make strategic decisions to bring people back because of the lockdown in the US.

"We actually asked some people to stay during the lockdown to ensure that they got the proper knowledge and training. It was a tricky time, but everyone working on this line really stepped up, and it shows what people can do during difficult times." ■

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Flying in the face of the virus

Specialist groups should be set up to target five key areas in response to the Covid-19 pandemic. That was the major conclusion after UAE aerospace sector leaders gathered at a top-level summit focusing on resilience strategy.
Jill Stockbridge *looks at what was agreed and talks to one of the main players.*

The Global Aerospace Summit 2020 resilience strategy forum was jointly hosted in Dubai by UAE investment company Mubadala, and advanced technology defence giant, Edge.

The attendees included senior management from CAE, Embraer, Emirates, GCAA, IFS, KryptoLabs, L3 Harris, Lufthansa Technik Middle East, Northrop Grumman, Rolls-Royce, Saab, Safran, Strata and Thales.

Conclusions from the initial round of these closed-door discussions included the critical importance of getting passengers flying again in numbers, and the need for an ongoing focus on technology development to build passenger confidence and accommodate new protocols.

Jay Little, vice president Middle East and Africa, customer & account management, Collins Aerospace, was among the senior aviation representatives who attended the forum.

With 75% of its former business with commercial airlines, the pandemic has hit the company, resulting in a sharpening of the focus on technology development and defence.

Little said: "We all know that commercial aviation is one of the hardest-hit industries. It will likely be several years until passenger flying levels reach what they were just a year ago. Despite near-term uncertainty on the commercial aviation side, we're confident in the long-term growth potential for our company. The long-term fundamentals of commercial aerospace remain intact."

Open and cooperative comunications

Picking up on the discussions from the resilience forum, Little added: "Maintaining open and cooperative communications globally will be paramount to opening up international air travel. Harmonising as much as possible the safety protocols and travel requirements will also facilitate operations and passenger confidence.

"To make the most of all the actions being taken, industry and governments need to work together to promote the safety of air travel."

Working with partners in aviation, healthcare and technology, Collins is developing new products to help maintain social distancing and minimal contact, and offering current technology to help boost passenger confidence.

Little said: "Our products and services touch nearly every aspect of the passenger journey, giving us a unique understanding of how to connect the dots that help create a healthier and easier experience for air travellers, especially as we face new expectations and health standards for post-pandemic travel.

"In the near term, we are looking at utilising the technologies that we have available today. For example, it's entirely possible, with existing technology, to have a contactless journey through self-service solutions – check-in, baggage processing and baggage drops, security checkpoints, and self-boarding gates. All of these systems reduce the need for face-to-face interactions and support social distancing."

The five task forces

It was agreed that task forces should be formed to focus on five critical areas for the aerospace sector in its response to the pandemic.
These were:

- **Business resilience;**
- **Defence partnerships;**
- **Restoring confidence in flying;**
- **Sustainability, and;**
- **Technology transfer and capability development.**

Although a smaller part of the company's business, the robust defence sector will help Collins to weather the Covid storm. Little said: "Our defence portfolio is resilient, with businesses that are aligned with global defence strategy and focus on higher growth, higher technology areas. That part of the business remains stable with continued opportunities to grow, especially when we consider synergies across the Raytheon Technologies (RTX) companies. And that's extremely encouraging."

As part of its 2018 UTC acquisition, Collins completed consolidation of office locations in the UAE in early 2020 before the pandemic began. Globally, other plans are also in place with respect to the RTX integration of the Heritage UTC and Raytheon organisations – these plans will continue to move ahead.

"Although the cost-saving measures are critical due to the crisis, we need to carefully balance that with our commitment to investments into new technologies and continue to innovate, even in challenging times," said Little.

"Therefore, we will continue to invest in the future to ensure Collins Aerospace is well positioned to emerge from the pandemic stronger, with the products and solutions our customers need." ■

> **"It's entirely possible, with existing technology, to have a contactless journey through self-service solutions – check-in, baggage processing and baggage drops, security checkpoints, and self-boarding gates."**
> JAY LITTLE

PICTURE: COLLINS AEROSPACE

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In the midst of the worst crisis in the airline industry's history, Dubai-based DAE Aerospace has turned in a strong set of figures for the year. **Alan Dron** *reports.*

Firoz Tarapore: "We have provided assistance that was unique to each airline's requirements as airlines around the world were affected in different ways."
PICTURES: DAE.

