

**FARNBOROUGH**  
INTERNATIONAL

**AIRSHOW**

18-22 JULY 2022

A GBP PUBLICATION

# SHOW REVIEW

ASIAN DEFENCE  
TECHNOLOGY

ASIAN  
AIRLINES & AEROSPACE

Daily News

WWW.GBP.COM.SG

## MAKING TOMORROW HAPPEN TODAY

INTERACTION: Leonardo CEO Alessandro Profumo

## IN GREAT DEMAND

Raytheon Intelligence & Space's laser weapon systems, operational and exportable, look set to capture a major chunk of the international market



## REVIVAL IN SIGHT

The Farnborough International Airshow 2022 signalled a revival of the global aviation market



C-390 MILLENNIUM

# UNBEATABLE COMBINATION

## RAPID RECONFIGURATION AND MISSION FLEXIBILITY.

When it comes to humanitarian missions, the rapid reconfiguration, speed and flexibility of the C-390 Millennium has proven indispensable for the Brazilian Air Force. During the height of the COVID pandemic, they employed the C-390 to deliver vital medical supplies, including ambulances and liquid oxygen, to remote communities in the Amazon Basin. After the 2021 Haiti earthquake, a C-390 was used by the Brazilian Air Force to deliver 10.5 tonnes of medicines, food and health equipment to help victims and support the emergency relief operation. And when a devastating explosion occurred in the port area of Beirut, Lebanon, the Brazilian Air Force got vital medicines and food supplies 'on the ground' in just under 16 hours. Proven in the field and in the toughest of environments, the C-390 has now been chosen by the Portuguese and Hungarian air forces to lead their humanitarian missions.

#C390UnbeatableCombination  
[embraerds.com](http://embraerds.com)



 **EMBRAER**

CHALLENGE.  
CREATE.  
OUTPERFORM.



# CONTENTS

- 
- 05**  
**REVIVAL IN SIGHT**  
The Farnborough International Airshow 2022 signalled a revival of the global aviation market
- 07**  
**MAKING TOMORROW HAPPEN TODAY**  
Leonardo looks to the future with the ambition of playing a leading role in the digital era
- 08**  
**PROPELLING UP**  
ATR puts on a sterling performance at Farnborough
- 09**  
**POISED TO SOAR**  
The warm reception from carriers to its planned turboprop and the industry's focus on smaller aircraft spell good news for Embraer
- 11**  
**IN GREAT DEMAND**  
Raytheon Intelligence & Space's laser weapon systems, operational and exportable, look set to capture a major chunk of the international market
- 13**  
**THE NEW WAVE**  
Funding for future air mobility declines in the first six months of the year as the focus of the aviation industry turns to sustainability initiatives
- 15**  
**SUSTAINABILITY IN ACTION**  
Luis Carlos Affonso,  
Embraer's Sr. VP of Engineering,  
Technology and Corporate Strategy
- 16**  
**EMBRAER EYES NEW MARKETS FOR THE C-390**  
Jackson Schneider, President and CEO,  
Embraer Defence & Security
- 17**  
**REINVENTING THE WHEEL**  
LOGIC CEO Alessandro Franzoni
- 18**  
**ON CLOUD NINE**  
PRABHAKAR ATLA, President & Global Head  
– Aerospace, Rail and Communications at CYIENT
- 19**  
**FORGING AHEAD**  
Aequis is reaping the benefits of vertical integration in its aerospace components business
- 20**  
**SAR SAVIOUR**  
Rafael is promoting its MicroLite Airborne EO/IR system for rotorcraft SAR applications
- 21**  
**TARGET IN SIGHT**  
Boeing is making a strong pitch for the F/A-18E Super Hornet as the Indian Navy's new fighter
- 22**  
**VERTICAL STRENGTH**  
Leonardo's AW149 is a strong contender for UK's New Medium Helicopter (NMH) requirement
- 23**  
**FROM AN OASIS TO AN OCEAN**  
Saudi Arabia plans to develop its nascent defence industry into a global powerhouse
- 24**  
**GOLDEN EAGLES MAY FLY TO MALAYSIA**  
Latest claims indicate that RMAF may go in for Korean FA-50
- 26**  
**THE WAY FORWARD**  
A new system designed to move aircraft at airports safely without using fuel is set to enter the market in 2023
- 27**  
**ONWARDS AND UPWARDS**  
Dramatic advances in urban air mobility could transform the aviation Industry by 2030
- 29**  
**ONE STEP AT A TIME**  
Eve Urban Mobility will start operations with manned flights but is already evaluating autonomous flight technologies
- 30**  
**STANDING OUT IN A CROWD**  
Manta Aircraft, which is developing three models of a hybrid-electric Vertical and Short Take-off and Landing (HeV/STOL) aircraft, is focused on inter-regional air mobility

**29<sup>th</sup>**  
**YEAR**

# CREDIT LINE

## **Publisher**

Vittorio Rossi Prudente  
vittorio.prudente@gbp.com.sg

## **Editor**

Jay Menon  
jay.menon@gbp.com.sg

## **Technology Editor**

Atul Chandra  
atul.chandra@gbp.com.sg

## **Managing Editor**

Arun Sivasankaran  
arun.sivasankaran@gbp.com.sg

## **ASEAN Correspondent**

Yulian Ardiansyah  
yulian.ardiansyah@gbp.com.sg

## **Art Director**

Miamica Khonglah  
maya.khonglah@gbp.com.sg

## **Web Director**

Elmer Valencia  
elmer.valencia@gbp.com.sg

## **Director of Sales**

Akshay Satyamurthy  
akshay.satyamurthy@gbp.com.sg

## **Advertising Contacts:**

marketing@gbp.com.sg

## **Europe & Americas and all other countries:**

Global Communications sas  
Tel: +39 049 723548  
Ingrid@global-communications.it

## **Japan**

Visionworks  
Jerry.Suppan@gmail.com

## **India + South East Asia**

Akshay Satyamurthy  
Mob: +919980080246  
akshay.satyamurthy@gbp.com.sg

# EDITOR'S NOTE

## Wings Level

The Farnborough Airshow 2022 provided a much-needed opportunity for the global aviation community to come together and discuss opportunities and prospects for the future as global demand for air travel accelerates. The industry's dramatic shift towards net zero carbon emissions and a sustainable future was also in evidence at all corners of the show.

The Urban Air Mobility (UAM) revolution is now well underway, and a series of all-electric vertical take-off and landing (eVTOL) aircraft were on display. With a huge amount of resources being poured into this market, it is simply a matter of time before the eVTOL disrupts the aviation industry as we know. This is quite likely to happen before the end of this decade. The defence industry has also taken notice and efforts to develop military variants of commercial eVTOLs are already underfoot.

A return to optimism for the commercial aviation industry and surging demand for military equipment because of heightened regional tensions have brought welcome relief to firms that have been battered by the market disruption caused by the COVID-19 pandemic. The resilience of the aerospace and defence industry, which has braved multitudes of challenges over the last two years, is indeed heartening to see.

GBP Show Review, brought together by an ace team that reported live from Farnborough Airshow 2022, is our newest offering and features high-level interviews and important product updates from the aerospace and defence industry. We hope you enjoy the issue and welcome your feedback for future iterations. The GBP Aerospace & Defence team will be present at Defence & Security 2022, which will take place in Bangkok from Aug 29 -Sep 1 and Vietnam International Aviation Expo 2022 (VIAexpo), being held from Sept. 15-17, and will bring you the latest updates from the industry. Log on to [www.gbp.com.sg](http://www.gbp.com.sg) for all the latest news from these shows and more.

## **Editor**

**Asian Defence Technology**

**GBP**  
**AEROSPACE**  
**DEFENCE**

Global Business Press Pte.Ltd.  
ASIAN DEFENCE TECHNOLOGY

30 Cecil Street,  
#19-08 Prudential Tower, Singapore 049712

Tel: +65 6850 5269 | Fax: +65 6438 2436

Email: [enquiry@gbp.com.sg](mailto:enquiry@gbp.com.sg) | Web: [www.gbp.com.sg](http://www.gbp.com.sg)





# REVIVAL IN SIGHT

## THE FARNBOROUGH INTERNATIONAL AIRSHOW 2022 SIGNALLED A REVIVAL OF THE GLOBAL AVIATION MARKET

– ATUL CHANDRA

The recently concluded Farnborough International Airshow 2022 which took place after a gap of four years was a showcase of the aviation sector’s recovery from the unprecedented events that disrupted the aviation industry, following the COVID-19 pandemic. The airshow also showcased the aviation industry’s dramatic shift towards a sustainable future, with sustainability, net-zero and advanced air mobility emerging as key topics at the event, which took place 18–22 July. The industry’s dedication to driving positive change and building a more efficient, greener future for the aviation industry was on strong display at the show.

Gareth Rogers, CEO of Farnborough International, said: Farnborough International Airshow has cemented its position as the place to have important conversations about the future of aerospace. As a catalyst for pioneering innovation, we have demonstrated that the industry is setting out clear, ambitious plans and there is a new-found opti-

mism for the future, made possible through strong strategies and collaboration.’ Announcements made on the first days of the show included the Jet Zero Strategy, the Aerospace Growth Partnership Destination Net Zero Strategy and new Future Combat Air Strategy, which were aimed at accelerating the UK’s leading position within the global aerospace arena.

The inaugural Aerospace Global Forum showcased the demand for collaboration within the industry and the wider ecosystem, providing a panoramic look at the disruptive and existential challenges of the 21st Century and actionable steps to a cleaner, more efficient generation of aerospace. The Airshow highlighted numerous opportunities for UK businesses in areas such as sustainability and advanced air mobility, which will be vital for the nation to maintain its tradition of leadership in the aviation industry.

The rapid revival of global air travel and the airline need for newer aeroplanes resulted in Boeing and Airbus, between them announcing \$4.5bn worth of deals for their current aircraft models. In total, 277 confirmed orders were placed at the show along with options for 81 more aircraft. The lion’s share of aircraft orders at the show went to Boeing. Kevin Craven, CEO of ADS Group said: “Total deals on aircraft made across the show, including firm, options and commitments on aircraft, including business and regional jets, comes to \$50.8 bn which is a positive boost for the industry. There is a clear demand for newer,

greener and fuel-efficient aircraft alongside increasing market recovery as the sector looks to accelerate progress towards net zero by 2050."



## Boeing Scores Important Orders

Boeing scored important orders for the 737 MAX and 787 at the show. The embattled airframer had announced in May, the resumption of 737 MAX production at its Renton, Washington factory. U.S. carrier Delta Airlines placed an order for 100 737-10 jetliners along with options for 30 more at the show.

The 737-10 is the largest model in the MAX family and Boeing is currently working towards final certification from the Federal Aviation Administration (FAA) for the type, which is expected in 2023. The 737-10 can cover 99 percent of the world's single-aisle routes and seat up to 230 passengers. Delta is to take deliveries of all aircraft on order from 2025. Delta's 737-10 orders will grow the size of its 737 family to more than 300 aircraft by the end of the decade. These new aircraft will be 20-30 percent more fuel efficient than the aircraft they will replace at Delta.

Miami-based U.S. private investment firm, 777 Partners also announced a new order and commitment for up to 66 737 MAX jets, which included a firm order for 30 737-8-200s. The ultra-efficient, high-capacity 737-8-200 can seat more than 200 passengers. Qatar Airways also finalized an order at the show for 25 737-10s. The airline was also the global launch customer for Boeing's new 777-8 Freighter in January. The Middle-Eastern carrier operates more than 120 Boeing airplanes including 777 and 787 passenger jets along with 747 and 777 freighters. Aircraft lessor Aviation Capital Group LLC (ACG) also placed an order for 12 additional 737-8s at the show.

Aircraft lessor AerCap took its orderbook for Boeing's 787 to 125 with an order for five 787-9s. AerCap is the world's largest 787 customer. Azerbaijan Airlines which operates two 787-8s inked an Memorandum of Understanding (MoU) at the show for four additional 787-8s.

