

AVIATION

TURKEY



**BOEING 747
LEGEND ENDS**

**GLOBAL AVIATION
JOURNALISTS GATHERED
AT IATA MEDIA DAYS IN
GENEVA**

**GULFSTREAM G700
AMASSES 25 SPEED
RECORDS DURING WORLD
TOUR**

**SPECIAL INTERVIEW WITH
GÖKHAN SEFA, FOUNDER
AT VENTUM AVIATION
CONSULTANCY**

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- Dialogue with Airline Leaders. Transformation of Business Models, Fleet Renewal, Recovery from the COVID Crisis
- MRO Digitalization

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Basım Tarihi

Aralık 2022-Ocak 2023

Yayın Türü

Sürelî

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Ventum
Aviation is
Focused on
Busines Jet
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Boeing
747 Legend
Ends!



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IATA Reports Airlines Cut Losses in 2022; Return to Profit in 2023

IATA expects a return to profitability for the global airline industry in 2023 as airlines continue to cut losses stemming from the effects of the COVID-19 pandemic to their business in 2022.

According to IATA lately published report, in 2023, airlines are expected to post a small net profit of \$4.7 billion—a 0.6% net profit margin. It is the first profit since 2019 when industry net profits were \$26.4 billion (3.1% net profit margin). In 2022, airline net losses are expected to be \$6.9 billion (an improvement on the \$9.7 billion loss for 2022 in IATA's June outlook). This is significantly better than losses of \$42.0 billion and \$137.7 billion that were realized in 2021 and 2020 respectively.

In 2023 the airline industry is expected to tip into profitability. Airlines are anticipated to earn a global net profit of \$4.7 billion on revenues of \$779 billion (0.6% net margin). This expected improvement comes despite growing

economic uncertainties as global GDP growth slows to 1.3% (from 2.9% in 2022). It is reported that despite the economic uncertainties, there are plenty of reasons to be optimistic about 2023. Lower oil price inflation and continuing pent-up demand should help to keep costs in check as the strong growth trend continues.

While indications are that there could be an easing of aggressive inflation-fighting interest rate hikes from early 2023, the risk of some economies falling into recession remains. Such a slowdown could affect demand for both passenger and cargo services. It would, however, likely come with some mitigation in the form of lower oil prices.

The outlook anticipates a gradual re-opening of China to international traffic and the easing of domestic COVID-19 restrictions progressively from the second half of 2023. A prolongation of China's Zero COVID policies would adversely affect the outlook.

If materialized, proposals for increased infrastructure charges or taxes to support sustainability efforts could also eat away at profitability in 2023.

All regions' financial performance continues to improve since the depth of the pandemic losses seen in 2020. North America is the only region to return to profitability in 2022, based on IATA estimates. Two regions will join ranks with North America in this respect in 2023: Europe and the Middle East, while Latin America, Africa, and Asia-Pacific will remain in the red.

European carriers are expected to see a loss of \$3.1 billion in 2022, and a profit of \$621 million in 2023. In 2023, passenger demand growth of 8.9% is expected to outpace capacity growth of 6.1%. Over the year, the region is expected to serve 88.7% of pre-crisis demand levels with 89.1% of pre-crisis capacity.

The war in Ukraine has curtailed the activities of some of the region's carriers. Operational

disruptions at some of the continent's hubs are being resolved, but labor unrest continues at various locations.

Passengers are taking advantage of the return of their freedom to travel. A recent IATA poll of travelers in 11 global markets revealed that





nearly 70% are traveling as much or more than they did prior to the pandemic. And, while the economic situation is concerning to 85% of travelers, 57% have no intention to curb their travel habits.

The same study also demonstrated the

important role that travelers see the airline industry playing:

91% said that connectivity by air is critical to the economy

90% said that air travel is a necessity for modern life

87% said that air travel

has a positive impact on societies, and

Of the 57% familiar with the UN Sustainable Development Goals (SDGs), 91% understand that air transport is a key contributor.

It is obvious that the financial recovery will take shape with a first

industry profit since 2019. For the bright and better days to Aviation Industry in 2023..