DAE TAKES THE STRAIN DURING THE PANDEMIC

Despite the challenges faced by the commercial aviation industry, with many airlines cutting fleet numbers and returning aircraft to lessors, DAE has fared well.

"DAE was fortunate enough to begin 2020 with a very strong liquidity position," noted CEO Firoz Tarapore.

"This allowed us, during the pandemic, to assist airline clients in dealing with the unprecedented loss of demand brought about by the travel restrictions. We were able to deepen existing relationships in some instances and enter into new ones in others."

In a year when even the increasingly strong leasing sector was cancelling orders with manufacturers, DAE continued to increase the size of its fleet.

"We do not have a direct order with the manufacturers," said Tarapore. "Nonetheless, in 2020 we took deliveries of 38 aircraft, of which 23 were for our 'owned aircraft' portfolio. All these aircraft are on lease with airlines."

The company's acquisitions were particularly strong in last year's third quarter, when it added 31 aircraft to its books, notably in leaseback arrangements to companies to provide them with much-needed financial support.

"We announced underwriting commitments for 55 aircraft in 2020," said Tarapore. "For the owned aircraft portfolio, these were principally in the form of purchase leaseback arrangements to assist clients with liquidity or other requirements."

Having said that, the financial situation of many airlines – whose cash flows suffered massively as they were unable to use the bulk of their fleets – necessitated DAE granting 34 carriers rent deferrals in the first half of the year, while, in its figures at the nine-month stage, DAE said it had reached deferral relief packages with 21 airlines.

"We have provided assistance that was unique to each airline's requirements as airlines around the world were affected in different ways. Further, airlines in some instances had access to governmental support programmes or other means of shareholder or loan assistance."

The great hope is that the arrival of vaccines in significant quantities will enable airlines to see light at the end of the tunnel, with demand for air traffic improving in the near future.

For the first nine months of the year, DAE's 'cash collection rate' of customers' payments was 80%. "The collections rate has stabilised now that more airlines are deploying additional aircraft to meet air traffic demand. We expect the collection rate to improve in 2021," said Tarapore.

Unlike many airlines that have had to seek financial assistance from their respective governments, he added: "DAE is structured to be a stand-alone entity with independent access to liquidity. We have not needed assistance – our resources have been more than ample to meet our requirements and those of our clients."

Out of the woods

However, the industry is by no means out of the woods. The International Air Transport Association (IATA) has said that 35 to 40 airlines have gone under so far. IATA's CEO, Alexandre de Juniac, said in mid-January that "additional bankruptcies" were likely to happen in 2021. Does DAE see many airlines going out of business in the next six months, as government aid packages taper off?

"There are a handful of airlines whose business propositions are under strain," admitted Tarapore. "These strains may take a permanent toll if some of the current air travel demand shifts turn out to be structural."

However, he was reasonably sanguine about the future of the sector: "Air traffic demand is expected to resume its '2GG' (2x GDP growth) trajectory once this pandemic is under control. The airlines have rediscovered that having an existing relationship with established, well-capitalised lessors is a very good thing during difficult times.

"We expect this will translate into good opportunities for franchise lessors, such as DAE, to deepen their customer relationships and provide incremental value to airlines," he concluded. ■