In addition to these orders, Boeing bagged orders from Aircompany Armenia and its partner company Georgian Airlines

for three 737-800 Boeing Converted Freighters (BCF); aircraft lessor BBAM Limited Partnership (BBAM) placed a firm order for nine more 737-800BCFs and Europe's largest all-cargo airline, Cargolux announced the selection of Boeing's 777-8 Freighter as the replacement for its 747-400s.

## Airbus Makes Gains

Airbus lagged behind Boeing when it came to aircraft orders announced at the show, but was able to make significant additions to its orderbook. European carrier easyJet placed firm orders for 56 A320neo Family jetliners, which would include upsizing of 18 A320neos to the larger A321neo model. easyJet is the world's largest airline operator of A320 Family aircraft, with a fleet of over 300 aircraft including the A319, A320ceo, A320neo and A321neo. Airbus also bagged orders from Delta Airlines for 12 more A220-300s at show. Delta now has firm orders for 107 aircraft (45 A220-100s and 62 A220-300s). Mahendra Nair, S.V.P. - Fleet & TechOps Supply Chain at Delta said the additional aircraft in the A220 Family were an excellent investment for Delta and would be fundamental in its transition to a more sustainable future for air travel. The U.S. carrier was the launch customer in the USA for the A220 and received its first Airbus A220 in October 2018. Delta operates a fleet of 388 Airbus aircraft, comprising of 56 A220 aircraft, 249 A320 Family aircraft, 57 A330s and 26 A350-900 aircraft (as of end of June 2022).

Airbus also received orders from LATAM Airlines for 17 A321neos, bringing the airline's total A320neo order book aircraft to 100. LATAM Airlines Group and its affiliates are the main group of airlines in Latin America, with presence in five domestic markets in the region: Brazil, Chile, Colombia, Ecuador and Peru. 'The A321XLR will enable the opening of new routes and will allow LATAM to increase its international reach in the region,' said Christian Scherer, Chief Commercial Officer and Head of Airbus International. The A321XLR can stay in the air for up to 11 hours and achieve a range of 5,700nm. Airbus has bagged nearly 550 orders for the long-range jetliner, which made its maiden flight in June.

In addition to these deals, other discussions and conversations at the airshow related to new aircraft orders and potential partnerships, demonstrated that there was a clear recovery following the global pandemic across sectors. The new orders have added to the existing backlog of aircraft and engine orders, billion-dollar global partnerships and contracts across the aerospace, space and defence supply chains announced at the show.



# MAKING TOMORROW HAPPEN TODAY

LEONARDO LOOKS TO THE FUTURE WITH THE AMBITION OF PLAYING A LEADING ROLE IN THE DIGITAL ERA

– JAY MENON

Leonardo was the protagonist of the first day of the latest edition of the Farnborough Airshow. The company's CEO Alessandro Profumo participated in the Aerospace Global Forum on the sidelines of the show, and then talked to few select journalists. "We want to be a company that is solid, global and driver of innovation" said Profumo, describing the company's strategic vision for the next ten years.

"We are in full execution of the strategic plan. In the past two years, our growth was based on two principles: on the one hand an international strategy of mergers & acquisition, allowing the optimization and strengthening our business portfolio; on the other hand, a strong push towards advanced and transformative solutions in both our core business and in new areas," he said.

"I see opportunities in all our market segments. We continue to look for export customers for our Eurofighter program. The second area for aircraft is training—not only our aircraft but also our International Flight Training School (IFTS), which has been a success. So those fit with two needs: the demand for fighters and the demand for pilots. We also have a role on the F-35 with the final assembly and check out facility."

## What About Helicopters?

"We are strong in helicopters, with our AW family and our military helicopters, including the NH90, AW101, the AW 159 and of course the AW149 multirole helo. We are also in the process of certifying the AW609," he said. Leonardo recently announced that Poland has signed a US\$1.82 billion contract to acquire 32 AW149 helicopters, and the company has established an assembly line in Poland to support Warsaw's acquisition deal. The Polish order is the first AW149 deal to be formally declared by Leonardo.

Leonardo is also pitching the AW149 for the UK's £1.2 billion (US\$1.5 billion) New Medium Helicopter (NMH) requirement. "The production of the AW149 could also be transferred out of Italy should the type be chosen by the UK," he said. The company has already begun establishing a production line at its Yeovil plant in the UK for the AW149 and could be in a position by year-end to begin building the super-medium-class platform at the facility. Profumo also indicated that it may soon stop production of the AW 149 helicopters in Italy in a bid to concentrate on the order from Poland and potentially the UK.

## Proteus Demonstration Flight

This July the UK Ministry of Defence's Defence Equipment and Support (DE&S) Future Capability Group (FCG) awarded a four-year contract valued at EUR71 million (£60 million) to Leonardo to deliver the Rotary Wing Uncrewed Air System (RWUAS) Technology Demonstration Programme (TDP), "RWUAS CCD Phase 3 TDP". This programme funded through Defence



Leonardo CEO Alessandro Profumo

Innovation, will include the flight of an advanced uncrewed VTOL prototype referred to by the UK MOD as "Proteus".

The award supports the company's strategic goal for its site in Yeovil, Somerset, already the 'Home of British Helicopters', to expand and also become the UK's hub for uncrewed military VTOL aircraft. In the UK, Leonardo is a close partner of the MOD and has already invested substantially in uncrewed military capabilities onshore. In Yeovil, the specialised helicopter design and engineering skills have made the site a focus for uncrewed systems.

"Leonardo is the only company in Europe able to provide complete solutions by designing and developing all the elements of uncrewed systems: platforms, sensors, mission systems, control stations and offer customers a certified low risk, high effective, fully integrated capability. The continuous development and integration of cutting-edge solutions across all domains of remotely piloted and autonomous/semi-autonomous systems and technologies is a key element of Leonardo's BeTomorrow2030 Strategic Plan," Profumo said.

## Company's Performance

Leonardo is well-positioned for increased military spending, after reporting a first-quarter rise in orders and core profit, according to its 2022 forecast. A potential increase in spending after Russia's invasion of Ukraine could add to growth estimates. The company is forecasting 15 billion euros in new orders and an EBITA of 1.18-1.22 billion euros at the end of this year. Leonardo closed the first half of 2022 with revenues of EUR6.576 billion and show a positive trend (+ 4 per cent) compared to the first half of 2021 (EUR6.3 billion), mainly thanks to the performance of the helicopters. The company's net profit rose to EUR267 million (US\$271.3 million), from EUR177 million a year earlier. 'The solid results of the first half allow us to confirm the guidance for 2022, Profumo said. "We already have a very important growth plan ... everything that arrives will come on top of this," he added.



ATR Chief Executive Officer Stefano Bortoli

# PROPELLING UP

## ATR PUTS IN A STERLING PERFORMANCE AT FARNBOROUGH

– JAY MENON

After facing a severe turbulence in its business during the Covid-19 pandemic with deliveries dipping almost into single digit in 2020, ATR seems to be cruising at a comfortable height with deliveries of 31 new and 10 second-hand aircraft to customers last year. The company has also secured 35 orders and letters of intent.

The Turbojet aircraft manufacturer also put on a sterling performance at Farnborough, collecting orders and letters of intent for 58 more airplanes across four operators. "I am relatively pleased with our 2021 performance and the orders we received at the Farnborough. We are definitely still a long way before we get back to 2019 levels, but we are working to get there," said ATR chief executive Stefano Bortoli.

"The consistency seen in the recovery is very reassuring," the head of the Toulouse-based air framer said. The backlog at the end of 2021 stood at 196 aircraft. "We are looking at ramping up production and is targeting more than 50 deliveries in 2024," Bortoli, whose four-year tenure ends in September, said. "And we expect a demand for at least 2,450 turboprop aircraft over the next 20 years as there is an increasing demand for regional connections and lower emission air transport. South East Asia, China and Latin America have been identified as areas of increased regional demand, as customer expectations for faster delivery expands beyond key primary gateways in each region."

## New Aircraft Takes Shape

"Our next generation of airliners, to be known as EVO, is taking shape. We plan to freeze the design in 2023, This new family of aircraft will take the design to the next level, with new engine powerplants, and other innovative improvements in technology, efficiency, economics and sustainability."

These will be twin-turboprop hybrid-powered aircraft, slated for entry into service by 2030. "We are talking to potential partners and have sent a request for information to engine manufacturers to develop the new powerplant."

"The aircraft will be a step forward in responsible flying through further incremental innovation. When it enters the market, the new ATR 'EVO' will pave the way towards a decarbonised future for aviation. Key benefits include a 20 per cent overall fuel improvement and 100 per cent SAF compatibility. This means that the aircraft will emit over 50 per cent less CO2 than a regional jet when powered by kerosene. When using 100 per cent SAF, its emissions will be close to zero."

## What is the Future?

"We look at the future with optimism. We see growth opportunities in many countries and places. We have continued to invest in our product, offering concrete solutions so that our customers can operate their aircraft with the most sustainable business model. "We also expect that our short take-off and landing (STOL) variant, the ATR 42-600S, is expected to enter service by the end of 2024. Adding the ATR 42-600S to our family makes total sense and paves the way for the company's future. There is a huge potential for 50-seater aircraft and the ATR 42-600S could help airlines widen their horizons, as it can reach up to around 500 new airports across the globe. This is clear illustration of our dedication in helping more people and more remote communities benefit from being part of a connected world and in a sustainable way. With this new version, we expect to expand the addressable market by 25 per cent, targeting new routes and the 30-seater STOL segment." The flight-testing camping of the STOL ATR42-600 is due to commence soon.

## On Sustainability

"ATR is responding by developing the most responsible and affordable turboprop ever, soon to be operated by 100 per cent Sustainable Aviation Fuel (SAF). We have just performed the first flight ever with 100 per cent SAF in both engines on a commercial aircraft. Certification is also on track for its latest generation PW127XT engine, with deliveries starting this year."

To highlight the modernity, comfort, fuel-efficiency and versatility of the ATR aircraft family, an ATR 72-600, soon to be 100 per cent SAF certified in both engines, was on static display at the show.

"Expediting the transition to net zero carbon emissions can only be achieved when all stakeholders within aviation work closely together. ATR, Swedish airline Braathens Regional Airlines and SAF supplier Neste collaborated to enable the first ever 100 per cent SAF-powered test flight on a commercial aircraft. This historic test flight took place in Sweden and was part of the 100 per cent sustainable aviation fuel certification process of ATR aircraft that started in September 2021 in cooperation with Braathens and Neste and this should be completed by 2025.





# POISED TO SOAR

**THE WARM RECEPTION FROM CARRIERS TO ITS PLANNED TURBOPROP AND THE INDUSTRY'S FOCUS ON SMALLER AIRCRAFT SPELL GOOD NEWS FOR EMBRAER**

– ARUN SIVASANKARAN

It is a good time to be Arjan Meijer, President and CEO of Embraer Commercial Aviation.

With the pandemic turning aviation on its head and carriers looking for smaller aircraft, Embraer finds itself poised to take advantage of the situation and to consolidate its hold on the up-to-150 seats segment. At the recent Farnborough Airshow, the company hit the headlines regularly, announcing a string of orders, including good news on the E195-E2 program, with Canadian Porter Airlines, which already had a firm order for 30 E195-E2s, signing a firm order for another 20 aircraft at the biennial event. The carrier, which will be the launch customer for the aircraft type in North America, has now placed an order for a total of up to 100 Embraer E195-E2 aircraft, including 50 options.

The bigger news was the enthusiastic response for the company's planned turboprop. According to Meijer, the company already has more than 250 letters of intent for the aircraft, which will have two variants, with 70 and 90 seats. The aircraft is scheduled to enter service in 2028, with the official launch and sales expected in the first half of 2023. The company is currently in discussions with Pratt & Whitney Canada and Rolls-Royce about engines for the aircraft and expects to select one before the end of the year.