Enjoy the issue...🌐

Ayşe Akalın
Editor in Chief

Ventum Aviation is Focused on Business Jet Sales & Acquisition and Cost Control Management



 **Ayşe Akalın:** What is the main focus of Ventum Aviation in Business Jet Industry

Gökhan Sefa: Ventum was established in 2018 and focusing on Business Jet sales/acquisition and cost control management for the aircraft owners.

As it is clearly known Aircraft sales and acquisition is a part of international trade business therefore it must be professionally managed. When there is available aircraft engaged by the prospective client, the client should be assisted for a well defined Pre Purchase Inspection (PPI), clear title, smooth transaction which is conducted with a successful closing via a well recognized escrow agency. In today's world it is highly important to retain a professional consulting company for aircraft needs so that the consulting firm can apply each important steps of transactions which are in compliance with Ethic and International trade rules.

The other business area focused by Ventum is cost control management of the business jet on behalf of the aircraft owner.



Founder at Ventum Aviation Consultancy, Gökhan Sefa & Editor in Chief of Aviation Turkey Magazine, Ayşe Akalın

This business is highly important to aircraft owners and takes a place once aircraft is acquired by the client and in operation.

 **Ayşe Akalın:** Could you briefly describe the important steps of Business jet transaction (sales & acquisition)

Gökhan Sefa: The most important step of the business jet transaction is to hire the right consulting firm that will protect the client's right who retained the firm. With that way, there will be neither grey zone nor hidden cost behind of the transaction. This will also prevent the client from spending any more money than what Aircraft fair market value is. The client that

retains a consulting firm for its aircraft needs has to know how much he/she would spend for the aircraft value and for the service of consultancy.. In other words to make the aircraft sales/acquisition process crystal clear, client should retain the right firm that can represent the client in international aircraft transaction by using the correct instruments. As it is clear, there are 2 sides of aircraft transaction. Once side it to sell as the other side is to purchase. First, Lets go with the important steps of buying an aircraft:

Selection of the aircraft type/model/age/range.. etc which would meet with the expectation of the client. Confirmation of the ownership history

and the mandated firm to make sure Aircraft is marketed by the exclusively retained agency and is not sanction ownership involved. This step will prevent the buyer from paying commissions to many unknown broker and provide the buyer a green light to move on the interest in the aircraft. Checking all the up to date maintenance records and next 2 years upcoming maintenance forecast of the selected Aircraft. Once we are confident that the aircraft is fine, has a clear title and enough proof to submit an LOI (Letter of Intend), we prepare the first draft of LOI. This LOI will clearly include the first offer price, which Escrow



Agency to be used, where Aircraft would be taken for PPI(pre purchase Inspection) and how much deposit to be placed to Escrow. Once LOI is accepted, the consulting company manages the opening of escrow account for the specific serial number of this aircraft and make sure the deposit is in that account. Working with the best reputable escrow agency is the key element of successful and the best secured transaction, once account is open at Escrow, it is a mandatory to protect the buyers right to search for title for international registry, confirming of the aircraft owner's record including the UBO's (ultimate beneficial owner) passport copy..etc. In other words, KYC(Know your customer) forms must be cleared and exchanged. With this

steps, the seller and buyer are now confirmed that there are end user sitting at aircraft transaction table and there is one consulting company representing the buyer as the other one representing the seller. This will secure the smooth, transparent transaction and protect aircraft value from hidden cost, unnecessary paid commissions...etc.

The other important step is to visit the aircraft and check all the previous records (Log book and record review).

On that step it is highly important to invite the prospective operator's technical manager for the record view since aircraft will be operated by them which will make operator the accountable company against to all Aviation Authorities around the world.

Once log books and records are clear for transaction, the next step is the preparation of APA (Aircraft purchase agreement). Please note that based on the deal structure and the mutual agreement by both parties APA can even be signed before Log Book review. In the end it is highly important to sign APA before PPI starts. This a red line for Ventum Aviaton and there is no negotiation on that to protect the client. Once APA is signed and aircraft is at the assigned facility for PPI, both buyer and seller will know how much of the work package they are individually responsible. In other

words, there is NO grey zone for the client that retained Ventum

Once PPI completed, the next step is to technical acceptance the aircraft or refuse the aircraft. The details and the conditions of the acceptance or rejection is clearly defined at APA. And again it is highly important to retain the right consulting company to input the right wording at APA for coverage.