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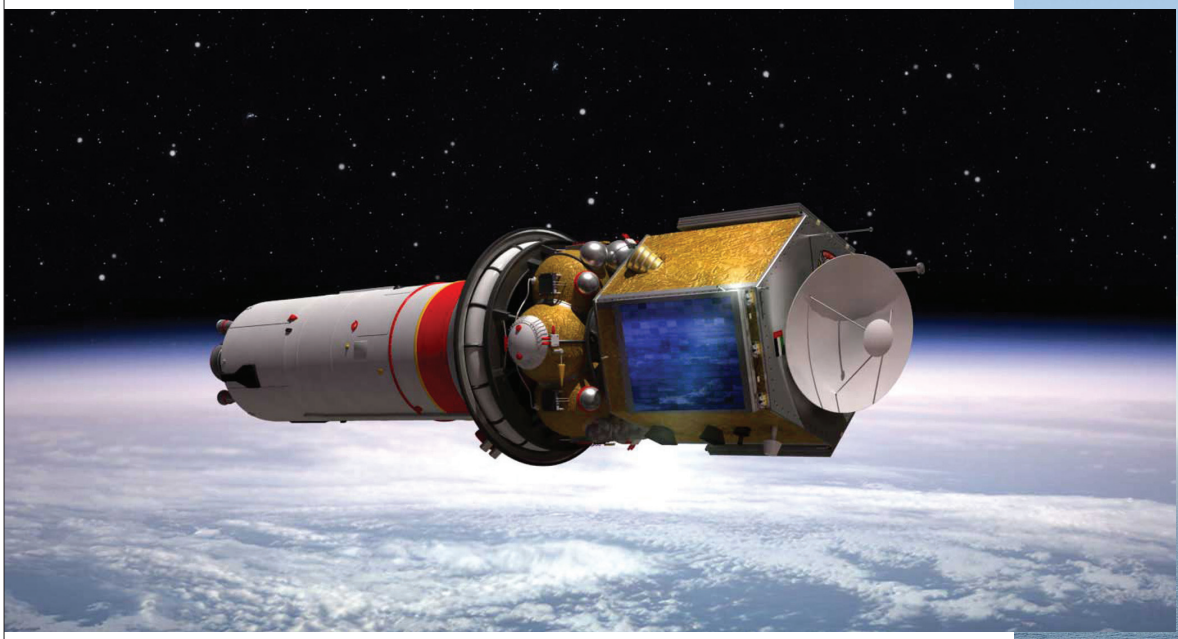


February will be a tense month for the UAE's Mohammed Bin Rashid Space Centre (MBRSC). That's when the Hope Mars space probe is due to go into orbit around the Red Planet. **Steve Nichols** *reports.*

Tension rises as Hope nears the Red Planet

Hope (Al-Amal in Arabic) was launched on July 20 from the Tanegashima Space Centre in Japan.

The launch was the first Arab space mission to Mars and aims to study the Martian atmosphere, inspiring the UAE's youth and paving the way for scientific breakthroughs that could affect everyone on Earth.

The launch date was critical. Every 18 to 24 months, Earth and Mars align in such a way that the journey is effectively shortened from a nine to a seven-month trip.

Missing the 'launch window' would have meant waiting another two years. However, despite initial launch delays due to bad weather, Hope eventually took off successfully.

The probe should complete its 500,000,000km journey on February 11, just in time for the celebrations planned to mark the Emirates' golden jubilee.

Travelling at speeds of up to 126,000km per hour, Hope has undergone at least seven trajectory correction manoeuvres (TCMs) during its journey.

In order to meet planetary protection protocols, missions are planned for an initial flightpath that will 'miss' the spacecraft's target, until tests have confirmed that it is performing normally.

This reduces the chance of an unplanned crash on the planetary surface and subsequent potential contamination.

For this, and other flight planning reasons, trajectory control manoeuvres are performed during flight.

A crucial 30-minute fuel burn, using the spacecraft's Delta V thrusters, is planned to reduce speed to approximately 18,000kmh to insert Hope into a Martian orbit.

Academic partners

Weighing 1,350kg, and approximately the "size of a small SUV", the spacecraft was designed and developed by MBRSC engineers working with academic partners, including the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado in Boulder, Arizona State University, and the University of California, Berkeley.

The mission has real science at its core. Hope is carrying three instruments to measure Mars' atmosphere and will spend an entire Martian year – two Earth years – monitoring the planet.

It will use its scientific instruments, which include visible, infrared and ultraviolet spectrometers, to map and understand the lower atmosphere of Mars and the weather systems that exist.

Its three instruments are the Emirates eXploration Imager (EXI), the Emirates Mars InfraRed Spectrometer (EMIRS), and the Emirates Mars Ultraviolet Spectrometer (EMUS).

The mission has three goals:

- To understand climate dynamics and the global weather map through characterising the lower atmosphere of Mars;
- To explain how the weather changes the escape of hydrogen and oxygen, through correlating the lower atmosphere conditions with the upper atmosphere; and
- To understand the structure and variability of hydrogen and oxygen in the upper atmosphere, as well as identifying why Mars is losing them into space.