Providing a fillip to Embraer's efforts for sustainable, emission-free, and commercially viable aviation, Norway-based Widerøe became the first airline to join the Energia Advisory Group, which is based on the Energia family, the next-gen-

eration of 19- to 50-seat aircraft that the plane maker is currently designing.

"We announced Energia last year and are currently talking to customers, trying to understand the segments and figuring out how smaller aircraft can find a way into the new world," says Meijer. "Our smallest aircraft for the longest time has been the E175 with 80 seats, 76 in the U.S. Now, we are talking about a segment up to 50 seats. We may in the future be talking about smaller airlines as well, a different kind of operators. We also have to find out to what extent the mainlines be looking at the smaller segment, because that is where breakthroughs will happen first."

## Quietly Efficient

"The quietness of the cabin is just one of the many qualities of the aircraft," said Meijer after the completion of the E2 Tech Shark Profit Hunter aircraft demo flight on the eve of the biennial event. "The economics of the aircraft is one of the major selling points; it is the most fuel-efficient aircraft that is out there today. The noise is the



Arjan Meijer



best in its class and the on-board experience is amazing. It is a very modern airplane. We have about 1600 E jets flying in the world today. The transition training from the E1 to E2 is just two and a half days. After that, you can fly the aircraft together. Being able to fly a mixed fleet is helpful for operators. It is an airplane that carriers can use to really complement narrowbodies."

Meijer is confident the E2 family will do well in Asia. "India has a clear direction to connect the mainlines to smaller airports. China as well. For that, you will need smaller aircraft. To do that. We have the E2, which is a smaller aircraft but has the same seat cost almost as a bigger narrowbody. So, airlines could fly the E2 into the smaller cities."

Embraer has a good footprint in Asia, but not as big as it has in Europe and the Americas, says Meijer. "We are seeing significant interest in Asia at the moment; more than 40 used E jets moved into Asia during the pandemic, into Australia and Vietnam for example. We have more than 100 aircraft flying in China today. We believe the E2 can really make a difference for China. In addition to connecting smaller airports to the main metropolises and complementing narrow bodies that are already flying, the E2 nicely fits between the ARJ21 jet and the C919 that they are developing. There are a lot of good reasons for this aircraft to play a much bigger role in Asia going forward."

### Warm Reception for Turboprop

Asia is one of the major markets that Embraer is eyeing for its turboprop as well. The company projects a 20-year demand for 2,200 turboprops and a requirement for 900 from the region alone. "There are a lot of short-range operations in Asia with turboprops, especially in countries such as India. We believe we can deliver greater efficiency in the market segment," said Meijer.

"We are currently selecting the engine and will have a decision before the end of the year," said Meijer. "We are looking at several regions to work together with; the partnership will involve both industrial as well as financial cooperation. We are looking at mid-2023 for the launch of the program. It will be an aircraft with 25-30 per cent less fuel consumption than jets on comparable routes. On one-and-a-half hour flights or shorter, this aircraft can really make a difference."

The focus on sustainability and on reducing CO2 emissions will act as tailwinds for the Energia family of aircraft, believes Meijer. "There is a tremendous amount of interest. A lot of operators want to embrace sustainability. The reason we have launched Energia as concepts and not products is because we want to show the market what we think is a realistic outlook. There are a lot of promises out there from people in order to attract funding. We do not believe the technology is ready to achieve their objectives. We want to show what we believe is realistic. We are interested in talking to partners who can help get these concepts realized into products. We believe there is future for these concepts and want to talk to customers to understand how they fit into their scheme of things."

### Looking Ahead, with Confidence

The partnership that was not to be with Boeing did set Embraer back initially, but Meijer isn't looking back. "When the partnership did not happen, we were all disappointed, but look at where we are today. The market today is completely different from what existed pre-crisis. Embraer is ideally positioned in the up-to 150-seats segment. The E jets flew more over the crisis period than any other product. Airlines are really looking at the smaller segment as they want to reduce risk."

Even as it moves to further strengthen its position as the major player in the regional jet market, Embraer has also unveiled plans to launch E190F and E195F Passenger to Freight Conversions (P2F). The conversions will be performed at the company's facilities in Brazil. "We believe the E1s are reaching an age where conversion makes sense. We are working on that. The first conversion is scheduled to be delivered to the market in 2024. We believe that we are perfectly positioned to fill the gap in the freighter market between turboprops and larger narrowbody jets."



# IN GREAT DEMAND

## RAYTHEON INTELLIGENCE & SPACE'S LASER WEAPON SYSTEMS, OPERATIONAL AND EXPORTABLE, LOOK SET TO CAPTURE A MAJOR CHUNK OF THE INTERNATIONAL MARKET

– ARUN SIVASANKARAN

Even as it prepares to deliver a High-Energy Laser Weapon System (HELWS) to the UK Ministry of Defence before the end of the year, Raytheon Intelligence & Space (RI&S) is seeing a spike in interest from countries across regions for its electronic warfare systems, especially laser weapons.

"We have seen interest for a number of systems across our product portfolio," says Annabel Flores, President of Electronic Warfare Systems for Raytheon Intelligence & Space. "Laser weapons, especially, is a compelling business case. More and more people are seeing drones as a threat. They want to be able to be prepared to counter them and protect their soldiers and their populations. We have had a lot of very heavy engagements in Europe, Middle East and Asia Pacific. We expect that to continue and hope to have our first customer from these regions soon."

### No longer Just a Concept

The company's laser weapon system, which can take down drones, rockets, artillery, and mortars, is proven, has notched 20,000 operational hours. In extensive live-fire exercises earlier this year, RI&S and Kord used a 50kW-class high energy laser integrated on a Stryker combat vehicle to defeat



**Annabel Flores**, President of Electronic Warfare Systems for Raytheon Intelligence & Space.



multiple 60mm mortar rounds. The directed energy weapon system is part of the U.S. Army's Directed Energy Maneuver-Short Range Air Defence (DE M-SHORAD). In March this year, the company paired the HELWS with the National Advanced Surface-to-Air Missile System (NASAMS) to defeat multiple drones. In March last year, the company was awarded a contract by the U.S. Air Force Lifecycle Management Center, to build and deliver an upgraded version of its HELWS.

As part of Project Swinton, Raytheon UK, which was awarded a HELWS demonstrator contract in September last year, will deliver the system to the UK Ministry of Defence (MoD) before the end of the year. The 15-KW class system, which will be installed on a Wolfhound land vehicle, will undergo six months of trails in 2023. While the 15-KW system is intended to defeat smaller to medium size Group 1 and Group 2 drones, the 50 KW drone being developed for the US Army is capable defeating Group 1,2, and 3 drones as well as rocket artillery and mortars.

"We believe Project Swinton will be the foundation for future procurements," says Flores. "A lot of the technology is new. So many countries are looking to understand how it works, and to learn more about the operational capabilities. The leverage for the laser is that you plug it into a generator, and it remains charged; it is almost an infinite arsenal that you have. You can keep the missiles for bigger threats. You are giving soldiers in the field one more tool in the toolbox to be able to respond to threats like drones, rockets, artillery, and mortars."

### Going International

In response to the spike in demand for laser weapons, RI&S plans to open an advanced laser integration centre next year in Livingston, Scotland. The facility will focus on the testing, fielding and maintenance of defensive high-energy laser weapons.

"We have our manufacturing center in McKinney, Texas, but given all the interest we are seeing, we wanted to make sure that we have a facility that will help us support our systems once they are deployed," says Flores. "We wanted a location that is not in the U.S.; UK is a great location where we can test, field and maintain these systems. This way, we can quickly address maintenance or other issues and get capability back on the field, rather than



having to import it back into the US.”

Lasers make sense from a cost and safety perspective, says Flores. “It is a much more economical solution to defeat the asymmetric threat from drones. It makes no sense to shoot a missile at what could be a US\$100-200 drone, especially in populated areas. That is something you would never do. Another advantage is that you can use it immediately. As long as the system is plugged in, it continues to recharge. If it is not plugged in, it has 200 seconds of power. In that time, you can defeat about 30-40 drones. It takes only about 30 minutes to recharge.”

### Ahead of the Pack

There are other companies developing laser weapon systems, but Flores is confident of Raytheon being the preeminent player in the market. “Our discriminator is two-fold. One is how advanced we are - we are already in production; our system is deployed. The other, from a technology perspective, is the beam director. Part of how lasers work is how well you control the power that you have. You really need to focus all of that energy in one spot. Some of these drones are highly maneuverable, but our beam director is able to focus on targets, hone-in, and stay on them, and be able to focus that laser energy in a very small area. It is very concentrated power. Not everybody can do that piece of it.”

RI&S is currently licensed to export 50-KW laser weapon system to multiple countries. “That is what we are focused on, for domestic and abroad” says Flores. “We think that is the right solution for this set of threats. When you start getting into much larger threats, there are other tools that you could use, and lasers may not make the most sense.”

There are lessons to be learned from the ongoing Russian war on Ukraine, says Flores. “A lot of commercial drones are being used differently than they were intended; we are seeing them become kind of an airborne IED similar to what we saw many years ago in the Middle East. We foreshadowed that this would happen and spent many years investing in lasers, the engi-

neering, and the science behind how you harness that power differently. For many years, lasers were always talked about as something that are going to be ready for products in five years. It was always five years away. We are proud of the fact that we have demonstrated that lasers are here today.”

### Built to Protect

RI&S laser weapon systems, which work on land, in the air and at sea, provides 360-degree coverage that protects bases, airports, stadiums and other high-value military or civilian targets. The system’s open architecture is another key highlight, says Flores. “That gives us the ability to advance and provide new software code that helps the system evolve. The software agility that we have introduced really takes us to the next level when it comes to helping our customers continually evolve with the threat. That is what we are putting forward across our entire portfolio. We do not have the luxury of time to develop a brand-new system every time there is a new threat. It is about making the most of existing capabilities, advancing them to the future, and looking to continually upgrade what is already deployed.”

Flores expects the strength of Raytheon Technologies to come together “in very unique ways to address future threats, both on the defence and commercial side.” “We have our core competencies, but we are really looking for synergies across the entire portfolio. We partner very heavily with the missiles and defense side because of the radar side of what they provide, but we are also actively working with Collins Aerospace as well, it is really exciting to watch our teams come together.”





# THE NEW WAVE

## FUNDING FOR FUTURE AIR MOBILITY DECLINES IN THE FIRST SIX MONTHS OF THE YEAR AS THE FOCUS OF THE AVIATION INDUSTRY TURNS TO SUSTAINABILITY INITIATIVES

– ARUN SIVASANKARAN

For those who attended Farnborough Airshow 2022 and witnessed firsthand the urban air taxi frenzy – concept vehicles vying for attention and headlines – it is hard to believe that funding for future air mobility (FAM) actually declined in the first half of 2022 compared to 2021.

One of the primary reasons for the decline in funding for FAM? You guessed right – the shift in momentum to the sustainable aviation segment. While sustainable aviation was responsible for just 2 per cent of funding in the first half of 2021, the figure jumped to 23 per cent in the first half of 2022 as a result of funding raised by companies such as Cranfield Aerospace Solutions and Surf Air Mobility.

According to a McKinsey & Company report released during the recently concluded airshow, industry funding for FAM from January through June this year was \$US2.2 billion, which is a significant decrease from the same period last year, when \$US4.3 billion flowed into the sector. The cumulative disclosed industry funding so far for the sector is US\$15 billion. There was a decline of about 25 per cent in deal activity in the first half of the year as well compared to the corresponding period last year. Average deal size also fell.

### Still in Good Health

The first signs of worry? No, says Tore Johnston, Franz Reuel, and Robin Riedel, in the report. “Some may question whether FAM players will continue to attract capital. We believe that skepticism is misplaced. True, funding has slowed on an annual basis, but that is compared to a record US\$6.9 billion in disclosed funding in 2021. Over the long-term, capital flows are still ahead of the pace in prior years. The short-term slowdown in funding thus far in 2022 is merely a resumption of normal growth after a big spike in 2021.”