When aircraft will be accepted and released for the service from the facility, it is time now for closing. The closing is the step where aircraft ownership/title will change. The most important step here is



that to release the full amount of the acquisition price to the escrow and wait for de-registration. The details of that steps must be defined at APA as well.

Once aircraft is deregistered from its Aviation Authority, Escrow with the instruction from the both parties consulting firms will transfer the title of the aircraft to its new owner as the fund is transferred to the previous owner. Dedicated escrow agency will notify both parties by sending the proof the bill of sales with dated and proof of the payment.

Here at Ventum Aviation clients retained Ventum

to acquire a business jet, usually receives 6 revision of the status report to make sure the client knows where he/she is at his/her acquisition process. Aircraft selling process is also similar to what explained above. However one of the key extinguish between them is preparation steps. Once Aircraft is to be sold by an retained consulting firm, consulting firm needs to make sure there will be a professional photographer involved supported by good marketing team for high resolution photographs and brochures. The data introduced to the market must be appropriate and up to date. Here at Ventum Aviation clients

retained Ventum to sell their business jet, usually receives 6 revision of the status report to make sure the client knows where he/she is at his/her sales process.

✈️ Ayşe Akalın: What is the most important steps of business jet transaction?

As I have briefed above, The most important step of the business jet transaction is to retain the right consultancy firm that will protect the clients right. With that way, there will be neither grey zone nor hidden cost behind of the transaction. This will also prevent both parties from spending any more than what Aircraft fair market value is.

The client that hires a consulting firm for its aircraft needs has to know how much he/she would spend for the aircraft and for the service of consultancy. In other words to make the aircraft sales/acquisition process crystal clear, client should retain the right firm that

can represent the client in international aircraft transaction by using the best instruments. As it is clear there are 2 sides of aircraft transaction. Once side it to sell as the other side is to purchase.

✈️ Ayşe Akalın: You describe Ventum Aviation as a consultant firm that is retained by seller or buyer side and manages the process for its customer. How is it separated from being a broker company?

Ventum is a not a broker company. The reason why we say that is that Ventum is not buying to sell someone else. Or we are not using someone else's funds to create a back to back transactions.

With full transparency, Ventum always represents one side of the transaction and receives its fee by its client. i.e. If Ventum is not retained to sell a specific business jet, Ventum never approaches to the owner of the jet and asks for fee to be paid if there is a customer of Ventum willing to purchase his jet

INTERVIEW



In that circumstances, Ventum would approach to this aircraft only when Ventum has an acquisition mandate signed by the buyer side which means Ventum will not work to sell the aircraft but will acquire the aircraft for its exclusive client.

✈️ Ayşe Akalın: As you mentioned earlier ventum is also focusing on cost control management for the business jet owners. Could you please provide more information what is cost control management of a business jet?

The baseline of Cost Control management of business jet is to make sure that owner will not spend any more than the owner should spend for the aircraft operation costs. As it is known, Aircraft operating cost has 2 aspects. One side

is fixed costs, The other side is variable costs.

Some of the examples of The fixed costs are: crew, salary, aircraft insurance, hangar parking fee, Operator fee...etc And some of the variable costs are: fuel, maintenance, accommodations...etc

As it is clear fixed costs are already agreed and fixed cost which mean the aircraft owner would already know how much he would spend each month whether aircraft is in operation or not. For the fixed cost items, ventum can play a major role before the contract sign with the service provider and then follow up that the invoices are appropriate with what it is signed in the contract. For example, it is important to enroll the aircraft engines on a engine program which will cover the cost of the

engine for schedule and unscheduled maintenance service.

Before that contract sign Ventum acts on behalf of the owner and shares contract negotiations skills to make sure the signed contract will well protect the client for the best convenient price.

This type of contracts are usually good for next 3-5 years. So once the right fixed contract is signed and activated , owner is secure and there is nothing to worry about it.

Some contracts for example can be signed as a yearly base such as insurance, operator, hangar parking...etc

However, the cost control management plays a key role when there are certain variable costs involved. For example, when Aircraft will due for

a schedule maintenance Ventum asks the operator to collect proposals from different maintenance facilities (MROs) and then prepare a comparison chart for the owner's best selection. Once the owner decides to select 2 MROs, it is then Ventum's responsibility to enter a contract negotiation process with the MROs to make sure each step of the maintenance will be well defined, and the cost of additional works will reasonable.