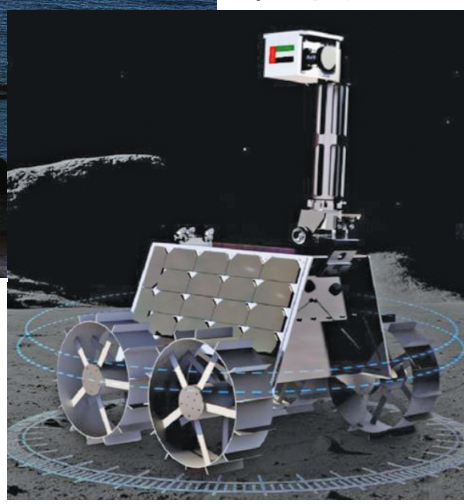
Sarah bint Yousif Al Amiri, the UAE's minister of state for advanced sciences, said: "Our science orbit is our final resting place around Mars. At our closest point we will be 20,000km from the surface.

Catching the window: after early delays, Hope launches from the Tanegashima Space Centre in Japan.

Left: An artist's impression of Hope in orbit around Mars.

Below: The UAE's Rashid lunar rover.

ALL PICTURES: MBRSC.



"We will look at how far the hydrogen and oxygen extends into space to get a better understanding of the loss of the Martian atmosphere."

Hope will explore the atmosphere of Mars globally, while sampling both daily and seasonal changes. This has never been done by any previous Mars mission.

Goldilocks zone

Understanding the atmospheres of other planets allows us to better understand our own. Earth and Mars are very similar. They both orbit in the Sun's 'Goldilocks' zone – where it may be not too hot and not too cold for liquid water to exist on a planet.

Mars is on the outskirts of the Goldilocks zone, just close enough to receive enough heat to be qualified as potentially habitable, but its thin atmosphere means it remains too cold.

While Earth has a breathable atmosphere and a liveable climate, Mars most certainly doesn't.

We know that its atmosphere is now 95% toxic carbon dioxide at minus 55 degrees Celsius on an average day.

The planet's low pressure means liquid water can't exist for more than a few minutes.

Scientists think Mars did have an atmosphere at some stage, as other missions have spotted hydrogen and oxygen near Mars, which now orbits around the planet in a giant cloud.

Hessa Al Matroushi, the UAE's instrument science lead on the Mars mission, said Hope will help scientists build a holistic model of the planet's daily and seasonal cycles, and help explain why the planet lost a lot of its atmosphere to space.

Hope's data could be invaluable to life on Earth. By understanding the Martian climate, we might be able to save Earth from a similar fate in years to come.

The UAE's aspirations for Mars don't stop with Hope. It has also declared that it aims to establish the first inhabitable human settlement on the Red Planet by 2117.

The Mars 2117 project is being developed and executed in partnership with major international scientific research institutions. ■

UAE LUNAR ROVER PLANNED FOR 2024

The UAE has plans to send a lunar rover to the Moon in 2024 as part of its long-term goal for the human settlement of Mars by 2117.

If successful, it would become only the fourth nation on Earth to do so, following the US, the Soviet Union and China.

India, Japan and Israel have all attempted, but failed, to land a spacecraft on the Moon's surface.

The half-a-metre long four-wheeled rover will likely weigh around 10kg and have a maximum speed of about 10 centimetres per second. It will be able to cope with slopes of up to 15 degrees and rocks not bigger than 30 centimetres.

The lunar rover will be known as 'Rashid' – named after the late Sheikh Rashid to honour his vision to develop Dubai.

Hamad Al Marzooqi, MBSRC Emirates lunar mission project manager, said that the project's primary objective is to advance the UAE's capabilities to "develop robotics for use on another celestial body".

"The Moon has extreme temperature conditions, from minus 170 degrees Celsius to 100 degrees," Al Marzooqi added. "This raises challenges that will need to be resolved for future lunar and Mars missions."

The rover will carry a number of scientific instruments, including two cameras or high-resolution optical imagers.

It will study the lunar surface, mobility on the Moon's surface, and how different surfaces interact with lunar particles, Al Marzooqi said.

One experiment will include a Langmuir probe – a device used to determine the electron temperature, electron density, and electric potential of a plasma.