According to the authors, the FAM industry is applying a portfolio approach, casting a wide net, and letting a broad range of companies pursue their own solutions. “Some will inevitably fail, and—as with the current blip in funding—that should not be taken as a signal of deeper problems. So many different concepts and designs are in development that some companies will get

it right, and we will see a disruptive new mode of mobility emerge.”

One of the primary reasons for the decline in funding for FAM? You guessed right – the shift in momentum to the sustainable aviation segment. While sustainable aviation was responsible for just 2 per cent of funding in the first half of 2021, the figure jumped to 23 per cent in the first half of 2022 as a result of funding raised by companies such as Cranfield Aerospace Solutions and Surf Air Mobility. According to the report, decarbonization will drive more interest in sustainable conventional take-off and landing aircraft powered by battery electric, hybrid and hydrogen sources. The cargo delivery market could be ready to scale with potential capital influxes from small to large drone sizes, it adds.

Prominent among the new breed of electric vertical take-off and landing (eVTOL) platforms promoted at the event were that of Embraer subsidiary Eve Urban Mobility, which unveiled its cabin mockup at the airshow, Vertical Aerospace, Lillium, Overair and Supernal. While almost all these platforms as well as California-based Joby Aviation will be manned at least initially, Wisk Aero, which is owned by Boeing and Kitty Hawk, is going straight for unmanned flights, and wants to seek certification for the aircraft around 2028.

### The Way to Decarbonization

Even though fuel related emissions account for almost 99 percent of total lifecycle emissions of commercial aircraft, decarbonization is a massive goal that the industry will only achieve if it also devotes attention to reducing non-fuel-related emissions in the lifecycle, McKinsey says in another report. More attention should be paid to the non-fuel-related emissions of aircraft across their full lifecycle, which encompasses the materials, manufacturing, assembly, and maintenance



operations value chains.

Most discussion in the aviation industry has been focused on reducing fuel-related emissions, often referred to as “well-to-wake” emissions. Airlines have already committed to achieving net-zero emissions by 2050, but the decarbonization goal will be achieved only if companies within the aerospace industry—airframe OEMs, propulsion specialists, and other suppliers—also contribute, the report, by Axel Esqué, Stephan Lidel, Kritika Rastogi, Robin Riedel, and Franz Reuel, adds.

The use of sustainable aviation fuels (SAFs) continues to be the most impactful short- and medium-term lever in the decarbonization pathway of the industry, the report says. Much of the efforts to reduce well-to-wake emissions in the aviation sector are focused on increasing the use of SAFs. The industry is also developing true zero propulsion technologies, including battery-electric and hydrogen-based propulsion, increased operational efficiency, and undertaking fleet replacement with more modern and fuel-efficient aircraft.

“Once the aviation industry introduces true zero technologies, non-fuel-related factors will comprise a bigger share of total emissions, making this a good time for OEMs and suppliers to start decarbonizing their products,” the report says. Aircraft manufacturers, suppliers and maintenance providers should include their direct scope 1 and 2 emissions in their decarbonization efforts, such as by moving to green electricity and making their processes more efficient. Building decarbonization into design on the part of OEMs, expanding decarbonization efforts along the supply chain, and securing access to low-carbon materials are some of the other ways by which the industry can address aviation’s non-fuel-related emissions, the report adds.

## Sustainability Initiatives

At the event, Boeing unveiled Cascade, a data modeling tool that shows the most effective scenarios for reaching path to net zero emissions by 2050. Cascade assesses the full lifecycle impacts of renewable energy by accounting for the emissions required to produce, distribute and use alternative energy carriers such as hydrogen, electricity, and SAF. Boeing plans to utilize the Cascade tool with airline operators, industry partners, and policymakers.

“We have to take a holistic view to decarbonization,” says Boeing Chief Sustainability Officer Chris Raymond. “And when we do that, it is clear that sustainable aviation fuel (SAF) is a necessary lever. We know it will take a ‘SAF and’ approach and not a ‘SAF or’ approach to achieving net-zero by 2050.”

Among the sustainability initiatives announced at the airshow was one involving Embraer, with the company announcing on the eve of the event that it had signed a Letter of Intent with Raízen to stimulate the development of the SAF production ecosystem. The Brazilian OEM has set a target of having SAF blends representing 100% of its fuel consumption in Brazil by 2030 and will be hoping that Raízen will help it achieve that. Among the plane maker’s other sustainability initiative is the four Energia concept aircraft that it has announced, which will fly using electric, hydrogen fuel cell, dual-fuel gas turbine and hybrid-electric propulsion.

Meanwhile, Airbus and a number of airlines, including Air Canada, Air France-KLM, easyJet, International Airlines Group, LATAM Airlines Group, Lufthansa Group and Virgin Atlantic, have signed Letters of Intent (LoI) to explore opportunities for a future supply of carbon removal credits from direct air carbon capture technology. The companies have committed to buying 400,000 tonnes of Direct Air Carbon Capture and Storage (DACCS) from 1PointFive, an Airbus partner. DACCS involves filtering and removing CO<sub>2</sub> emissions directly from the air using high powered fans. Once removed from the air, the CO<sub>2</sub> is safely and permanently stored in geologic reservoirs. As the aviation industry cannot capture CO<sub>2</sub> emissions released into the atmosphere at source, a DACCS solution would allow the sector to extract the equivalent amount of emissions from its operations directly from atmospheric air.





**Luis Carlos Affonso**, Embraer's Sr. VP of Engineering, Technology and Corporate Strategy

## SUSTAINABILITY IN ACTION

### "THAT'S THE ONLY WAY TO SURVIVE IN THE INDUSTRY"

As the latest Embraer E190-E2 'Tech Shark' touched a cruise altitude of 15000 feet over the Isle of Wight, during a demonstration flight from Farnborough, the only "noise" on-board was that created by the enthusiastic shutterbugs. "A quiet plane is an efficient plane," Luis Carlos Affonso, Embraer's Sr. VP of Engineering, Technology and Corporate Strategy, seated next to me, exclaimed. "Noise is energy. If you're making a noise, you're wasting energy."

#### That Silent Approach

"When we started in 2010 our project was the third largest aero-acoustic study in the world. As we knew Pratt & Whitney's PW1900G engines were some of the quietest available, we turned our attention to the E2's structure to find opportunities to reduce noise – namely air friction from the wings and the landing gear. Engineers simulated the in-flight air stream both virtually and physically – with a scale model in São Carlos' aerodynamics lab's wind tunnel – where giant fans produce winds up to 180km/hour and ultra-sensitive microphones detect noise sources on the aircraft structure. Using this information we made adjustments until we found the ideal geometry of the wing and landing gear. So the E2 isn't just certified sustainable – it's certified quiet."

As the 114 seat aircraft hovered over the southwest of England, it was being powered by Pratt & Whitney PurePower Geared Turbofan engines with 39.06 per cent sustainable aviation fuel (SAF) blend. "SAF has been a big part of Embraer's sustainability roadmap. We are aiming towards a goal of having SAF blends representing 100 per cent of the fuel consumption in Brazil by 2030," Affonso said. Recently, an Embraer E195-E2 medium-range airliner successfully completed a flight test with one engine burning 100 per cent sustainable aviation fuel.

"This test demonstrates that the E2 is ready for 100 per cent SAF certification and operation once the industry finalizes standards," he said. To drive a sustainable, long-term recovery in the aviation industry, facilitating the transition to net-zero flying by the middle of this century remains a priority across aviation's value chain. "Achieving net-zero CO2 emissions by 2050 will not only help create an environmentally sustainable future but also ensure a financially resilient and competitive aviation industry as a whole," he noted.

#### How Do We Do This?

According to Affonso the use of SAF – fuel either made from biogenic feedstocks such as waste cooking oil, agricultural residues and municipal waste, or through next generation SAF technologies such as power-to-liquid from recycled CO2 and carbon-capture technologies – will play an indispensable part in achieving this transition. Given the long lead time for new propulsion technologies like hydrogen and electric to come to market, SAF is a way to make substantial progress on net zero immediately, for both long and short haul aviation.

#### But There is a Red Area.

"The problem of wider adoption is two-fold: the cost and current limited supply of SAF. Today's commercial production of SAF is only approximately 0.05 per cent of total EU jet fuel consumption – and the current pace of growth is nowhere near what it should be to meet global climate objectives.

#### So What is the Solution ?

"We need to significantly increase the availability of SAF all across the globe. SAF that is currently commercially available can reduce GHG emissions by up to 80 per cent on a life-cycle emissions basis as compared to fossil fuels, offering airlines a way to become greener while continuing to fly. "

#### Compatible to E2 Family

"SAF can be used without modification to existing aircraft and engine infrastructure," Affonso pointed out, adding, "All Pratt & Whitney engines and Embraer aircraft are currently certified to operate with SAF blended up to 50 per cent with standard Jet A/A1 kerosene, according to ASTM International specifications. Future specifications will enable blends of up to 100 per cent SAF to maximize the emissions reduction potential of using fuel derived from sustainable, non-fossil-based feedstocks."

# EMBRAER EYES NEW MARKETS FOR THE C-390

Embraer Defence is eyeing new markets for its new generation multi-role military transport aircraft, the C-390 Millennium, which is also available in its air-to-air refuelling configuration, the KC-390. The Brazilian airframer entered into a memorandum of understanding (MoU) at the recently concluded Farnborough Airshow with BAE Systems, wherein both firms will establish a strategic partnership to collaborate in markets in which the latter has a significant presence, including selected markets in the Middle East, for example, the Kingdom of Saudi Arabia. Embraer would benefit from BAE Systems' valuable international defence market experience and delivery and support to complex military projects, said Jackson Schneider, President and CEO, Embraer Defence & Security. "We believe that the best approach for us is going to be aligned with partnerships and specific regional partnerships or local partnerships. We were announcing the first one for Middle East looking at the market in Saudi Arabia. But in short, I think that we will be able and I hope to be able to announce other partnerships in the future."

Embraer is eyeing several customers around the world including the Middle East, where many air forces operate ageing C-130 fleets, which require replacement. In addition to offering the C-390,



**Jackson Schneider**, President and CEO, Embraer Defence & Security.

Embraer along with BAE Systems will also look at opportunities to develop special mission variants of the aircraft. Something, Schneider says can be done with relative ease and an area, where he is optimistic about Embraer's chances. A VIP configuration could also be considered. However, he added that this was the beginning of the process and that Embraer and BAE Systems were hoping to together address the Saudi requirement, so that they could meet it in the best way possible. BAE Systems has a longstanding presence in Saudi Arabia and understands their needs, he added.

Commenting on Embraer's efforts in promoting the C-390/KC-390 for Saudi Arabia, Schneider said, "We are bringing to Saudi Arabia, the best platform in the market and are looking to enter into a deeper partnership when it comes to our defence platforms and we are very flexible on doing things together." The C-390 can deliver more payload much faster than any other airplane in the medium airlift market; it has a maximum payload of 26 metric tons and has a cruising speed of 0.8 Mach, thanks to its twin IAE V2500 jet engines. The aircraft also has a range of 3,370 miles. Unlike some of its legacy competitors, Schneider says Embraer made full use of its experience with commercial aeroplanes going back 15 years, to incorporate the latest avionics and systems on the aircraft, which aid in the aircraft's high availability rates for operational missions.

Embraer currently has three customers for the KC-390, which was developed as a joint project with the Brazilian Air Force. The Brazilian Air Force (FAB) will now take 22 aircraft instead of 28 earlier contracted in 2014. Deliveries will now stretch out to 2034. The Portuguese Air Force (FAP) has five KC-390s on order and deliveries are expected to commence next year. Hungary has signed up for two KC-390s, with deliveries slated in 2023-24. The aircraft are produced at Embraer's Gavião Peixoto factory, in Brazil's São Paulo state.

Embraer and BAE Systems also announced at the show, a collaboration to work together on developing a potential defence variant of the Eve electrical vertical take-off and landing (eVTOL) vehicle, formalising a partnership first announced in December 2021. "This product will to be the future of the aviation and we see a market for defence applications. Together with Embraer's tradition in aviation and BAE Systems' knowledge about this market, we are confident that will be first ones to address this requirement." Schneider added that potential applications for military eVTOLs could involve logistics roles, medical evacuation and special mission roles.





# REINVENTING THE WHEEL

**AT LOGIC, GROWTH IS NOT A SLOGAN, IT IS A MIND-SET**

– JAY MENON

Since 1962 Italy's Logic Avionics System Group has been designing, developing, manufacturing and selling aeronautical equipment. Logic's flexibility in tailoring solutions to the needs of the customer has generated a wide range of equipment for the various product families. The company recently took a majority stake of electronics specialist Gelco, capping the first phase of a mergers and acquisitions strategy launched five years ago. Under its M&A plan, Logic Group, whose subsidiaries include Blu Electronic and Gemelli, has grown from some EUR 20.1 million in revenues in 2017 to a forecast EUR49 million in 2022.

As the company celebrates an important milestone of 60 years of operations as Tier-1 partner of major international OEMs. its CEO Alessandro Franzoni said: "We are very proud to have completed this first stage of our strategic development plan. This will provide the Group with a solid base to continue the process towards an international footprint. Our M&A plan helps in reinforcing the technological and industrial bases to make the Group growing on the value chain."

As part of its organic development, Logic has become a system integrator for electrical power systems, helicopter full ice-protection systems, intercom systems, and recently obtained EASA Part 21 J (A) DOA approval, which it expects will result in its first ETSO—for a backup flight instrument in the first quarter of 2023. The group also actively participates with Phase Motion Controls in the development of a brushless 28-VDC starter/generator.

"Our safety critical Electro Mechanical Actuators are powering the primary flight controls of a modern advanced trainer aircraft. The company is investing in enabling technologies for power management and distribution of hybrid propulsion system that will power future aircraft," Franzoni said.

## On Future Plans

"We are investing a lot on technologies and product for power distribution and management on board of electric and hybrid aircraft, because we determined that that is the future. So, we decided to create in our premises a lab for validation of technologies to be then exported on to future hybrid aircraft. That technologies may be largely different from the one that we use in our aircraft today. The power will be so big that most of the technology we use today may no longer be usable in the future. So, we decided to create this laboratory not only to progress in technology development on our components, but also to provide to the system integrator a place where they can test and validate their technology on propulsion system, and be together with our technology on power management and distribution in an integrated environment. We have been listening to requirements from different players and we have established the configuration of the laboratory which is now under construction in our premises in Cassina de Pecchi. Parallel to that we are also investing in developing subsystems in cooperation with the Italian company Gelco, which we just acquired.

## Advantage of Acquiring Gelco

The main scope of the acquisition of Gelco is to provide us a full vertical integration from design, development, qualification, and prototype production. Before the acquisition of Gelco, Logic was merely an engineering prototype company, with a small production base, doing in-house assembly testing, With the acquisition of Gelco we now have a large manufacturing base. Plus they have now a small engineering department that we plan to grow. But we plan to grow the way we need in Logic.

We will multiply our forces and so they will be able to immediately verticalize the prototype and start production for us. But in the near future, they will also do design and development of modules and components.

Gelco is very strong in manufacturing right now, they have two fully automated production line SMT technology and not only are they good in manufacturing, they have a customer base, which is largely complementary with ours. They have important customers like Elettronica, Northrop Grumman, Rheinmetall which are not currently in our customer base and vice versa. So we can expand and cross sell. In short, with this acquisition, we have reached our primary target.

## IS THE NEXT STEP TO GO GLOBAL?

The next steps will be to continue both organically and through M&A. We see the next target for us at 100 million euros, but the next steps will most likely be in terms of acquisitions abroad. We think, to complete this growth process, we also need to have an industrial footprint which is international. We now have an international customer base. More than 60 per cent of our sales are abroad. But we need to have an international footprint. Our strategic focus initially will be on an Airbus country and United States. But of course, most will depend also from opportunities. We have growing businesses in some Middle East and Far East countries as well.



LOGIC CEO Alessandro Franzoni



**PRABHAKAR ATLA**, President & Global Head  
– Aerospace, Rail and Communications at CYIENT

# ON CLOUD NINE

## CYIENT IS STRENGTHENING FUTURE-READY CAPABILITIES

– JAY MENON

Cyient, a global engineering, manufacturing, and digital technology solutions company, is reinforcing its commitment toward strengthening future-ready capabilities and is steadily pivoting to be a consulting-led technology solutions partner for its customers. At Farnborough, the company announced a multi-year partnership with Honeywell to manufacture the aviation industry's first cloud-connected cockpit system – The Honeywell Anthem.

"The Honeywell Anthem flight deck will have unparalleled levels of connectivity, an intuitive interface modelled after everyday smart devices, and a highly scalable and customisable design. It will be driven by a versatile software platform that can be modified for virtually every type of aircraft, including passenger and cargo planes, business jets, helicopters, general aviation planes, and the fast-developing class of advanced air-mobility (AAM) vehicles," said Prabhakar Atla, President & Global Head – Aerospace, Rail and Communications at Cyient. "This is a testament to the value we create as strategic partners for our customers in the Aerospace and Defense sector with our cutting-edge Design-led Manufacturing (DLM) powered by technology."

### So What is DLM?

"Design Led Manufacturing or DLM is using an integrated manufacturing approach. We support the

entire product life cycle from concept through manufacturing and beyond. Our engineers not only design products to specifications but also consider potential challenges that could occur during the manufacturing stage. It helps in reducing product costs with our value engineering recommendations that result in more efficient designs, components, and production processes. Customers also benefit from seamless transition from the design phase to the manufacturing phase. "We at Cyient also take complete ownership of the process from the development and manufacturing phases, which ensures accountability."

### Cost Factor

"Cyient's focus is on reducing costs, improving quality and reliability, while decreasing time-to-market. We utilise a proactive approach to obsolescence management, taking extra steps during the design phase to ensure that there are no delays during the manufacturing process."

### Identifying the Right Components

"Cyient identifies components by performing risk analysis of the electronic component life cycle. We identify alternate and interchangeable BOMs, stockpile parts for future production, and avoid out of stock, allocation, or costly last time buy situations. We avoid redesigns and provide multi-sourcing options that proactively help with design decisions. We understand the criticality of getting the product to market quickly. And we focus on the quality of the products in addition to the speed-to-market, so that the new product introduction is a success."

### Cyient as a Defence and Aerospace Company

"In the aerospace sector we design, build, manage and transform subsystems. Subsystems can be as complex as those going into an aerospace engine or any hardware product that goes into the aircraft.

"We believe that the next evolution of the propulsion systems and the aircraft will be primarily towards a mix of the convention plus hybrid. So we are focusing on developing themes and concepts on these lines and discussing with our customers."

### A Global Indian Company

"We have our headquarters in India, but we are fairly global. Approximately, half of our design capabilities have already been accepted internationally. The US, and the UK are important hubs for our business, but we also have our presence across Europe, where we have expanded our operations. We announced two acquisitions in Europe in the last three months.

### On Alternate Energy

Industries have been in a state of constant evolution. The kind of engines that flew before are not the same. The ones that will fly in the future will be unimaginable. We have designed a new engine which burns 17 per cent less fuel compared to commercial engines. The concept there is that you put a gear in an engine so that it burns less fuel than what it is required in a commercial aircraft. The process has started and when we design the next generation of the systems, we are going to focus on sustainability and renewability. But it is not easy.





# FORGING AHEAD

## AEQUS IS REAPING THE BENEFITS OF VERTICAL INTEGRATION IN ITS AEROSPACE COMPONENTS BUSINESS

– ATUL CHANDRA

Leading Indian aerospace components maker, Aequs Pvt. Ltd (Aequs) is bullish on its growth prospects and is well placed for a production ramp up to meet surging demand from the aerospace industry. Aequs operates the largest aero machining facility in India with over one million machining hours delivered per year from its Belagavi Aerospace Cluster, located in the Southern Indian State of Karnataka. The Aequs SEZ hosts separate facilities for forging, machining, surface treatment, assemblies, tooling etc. that cater to multiple stages of the aerospace supply chain – all in one location.

In an exclusive interaction with GBP on the sidelines of the Farnborough Airshow, Aravind Melligeri, Chairman & CEO, Aequs, provided an insight into the company's activities. A regular visitor to the Farnborough Airshow over the last 15 years, Melligeri said discussions with partners and potential customers at the show, were largely centred around the challenges being faced by the industry, especially related to pricing of materials and their availability and supply constraints. With Europe and the USA facing constraints related to production ramp-ups due to shortage of labour, Melligeri said this could provide a great opportunity for India, where availability of labour has not been as much a problem.

"At Aequs we have been able to leverage this more and more. In our discussions we also find that due to emerging geopolitical risks, many companies are now looking at India as a better option to transition out their business to." We tick all the boxes for companies that need a high-performance aerospace components supplier in an emerging market who can improve cost structures over a period of time through vertical integration and reduce the carbon footprint, Melligeri said. However, a problem we are now facing is that some of our potential customers, are not able to put the teams and resources together to transition work out to us, he added.

Despite the disruption to its business during the pandemic, Melligeri said Aequs added US\$20 million in new work in 2021 and is looking to double that figure this year. The company's aerospace business is worth approximately US\$100 million. Aequs is looking to expand its forging facility as Melligeri foresees a capacity constraint if the expansion does not take place. Aequs announced in July, that it had entered into a strategic alliance with the US\$26 billion Hindalco Industries for long-term collaboration and joint business development in the commercial aerospace sector. "Our partnership with Hindalco will allow us access to local aluminium, which can be forged, machined and finished at our facilities. This allows us to offer 100 percent in-country value add, which has never happened in the past."

He added that when it comes to aerospace components made of aluminum, India was earlier not able to deliver 100 percent in-country value add. The challenge he said, is that India presently does not have sufficient domestic consumption of aluminum plates which are used for machining. As a result, setting up a billion dollar aluminum plate facility is a challenge, in a country which consumes only about 6,000 tonnes of such material annually. However, with the partnership with Hindalco, Aequs will be able to make this transition, which is already attracting interest from airframer's such as Airbus.



ARAVIND MELLIGERI, Chairman & CEO–AEQUS



veillance and reconnaissance missions the official said, adding that radars used on maritime helicopters in the SAR role, struggled to find small objects in the ocean. This forces the crew to conduct a visual search at low level, switching to night vision goggles (NVG) at night. "When conducting a visual search with the naked eye or NVGs, the helicopter has to descend to 200 feet during which the crew can see 60m on either side. With MicroLite on an SAR helicopter, it can fly at 2,000 feet, allowing an area of 1000m to be scanned," the official said. A single console is provided onboard the helicopter for the sensor operator.

The MicroLite features a high-resolution medium wave IR (MWIR) sensor and visual high definition (HD) colour sensors. The entire sensor is only about 25cm in size and weighs 8.5 kg along with an additional 2 kg for the computer which undertakes processing tasks. The MWIR sensor and visual colour sensors both offer a resolution of 140 Mpixels X 2 Hz. The sensor provides for independent and simultaneous monitoring of IR and colour video for multiple users.

The entire area is continuously revisited at a very high rate, allowing for simultaneous high-resolution tracking and investigation of multiple targets, including small targets. The sensor can continuously monitor a large area, creating a wide footprint. It also provides false alarm minimisation. The scanning mechanism on the sensor covers a FOV of 55 degrees by 56 degrees, twice every second. The sensor allows SAR missions to be undertaken with a far higher degree of certainty and will reduce the time taken to undertake such missions.