"This is the first time such a sensor has been sent to the Moon," said Al Marzooqi, adding that it is thought that electrostatic charging of the dust on the surface of the Moon caused it to "stick" to the Apollo astronauts' spacesuits.

Another payload, called the material adhesive demonstration (MAD), will examine how the lunar surface clings to different types of materials.

The rover's data will be shared with the global scientific community.

No landing area has currently been selected for the probe, but it is likely to be at mid-latitude, around 45 degrees north or south of the lunar equator.

The UAE will build the rover itself, but is looking for international or commercial partners for the Emirates lunar mission and to carry the rover to the Moon. ■

Linus Benjamin Bauer

Marcelle Nethersole *speaks to the founder and managing director of Bauer Aviation Advisory (BAA).*

1

Can you tell me what Bauer Aviation Advisory does?

We are one of the region's only consulting firms dedicated to aviation. We've brought our international expertise to the Middle East in order to serve the region's commercial aviation sector.

We do everything, from supporting airlines and airports with corporate strategy and business model innovation, to network and fleet planning. Additionally, we help clients streamline day-to-day operations.

Our experienced professionals have proven track records in management consulting, revenue management, business development, corporate strategy, network management, mergers and acquisitions, alliances and partnerships, and sales and marketing, in addition to fleet management.

Underlying our services is our mission to secure a green future for the aviation industry.

2

You recently opened a new office in Dubai to help navigate the impact of the pandemic. How will you do this?

We will be providing unrivalled expertise through our experienced team of international consultants who, on average, have 15 years' experience each. Many have helped overcome previous crises to have hit the industry.

We also understand our clients' businesses, the landscape in which they operate, and their outlooks, which is why I have built an expert team with local knowledge and expertise through a series of strategic hires.

Relocating to Dubai myself has made it easier to be that trusted partner to clients.

3

Why is BAA focusing on the Middle East?

The region is well established and incredibly vibrant, home to some of the most aspirational airlines and airports globally, many of which serve Dubai and have a presence here.

Undoubtedly, Dubai is a global powerhouse for international business, making it an ideal base for our firm.

Moving to Dubai was also strategic. It gives us unrivalled global connectivity, making it easier and more convenient to meet clients around the region.

Dubai's leadership recognises the strategic importance of the sector in diversifying its economy and, as the world emerges from the pandemic, we will be in the right place at the right time to help drive its recovery.

4

With the ongoing pandemic, what do you see for the MENA aviation industry?

Over the past few months, we've witnessed huge rapid developments that will shape the future of the MENA region's industry. The signing of the Abraham Accords has unlocked air travel between Israel and the UAE, Saudi Arabia and Bahrain, something which would have been unforeseen a few years ago.

We've also seen the end of the long-standing Qatar blockade, which had reshaped airspaces, caused inefficient routings and had an impact on connectivity for many carriers in the region.

These developments are game-changers for the region's aviation sector, which can create a myriad of opportunities.

But we're still in the midst of a global pandemic, with new strains of the virus causing countries to close air bridges and reimpose quarantine restrictions.

We anticipate the commercial aviation industry in the MENA region rebuilding this year, ahead of an industry recovery in 2022-2023, before emerging stronger than pre-crisis levels from 2024.

5

Once there is a grip on the pandemic, on what will BAA be concentrating?

Our utmost priority remains to deliver long-term sustainable value for the aviation industry.

When the pandemic subsides, there will be a lot of work needed to rebuild the aviation industry. With this in mind, we'll be providing businesses with various health checks and customised solutions for airlines and airports to help them transform their performance. Our other focus will be on enhancing corporate strategy and maximising operational efficiency and effectiveness to achieve a sustainable competitive advantage throughout our clients' value chain.

6

What does a typical day involve for you?

No days are ever the same, especially in the world of aviation. I usually skip breakfast and head straight to work to go over my agenda and catch up with my international team throughout the morning. As I'm trying to establish the business in a new market, some days may largely consist of networking with other industry leaders, or connecting with clients in Dubai over lunch or coffee. Other days consist of various video conference calls with our clients, partners, investors and the media.

Being a leader and a mentor is important to me, so I participate in the 'high-five' at 4:05pm daily to be visible among my international team and show them I value each one of them.

When I leave the office, I take time to catch up on conversations and follow-up on items from earlier in the day, whether it's a meeting over dinner or sending a few e-mails.

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