The MicroLite's gimballed-turret design, enables horizon-to-horizon field of regard and the system also includes an onboard data processing and storage unit for real-time advanced image processing. Up to 12 hours of footage can be stored onboard the aircraft. The official also said that another highlight of the sensor, was that footage recorded by the device could later be simultaneously accessed by up to 10 users at the same time.

The MicroLite was originally launched as an Intelligence, Surveillance, Targeting and Reconnaissance (ISTAR) system, for use on small aerial platforms such as unmanned aerial vehicles (UAV), manned aircraft, aerostats and observation balloons. It is part of Rafael's family of advanced aerial EO systems, that include the Litening advanced targeting pod, the RecceLite real-time Digital ISR pod and the Toplite EO/IR System, and more. Over 1700 Litening pods have been fielded operationally.

# SAR SAVIOUR

## RAFAEL IS PROMOTING ITS MICROLITE AIRBORNE EO/IR SYSTEM FOR ROTORCRAFT SAR APPLICATIONS

– ATUL CHANDRA

Rafael Advanced Defence Systems Ltd (Rafael) is promoting 'MicroLite,' its lightweight, EO/IR sensor for airborne Search & Rescue (SAR) missions. Company officials in an exclusive briefing to GBP at the Farnborough airshow, announced that Rafael is now in the final stages of developing MicroLite for helicopters for use in the maritime SAR role. "This is a brand-new system configured for maritime SAR applications and we are in the final stages of development. We are between TRL 8-9 for this system," a company official told GBP. Rafael has already secured a launch customer and potential customers can also avail of demonstrations in Israel, the official said. "We are now in the process of refining the system, further," the official added.

With MicroLite, an SAR helicopter crew can cover a search area 10 times faster, as compared to a visual search. SAR assets are typically required to perform reconnaissance of a large area and current SAR helicopters are typically fitted with video payloads that have a very narrow field of view (FOV). The chin mounted sensor can also be configured for combat search and rescue (CSAR) missions on land but will require different algorithms. It could also have application for border security and homeland security.

MicroLite for helicopters can be used for both sur-





# TARGET IN SIGHT

## BOEING IS MAKING A STRONG PITCH FOR THE F/A-18E SUPER HORNET AS THE INDIAN NAVY'S NEW FIGHTER

- ATUL CHANDRA

Global competitions for carrier borne fighter aircraft are few and far between with only a handful of nations operating aircraft carriers. The Russian and Chinese markets for such fighters are only open to their domestic manufacturers. Outside of the USA, France and the United Kingdom, India remains the only sizeable market for carrier borne fighter aircraft. At present, Boeing and Dassault Aviation are locked in a competition for the sale of 26 naval fighter aircraft to India under the Multi-Role Carrier Borne Fighter (MRCBF) programme. The navy is looking to replace its Russian built MiG-29K fighter jets with either the F/A-18E Super Hornet or Rafale M (Marine). Boeing is offering the Super Hornet in E-Variant (single-seater) and F-Variant (two-seater) to the Indian Navy.

Boeing has made rapid inroads into the Indian defence market since the late 2000s with sales of the P-8I maritime patrol aircraft to the navy and C-17 Globemaster III, AH-64E 'Apache' and CH-47I 'Chinook' to the air force. A fighter sale to India, will mark a massive win for the U.S. firm and during an exclusive media interaction on Boeing's defence prospects in India, company officials were quietly confident of the Super Hornet's selection as the next naval fighter.

Speaking on the successful operational demonstration tests performed with two Super Hornet aircraft at Indian Naval Station Hansa in Goa, India in July, Randy Rotte Boeing's Senior Director for International Business Development for the Asia-Pacific region told GBP, "We performed the operational demonstration at very heavy weights, simulating either the carriage of a very heavy fuel load or weapons load. This means that the aircraft would be combat effective, immediately after take-off from the aircraft carrier." A team of almost 60, U.S. Navy and Boeing personnel supported the demonstration effort, which showcased the Super Hornet's ability to operate from a Short Take-Off but Arrested Recovery (STOBAR) aircraft carrier. Company officials said the in-country demonstrations had been nearly six years in the making. Over the course of the tests held in India, the two aircraft undertook multiple ski-jumps, roll-in and fly-in arrestment's, as well as performance flights. These flights were performed in a variety of weights in air-to-air, air-to-ground, and air-to-surface configurations as mandated by the Indian Navy.

Maria Laine Boeing's Vice President of International Strategic Partnerships for Defence, Space & Security, said "The Super Hornet has the lowest lifecycle costs for the sustainment of that platform of any tactical fighter in the US government inventory,"

adding that this was a true competitive discriminator advantage for the Indian Navy. Rotte also added that the Super Hornet's advanced network architecture would allow it to interface with the P-8I and other U.S.-origin helicopters and future carrier-based unmanned systems. The navy recently took delivery of its first batch of two Sikorsky MH-60R helicopters in India, in addition to three aircraft which are being used for crew training in the USA. Commenting on the performance of Boeing's existing platforms in India, Rotte stated that the operational readiness rates of navy P-8Is were "off the charts" and the aircraft were being used extensively for a variety of missions. The same was the case with the C-17, which he said is being flown extensively by the air force. Rotte added that Boeing definitely believes that there will be additional opportunities for sales related to the P-8I and additional helicopters for the Indian armed forces. "As long as we can continue to perform, I foresee them at some point in looking at whether that's something they want more of."

Heidi Grant Boeing's President, Business Development Defence, Space & Security Global Services said the company would be able to leverage opportunities for Indian suppliers within its commercial business as areas of future collaboration as it looked to create a more resilient supply chain, for which it is looking at how it can deepen its partnership in India. Indian firms are today part of Boeing's global supply chain for platforms such as the FA-18, F-15EX, P-8, CH-47 Chinook, AH-64 Apache, T-7 and V-22 and entry into Boeing's commercial aircraft supply chain will provide them with much needed economies of scale. Commenting on Boeing's in-country presence, Salil Gupte President Boeing India, said that with the ongoing focus on 'Atmanirbhar Bharat' and building the industrial capability for aerospace in India, Boeing had done the most of any foreign OEM. "We are currently doing over US\$1 billion worth of exports annually from India, spread across 280 different suppliers." He also added that Boeing was investing in a state-of-the-art US\$200 million campus in Bangalore.



# VERTICAL STRENGTH

## LEONARDO'S AW149 IS A STRONG CONTENDER FOR UK'S NEW MEDIUM HELICOPTER (NMH) REQUIREMENT

– ATUL CHANDRA

An important new rotorcraft type on display at Farnborough, was the military variant of Leonardo's AW149, which was flown in directly to participate at the show from weapons trials being undertaken in Europe. The AW149 is competing for the UK's New Medium Helicopter (NMH) requirement. Leonardo submitted its response to the UK MOD Defence Equipment & Support (DE&S) Pre-Qualification Questionnaire (PQQ) in June and company officials are confident of the new rotorcraft's prospects.

GBP spoke with Mike Morrisroe, Head of UK Campaigns, Leonardo Helicopters and Mark Burnand, Chief Test Pilot, Leonardo Helicopters UK to better understand the capabilities of the new medium helicopter, which is likely to also be a strong contender in the export market. According to Mike, since the AW149 is Leonardo's latest generation medium multi-role battlefield helicopter, a key requirement was the need to carry men and materials in and out of confined areas. "From an aircraft perspective, we were looking at a helicopter with as small a footprint as possible but with a large cabin. The AW149's footprint is similar to the Bell 212, but whereas that was a 5-tonne helicopter, we are in the 8.5 tonne category."

Mark said a major advantage of the AW149 is its large cabin, which can accommodate 12 fully

armed troops, with the ability to go up to 16 troops seated in four rows of four passengers. There is also a high-density seating configuration which can accommodate 19 passengers. "We have also demonstrated the ability to have crew served weapons fitted without impacting door space," he said. The wide cabin also allows stretchers to be carried across the cabin. The aircraft on display at Farnborough was also fitted with an auxiliary fuel tank, which was fitted behind the middle two seats at the back. Mark also alluded to the excellent battlefield survivability of the helicopter, which has a wide range of defensive aids systems and chaff and flare dispensers to defend against Man Portable Air Defence System (MANPADS) threats. The AW149 has been designed from the outset to be a highly versatile military platform and Leonardo has developed different mission kits to meet customer requirements.

Leonardo is offering two engine options for the UK NMH requirement between General Electric's (GE) CT7-2E1 and Safran Helicopter Engines (SHE) Aneto-1K, which develop 2000 shp and 2500 shp respectively. The AW149 on display at the show was fitted with a GE CT7-2E1 with an inlet barrier filter. An Infra-Red suppression system can also be fitted. The Aneto-1K is a derivative of SHE's RTM322, which was fitted on the UK's AH-64D Apache attack helicopters and on Royal Navy Merlin helicopters. According to Mike, the Safran powerplant was better suited for operations in 'Hot and High' environments but comes with a weight penalty and burns more fuel. The GE CT7-2E1 on the other hand he says, provides operators with range and endurance but still very good 'Hot and High' performance capability.

Leonardo has already begun to establish a new AW149 production line at its site in Yeovil which will ensure that the first UK AW149s can be delivered into operational service by 2025. The new AW149 line will also have commonalities with the AW189 which was previously produced on-site in Yeovil. Both types share the same external footprint in addition to having common engines, drivetrain, blades, Digital Automatic Flight Control Systems, and Flight Management System. Leonardo built 10 AW189 helicopters in Yeovil between 2014-18 for the UK's Search and Rescue service which are operated by Bristow Helicopters. The AW149 programme received a boost in July, when Poland awarded a contract worth approximately EUR1.76 billion for supply of 32 AW149 multi-role helicopters to PZL-Świdnik, a Polish company fully owned by Leonardo.



# FROM AN OASIS TO AN OCEAN

## SAUDI ARABIA PLANS TO DEVELOP ITS NASCENT DEFENCE INDUSTRY INTO A GLOBAL POWERHOUSE

– JAY MENON

At the FIA visitors from across the globe were introduced to various strategic objectives and initiatives undertaken by Saudi Arabia's blooming defence sector. "As one of the world's 20 biggest economies, the Kingdom is opening itself up to international investment and on an unprecedented scale. This has been our journey since 2017 and under the guidance of Vision 2030. It is an exciting prospect for any original equipment manufacturer or any other investor around the world to become a part of this journey of transformation," said General Authority for Military Industries' or GAMI Governor Ahmad Al-Ohali.

"With the localization and technology development plans, supply chain program, our human capital strategy, the World Defense Show, and many other programs, Saudi Arabia will not only expand its footprint in the global defense industry, but also become a hub for innovation in defense," he added.

"Saudi Arabia today is an investment powerhouse and our reforms over the past several years are proof that we are ready to take all necessary measures to maintain and build on the momentum," Al-Ohali said. Saudi Arabia's aims to localise more than 50 per cent of its expenditure on defence by 2030.

### How GAMI Helps

GAMI hopes to develop its nascent industry by collaborating with different stakeholders in the defence and security sectors. "For example, we have identified our platforms (and) localisation plans, developed a robust industrial and services supply chain program, a Military Industry Human Capital program, organised the World Defense Show, and much more. None of this would have been possible if we didn't have the support of other government stakeholders like the Ministry of Defense and other security ministries, as well as the public and private sector players such as Saudi Arabian Military Industries, and the local and international original equipment manufacturers."

"GAMI does not only determine the investment opportunities in our localisation initiatives, but we also make it easier for local and global investors to find the right opportunity and the right strategic partner for them in the Kingdom. Again, these are all key components of our effort to create a healthy, strong, sustainable ecosystem," Al-Ohali said.

"Innovation, research and technology in the defence ecosystem is vital for sustainable localisation. We are working closely with the newly established General Authority for Defence development to guide the defence technology development."

Al-Ohali said training of young people was a key component of the strategy. "One such initiative is the National Academy of Military Industries, whereby GAMI is establishing an independent academy to train, upskill, and enable the national personnel



that will ultimately help us realise our localisation goals."

GAMI has determined six defence segments that present opportunities for investment, including land for manufacturing; maintenance repair and overhaul fixed wing; electronics; unmanned aerial vehicles; maintenance and repair for the navy; and production of personnel equipment.

### Second Edition of WDS

The second edition of Saudi Arabia's World Defense Show is expected to be bigger with the addition of another building offering participants additional exhibition space to compliment the two existing main halls. "The next WDS will be a five-day event from Feb 4- Feb 8, 2024 and will have a day for the public to witness the show," Andrew Pearcey, Chief Executive Officer of World Defence Show, said.

"After the success of the inaugural show with 65,000 trade visitors, over 600 exhibitors and deals worth SAR 29.7 billion (US\$7.9 billion), we have managed to put the Kingdom of Saudi Arabia in the map of international defence trade shows," he said.

A third of the exhibitors have already confirmed their participation for the 2024 event, he added. The show also helped affirm unprecedented demand from the local and global defence markets. "The economic impact created by the first WDS is already being felt in the Kingdom with small scale local defence manufacturers gaining a competitive edge in the global market," he said.

The organisers have established a WDS advisory group comprising several big and small and medium companies to work on the feedback received from participants at this year's show. "The incredible feedback we received from the industry, following the success of our first edition, has propelled us to continue growing and enhancing the offering of the show. We strive to serve and satisfy the industry's needs, so it is crucial that we work alongside all our partners to ensure we continue to evolve all areas of the show," he said. Independent survey results revealed that 88 per cent of attendees are highly likely to return to Riyadh for the 2024 edition.

# GOLDEN EAGLES MAY FLY TO MALAYSIA

## LATEST CLAIMS INDICATE THAT RMAF MAY GO IN FOR KOREAN FA-50

– JAY MENON

The Royal Malaysian Air Force (RMAF) is likely to select the Korea Aerospace Industries (KAI) built FA-50 Golden Eagle light combat aircraft to replace its ageing fighters, possibly putting at rest speculations that RMAF may go in for India-made Tejas LCA or Turkish Aerospace Hurjet supersonic advanced trainer.

The RMAF is currently focused on acquiring new platforms under the light combat aircraft program to replace the Hawk, MB-339 and Mig-29 platforms. Last June, the Malaysian Defence Ministry floated a tender for the program. The brief announcement said the service aims to acquire 18 aircraft initially.

The light combat aircraft is expected to address a wide variety of threats, from conventional to insurgencies. These expectations are consistent with the 2019 Malaysian Defence White Paper, which states the need to enhance Malaysia's air defence and air strike capability.

Earlier, India's Hindustan Aeronautics Ltd (HAL) CMD R Madhavan had claimed that the South East Asian nation had identified the Indian-manufactured single engine Tejas light combat aircraft (LCA) for its fighter replacement program. Turkish Aerospace (TAI) General Manager Prof. Dr. Temel Kotil also had exuded confidence after the offer to Malaysia to build 15 of the possible order of 18 Hürjet single-engine, tandem seat, supersonic advanced trainer, and light combat aircraft.

According to local Malaysian sources, six companies had submitted tender documents. Apart from the FA-50, Tejas and Hurjet, China had offered the L-15, Italy participated with Leonardo M-346, and the Russian Federation with its MiG-35.

"The RMAF chief (Gen Asghar Khan Goriman Khan) has evinced keen interest in the FA-50 compared to the other vying aircraft, as it is an affordable and efficient supersonic advanced light attack platform," an official said on condition of anonymity. "The deal is expected to go through if the current government comes back to power in the coming elections."

Malaysia is expected to conduct early general elections before the term of the current Parliament ends in July 2023.



Since the retirement of its MiG-29 and F-5E fighter jets from front-line roles in the late 2010, the RMAF has been considering several options for over a dozen new aircraft including the possibility of acquiring new Russian fighters such as the Yak-130 and MiG-35, also known as the MiG-29 M2 aircraft, and the Sino-Pakistani JF-17 fighter jets.

Malaysia's Defence Minister Hishammuddin Hussein also seems to be interested in acquiring the South Korean FA-50 after he termed the aircraft as a "reliable platform based on good reputation."

A senior official from KAI also confirmed: "Malaysia is in advanced talks with us. The two countries believe that bilateral cooperation in the defence industry can become a symbol of mutual trust and a robust strategic partnership."

South Korea's Defense Minister Suh Wook met virtually with his Malaysian counterpart Hishammuddin Bin Tun Hussein in April this year and the two sides signed a memorandum of understanding on defence cooperation. Suh also used the opportunity to promote the FA-50 light attack aircraft.

"The FA-50 will certainly give Malaysia an upper hand," the KAI official said.

The RMAF has an estimated 71 combat aircraft in its inventory, ranging from F/A-18D Hornets, Mig-29N, Sukhoi-30 MKM, Hawk MK-108/MK-208 and MB-339C combat aircraft. The Hornets and Hawks were acquired in the mid-1990s, while the Sukhois were delivered to the RMAF between 2007 and 2009. The Mig-29s have been retired from service in phases since 2009. The first attempt to find suitable replacements was the Multi-Role Combat Aircraft program. But budget constraints led Malaysia to suspend the program in 2017.

"Given Malaysia's budget constraints, it will be tempting for defence planners to choose a light combat aircraft platform based primarily on acquisition costs, which they have done previously. For example, the acquisitions of the MiGs and Sukhois from Russia were paid partly through barter trade," according to Abdul Rahman Yaacob, a PhD candidate at the National Security College, The Australian National University.

"But policymakers should also consider other costs in determining the appropriate light combat aircraft platform. A possible alternative approach is to adopt a Total Ownership Cost concept for the new platforms to operate at the optimal level in the long run, which would include the development, personnel, training, and logistical support costs," he noted. "This approach will provide a clearer picture of the new asset's running costs and lead to a well-informed decision on which platform to acquire so that the RMAF can execute its mission in the long run."





**SOFEX JORDAN**

# THE XIII<sup>TH</sup> EDITION

OF THE SPECIAL OPERATIONS FORCES EXHIBITION & CONFERENCE

# SOFEX JORDAN 2022



31<sup>ST</sup> OCTOBER- 03<sup>RD</sup> NOVEMBER



THE AQABA GATE AVIATION

KING HUSSEIN INTERNATIONAL AIRPORT

BOOK YOUR STAND TODAY, CONTACT [SALES@SOFEXJORDAN.COM](mailto:SALES@SOFEXJORDAN.COM)

[WWW.SOFEXJORDAN.COM](http://WWW.SOFEXJORDAN.COM)

# THE WAY FORWARD

## A NEW SYSTEM DESIGNED TO MOVE AIRCRAFT AT AIRPORTS SAFELY WITHOUT USING FUEL IS SET TO ENTER THE MARKET IN 2023

– ARUN SIVASANKARAN

Even as the aviation industry strengthens its focus on sustainability, an innovative system to move aircraft at airports from the runway to the gate and back, without using fuel, is attracting attention.

The Aircraft Towing System (ATS), developed by Oklahoma-based Aircraft Towing Systems World Wide LLC., has a fully automated design and promises significant savings on fuel, faster pushback times and enhanced safety. According to the company, Chicago O'Hare could save as much as US\$491 million in fuel costs alone each year by using the system. A prototype of the technology, presently being installed at the Ardmore Industrial Airpark in Ardmore, OK, will be completed in September this year. The company expects to sell its first system in 2023.

"Fuel savings is just one of the benefits," says Vince Howie, Company CEO and Vice President. "Reduced engine run-time while on the ground results in reduced emissions. As the engine is switched off while towing, there is less noise. The system also lowers manpower requirements significantly."

The idea for the system came about during a chance meeting between Howie, who was Director of Aerospace & Defense for the Oklahoma Department of Commerce until 2020, and Stan Malicki at the Paris Airshow in 2015. "Back then, it was just an idea that Stan had. I thought that it had a lot of potential and invited him to come to Oklahoma," says Howie. "He liked what he saw and wanted to work on the concept in the state. We formed an LLC and asked the Oklahoma State University to design and develop a prototype. Once we got the design to the point where we started talking about a prototype, I left my job with the state and began working on this full time."



### One System, Three Configurations

Following feedback from prospective buyers, ATS has decided to come up with three configurations of the system. "We have a complete airport system that goes all over the airport, but what we are ready to sell and what we are prototyping is the pushback piece at the gate that eliminates two dollies, tugs and marshalling crew. We also have a point-to-point ferry system. American Airlines is interested in one at Tulsa Airport to take the aircraft from the terminal to the maintenance bay. It now takes up to 16 people to move the aircraft that mile and a quarter to the maintenance bay. With this, we can do the same thing with just one person."

The under-development system uses an electrohydraulic powered pullcar and tow dolly system to automatically transport aircraft at airports using the ATS underground channel system. After landing, the pilot taxis to the appropriate taxiway and drives the aircraft nose wheel onto the ATS tow dolly. Once secured, the aircraft's main jet engines are shut down. The aircraft then moves using the ATS underground channel system located beneath the taxiway to the appropriate gate.

### In Demand

"We are in negotiations with a number of prospective customers," says Howie. "We are talking to Baltimore Washington International; they are interested in a ferry system to take the aircraft to the maintenance bay. They want us to be certified by the FAA; we have started the process. In Madrid, they are interested in trying out the pushback option. We had initially targeted the larger hubs with the system but at a conference, I had representatives from 22 airports come up and ask if they could buy just the pushback component of the system. That is when we decided to have three configurations of the system."

"Everyone loves it; they think it will solve all their problems," says Howie. "But they want to see it work. Next year, we will sell one or two systems. Once we start moving planes, that will be gamechanger for us. Fuel savings alone, you could pay for the system in less than a year if you did a total system in a large airport."





# ONWARDS AND UPWARDS

## DRAMATIC ADVANCES IN URBAN AIR MOBILITY COULD TRANSFORM THE AVIATION INDUSTRY BY 2030

– ATUL CHANDRA

Current advances in Urban Air Mobility (UAM) were on display at the Farnborough Airshow, with some impressive all-electric vertical take-off and landing (eVTOL) aircraft on display. Despite their science fiction appearance, there does appear to be a strong future market for eVTOLs. “The Future of Vertical Mobility” published by Porsche Consulting predicts demand for 500, 2,000 and 15,000 passenger eVTOLs in 2025, 2030 and 2035, respectively. While there are scores of UAM programmes underway worldwide at various stages of development, some of the most promising products made an appearance at Farnborough.

### Vertical Aerospace VX4

Perhaps the most impressive looking of them all, was the full-scale mockup of the VX4 eVTOL from Vertical Aerospace. The VX4 eVTOL is Vertical’s attempt at developing a piloted four-passenger zero operating emissions aircraft, which will be capable of travelling over 160km and achieve speeds of up to 320kph. Vertical’s VX4 is targeting entry into service in 2025. The VX4 features four tilting rotors at the front and four stowable rotors at the rear. The aircraft’s airframe will be made from lightweight carbon fibre composite and features a custom designed high-aspect ratio wing to generate lift during cruise.

A Rolls-Royce electrical power system will be integrated into the piloted eVTOL and nearly 150 Rolls-Royce engineers based in Hungary, Singapore, Germany, USA and the UK are working

with Vertical Aerospace team on developing the aircraft. The Rolls-Royce developed electric power system includes, the company’s latest 100kW-class lift and push electrical propulsion units. The company claims that the aircraft’s design will support a vehicle noise signature which will be 15dBA lower than a comparable helicopter.

In addition to its industrial partnerships with Rolls-Royce, Honeywell, Microsoft, Solvay, GKN, and Leonardo, the former three of which are also investors into Vertical; Vertical also announced a partnership with Hanwha Aerospace and CAE at the show. Hanwha Aerospace will develop the electric mechanical actuator for the VX4, including the tilt and pitch control for the four forward propellers, and aerodynamic control surface actuation on the wing and V-tail. CAE will be the pilot training partner for the VX4 and its innovative pilot training program will leverage advanced technologies including Mixed Reality and Artificial Intelligence to enhance the learning experience and will help shift the training paradigm toward cost-effectiveness and scalability.

Vertical Aerospace was founded in 2016 and has a pre-order book by value for more than 1,400 aircraft from global customers which include American Airlines, Virgin Atlantic, Avolon, Bristow, Marubeni, Japan Airlines (JAL), Gol, Air Greenland, Gozen Holding and AirAsia, etc.

### Wisk Aero

Another Advanced Air Mobility (AAM) company that displayed its eVTOL at the show was American firm Wisk Aero. Wisk is the developer of the first all-electric, self-flying air taxi in the U.S. and displayed its 5th generation aircraft, a two-seater eVTOL called ‘Cora’ at Farnborough for the first time. Wisk has a fleet of test, demo, and display



aircraft, which allowed the AAM company to display its aircraft in the UK and Australia, simultaneously.

Company officials announced at the show, that they would unveil the 6th generation prototype of their eVTOL later this year. The four seater eVTOL will also be used to obtain U.S. Federal Aviation Administration certification. While declining to comment on the cost of its eVTOL development, a company official said that developing a similar eVTOL in the same category would require an investment of US\$2 billion.

Company officials also stated that they were hard at work with their partners to increase the battery life onboard the aircraft as it was 1/3rd the weight of the aircraft and would also have a critical bearing on operating costs. The official said that they are 500 engineers working across Wisk's eVTOL programmes and the primary focus was to deliver an affordable, efficient and sustainable aircraft that operated with the highest levels of safety.

Wisk is an independent company backed by Boeing and Kitty Hawk Corporation. The AAM company secured US\$450 million in funding from Boeing in January.

### Joby Looks to UK eVTOL Certification

California-based eVTOL aircraft maker Joby announced at the show that it had formally applied for UK certification of its revolutionary aircraft design. Joby will work with the FAA for its U.S.-based certification to be concurrently validated by the United Kingdom's Civil Aviation Authority (CAA).

JoeBen Bevirt, Joby Aviation's founder and CEO, said that by working hand-in-hand on certification, the U.K. and the U.S. were setting the stage to be amongst the earliest adopters of this important new technology. Joby's five-seat, piloted eVTOL is designed to connect people and cities through fast, quiet, and emissions-free flight. It will have a maximum range of 150 miles and a quiet acoustic profile.

The eVTOL maker is targeting the U.S. to be its first operating market and is currently pursuing

"type certification" with the FAA.

### eVTOL Cabins Unveiled

Embraer-backed eVTOL developer, Eve Air Mobility unveiled a new cabin mock-up for its aircraft which featured lightweight seats made from recycled plastic for the passenger cabin and a single-pilot flight deck. "As with any important aircraft development, the most important aspect goes inside," Stein added. "Since the beginning of the project, we have been focusing a lot on the user experience. We are understanding the different needs, the different users from different backgrounds to ensure we are developing a product to deliver a vast user experience – something that's simple and intuitive for our users."

Eve also unveiled a new wing and empennage combination redesign which replaces the originally planned wing and canard configuration. "With not a lot of moving parts and complexity, we can keep it efficient, relying on wings to fly and cruise. We are keeping the same DNA. It's just the point of development where we felt it's mature to share," said Eve Co-CEO Andre Stein. Eve has plans for entry into service for its eVTOL in 2026.

The Eve eVTOL will be equipped with eight vertical lift rotors and a pair of pusher propellers, which will propel it to a cruise speed of 125 mph. The company is targeting to achieve a range of up to 60 miles on a single charge. Eve has already signed provisional sales agreements covering deliveries of 1,910 aircraft. Stein said. Republic Airways, Halo Aviation, Flapper, Helipass, Blade, Widerøe Zero, Falko, Fahari Aviation, Bristow, Helisul Aviação, Falcon Aviation, and Avantto are among the operators, flight booking platforms, and leasing companies that have committed to buy the Eve aircraft.

U.S.-based mobility service provider Supernal, also unveiled the initial design for its new eVTOL. The five-seat cabin concept showcased a light-weight interior cabin, made of forged carbon fiber. Sustainability was at the forefront of the cabin design which features materials such as advanced recyclable carbon fiber reinforced thermoplastic, durable plant-based leather, recycled plastic fabric and responsibly sourced woods. Supernal is part of Hyundai Motor Group and is working to certify its eVTOL vehicle for commercial use in the United States starting in 2028 – and in the E.U. and U.K. shortly after.







At least one Urban Air Mobility (UAM) company has opted to go for unmanned operations from the get-go, but Andre Stein, Eve Urban Mobility CEO, believes manned flights are the answer. For now.

**“The future is unmanned, but we believe the best approach is to initially have a human operator inside. With that, you can acquire enough data and knowhow so that we can transition to unmanned operations, when we believe it is safe,” Andre Stein, Eve Urban Mobility CEO**

“The future is unmanned,” he said in an interview, after unveiling the cabin concept of Eve’s air mobility vehicle during the Airshow. “But we believe the best approach is to initially have a human operator inside. With that, you can acquire enough data and knowhow so that we can transition to unmanned operations, when we believe it is safe.”

The Company’s eVTOL is expected to enter into service in 2026. In an ideal situation, Eve would start unmanned operations simultaneously in all regions, but Stein says that isn’t likely. “We believe we won’t be everywhere at the same time. Some countries might take longer. Some countries might adopt it faster.”

Ground rules exist for certification of manned eVTOL aircraft but are yet to be introduced for unmanned aircraft carrying passengers. “Using a pilot operation first allows us to create a concept of operations,” Stein said. “Having these different concepts of operations in different parts of the world will help us understand the operations really well, that will help us design autonomous operations based on the knowledge we gain. Recently, we flew a pack of sensors using a helicopter in an urban environment in Rio, to start the machine learning process.”

Eve is committed to a sustainable future for aviation, Stein added. “We see ourselves as one of the big enablers of UAM. We have a holistic way of looking at the sector. We do not intend to be an operator ourselves but will work with our partners in different ways to create operations that are efficient.”

### Industry Backing

The company has the largest backlog in the industry in terms

# ONE STEP AT A TIME

## EVE URBAN MOBILITY WILL START OPERATIONS WITH MANNED FLIGHTS BUT IS ALREADY EVALUATING AUTONOMOUS FLIGHT TECHNOLOGIES

– ARUN SIVASANKARAN

of customers with letters of intent signed already for almost 2000 eVTOLs. According to Stein, Eve has one of the most diverse bases of customers and partners, including helicopter operators, ride sharing apps, and leasing companies. “We have partners and customers in every single continent apart from Antarctica. We are working together on all parts of the UAM ecosystem with partners such as infrastructure providers, financial institutions, and technology providers.”

Among the operators, flight booking platforms, and leasing companies that have committed to buy Eve’s eVTOL are Republic Airways, Halo Aviation, Falcon Aviation, Blade, Falko, Fahari Aviation (a subsidiary of Kenya Airways), Bristow, Helisul Aviação, Flapper, Helipass, Widerøe Zero, and Avantto.

Embraer and Eve are committed to seeking input from customers while developing the eVTOL. “We are co-creating this solution along with our customers,” said Stein. “We want to engage with them early on and deliver the right solution. Our focus is on the right building blocks. It is not about rushing but about having the building blocks right.”



# STANDING OUT IN A CROWD

**MANTA AIRCRAFT, WHICH IS DEVELOPING THREE MODELS OF A HYBRID-ELECTRIC VERTICAL AND SHORT TAKE-OFF AND LANDING (HEV/STOL) AIRCRAFT, IS FOCUSED ON INTER-REGIONAL AIR MOBILITY**

– ARUN SIVASANKARAN

Even as a rapidly growing list of companies compete to gain control of the nascent Urban Air Mobility (UAM) market, a European company has decided to take a different route to success.

Manta Aircraft, with offices in Italy and Switzerland, is developing different models of hybrid-electric Vertical and Short Take-off and Landing (HeV/STOL) aircraft for multipurpose use. The company is building a 2-seater piloted aircraft for utility missions (ANN 2), a bigger aircraft that can handle between 2 and five passengers (ANN Plus), and an autonomous long-range drone (ANNA Drone). All three models have a cruising speed of 250-300 kilometers per hour and are being designed for inter-regional air mobility.

It was a conscious decision to stay away from the urban air mobility space, says Lucas Marchesini, CEO of Manta Aircraft. "If you think of the world and its seven billion people, how many live in the twenty cities where urban air mobility is feasible? We are focused on range. We want to make long-distance, high-speed air transport possible."

## The Point of Difference

"We have a gas turbine that provides all the power for the cruise and part of the power for the vertical take-off and landing," adds Marchesini. "When we need to do vertical flight, we use the batteries as well. It is similar to a hybrid car; we use a serial hybrid propulsion system. The gas turbine is not used for propulsion directly but used to drive the power generator; it is the power generator that produces the electric power for the electric motors. This can be supplemented by the battery power when in vertical flight, and when we want to fly silently."



The battery on all the models is much smaller than on other eVTOL aircraft, says Marchesini. "The small battery has many advantages; it is lighter, and the cost of the battery is much lower than those on other aircraft," says the company CEO. "The hybrid propulsion system allows an outstanding range for regional and inter-city flights. Another advantage that the platform has over others is affordable operating costs."

The ANN platform has two ranges. "The range is 300 kilometers with vertical take-off. In that case, the maximum take-off weight is limited," says Marchesini. If you have a road strip of 300 meters, you can load the aircraft a lot more and the range increases significantly. You can load a lot more fuel or payload then. The platform has big fuel tanks; the wings are all fuel tanks. With the maximum number of passengers, the aim is to have at least 800 km range when you have a runway."

## Already in Demand

Manta has already signed agreements with two companies. One of the agreements is with Avionord, a private air transport company that specializes in Medical Air Transport. The two companies are expected to field as many as 15 eVTOL aircraft derived from the ANN platform in medical services configuration.

"The company plans to cover Italy first," says Marchesini. "They are also operating in the southern areas of France, and in other countries such as Australia and Greece. They want the ANN platform because of its range; when you have to transport a heart for 300-400 km, you need the range. This is a perfect use case; you have a very small and light payload which has a very high value. The other agreement is with a company that currently provides ground transportation services for VIPs in England, Egypt, Morocco, and Saudi Arabia. They now want to get into advanced air mobility."

Marchesini expects the ANN drone to become operational first "because of all the regulations for manned flight." The company expects to have the first unmanned prototype ready by the end of 2023, he adds.

"We will start taking orders in 2024 and deliver in 2025 for the experimental market. In the United States, there are more than 27,000 experimental aircraft. I believe the two-seater is good for the experimental market."





# VIETNAM INTERNATIONAL AVIATION EXPO 2022

15 - 17. 09. 2022 

VIETNAM NATIONAL CONVENTION CENTER  
Gate 1, Thang Long Boulevard, Nam Tu Liem, Ha Noi.

#### SUPPORTING ORGANIZATIONS



#### OUR SPONSORS



#### ORGANISED BY



#### PARTNERS



#### PATRONS



#### MEDIA PARTNER



[www.vietnamaviationexpo.vn](http://www.vietnamaviationexpo.vn)

# A FORCE WITH NATURE E2

## E2. THE WORLD'S MOST EFFICIENT SINGLE-AISLE AIRCRAFT

Lower fuel burn and emissions. Extremely quiet inside the cabin and outside. The most efficient aircraft in single-aisle. When it comes to environmental friendliness, the E2 is a force with nature.

#AForceWithNature



 **EMBRAER**

CHALLENGE.  
CREATE.  
OUTPERFORM.