Once aircraft is at the selected MRO, Ventum works very closely with MRO and the aircraft operator to monitor the maintenance and additional prices.

As it is known technical expenses are an ongoing expenses which occurs every month. There is always service request from the operator to make sure aircraft is airworthy.

In order to provide a full transparent cost control Ventum always keeps a dedicated person from the aircraft owner company in each correspondences and never applies back charges. The goal of the cost control to make sure that Aircraft will be operated with a reasonable cost and the owner will be paying the invoices to the end user. In order to secure that goal Ventum never takes



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INTERVIEW

any invoices over its account. The payments are always done between the owner/operator/end user. Ventum charges its clients on a monthly fixed “cost control management invoice” and never takes any addition on it.

Our historical data proves that Ventum saves over 150.000USD /per year / per aircraft that includes pilot training rebates to be used for the aircraft owner and saving of maintenance services

✈️ Ayşe Akalın: What does Ventum do to protect the aircraft owners from unnecessary spending?

For that step, ventum makes sure the owner of the aircraft is well informed about his aircraft ongoing process.

Is it nice to have it? Or is it mandatory to have it. If it is mandatory, is it right to be paid? Once Ventum at that stage, it is important to report the owner a solid data with a proven record. For example, Owner might be offered to enroll a parts program which is normal upfront payment yearly fixed block hour with the escalation of each year. The program might cover some of the parts where the owner will probably may not need next 3-4 years. In a circumstances like that Ventum checks the previous historical records of the aircraft and makes an assumption whether it is mandatory to add that coverage to “part agreement” or it is only nice to add that coverage. The secret of our cost control management is that Ventum provides

each data about the service intended to be purchased and let the owner decides how to act.

✈️ Ayşe Akalın: Where do you see most spending occurs and what how do you control it?

Most of the spending occurs for technical services. If technical expenses are not projected well and not followed on a daily basis there is a big possibility the cost of technical expenses will go higher and higher.

Recently, One of the aircraft that is managed by Ventum had to go 96 Months inspection which is the most expensive maintenance service for that type of aircraft. Before the maintenance started, the contract negotiation and management skills

of Ventum allowed the aircraft owner to prepare a budget for maintenance which didn't surprise the owner in the end of maintenance. Ventum's calculation for the service 98% appropriate with the total final invoice provided by the dedicated MRO.

✈️ Ayşe Akalın: Other than Ventum's existing clients in Turkiye, do you have another clients out side of Turkiye that Ventum provides cost control?

As of today ventum manages fleet of business jets worth over \$50Million. Other than Turkish operators that Ventum has aircraft, there are also aircraft of Ventum under the operations in UK and international companies like jetAviation which is the General Dynamic company ➡





TÜRKSAT



Gulfstream G700

Amasses 25 Speed Records

During World Tour



Fully Outfitted G700 Traveled to Six Continents as World Tour Wraps

Gulfstream G700 achieved 25 speed records on the recently completed G700 world tour. Gulfstream flew two fully outfitted G700 production test aircraft to more than 20 countries across six continents to

demonstrate the aircraft's performance capabilities and the flexibility and comfort of the most spacious cabin in the industry.

"The G700 world tour was a tremendous success," said Mark Burns, president, Gulfstream. "We knew the aircraft would perform exceptionally well, and they exceeded even our own high expectations for both reliability and performance across a variety of routes. Showcasing the outfitted aircraft to our customers and prospects around the world bolstered the already strong demand we are seeing for the G700."

Notable record runs achieved by the G700 include:

- *Savannah to Riyadh, Saudi Arabia, in 12 hours, 36 minutes at an average speed of Mach 0.90 to begin the international portion of the tour*
- *Istanbul, Turkey, to Van Don International Airport in Vietnam, in 9 hours, 2 minutes at an average speed of Mach 0.90*
- *Riyadh to Melbourne, Australia, in 13 hours, 39 minutes at an average speed of Mach 0.87*

• *Christchurch, New Zealand, to Los Angeles in 12 hours, 13 minutes at an average speed of Mach 0.87*

In total, the two G700 outfitted aircraft traveled 53,882 nautical miles/99,789 kilometers over more than 180 hours of flying. The world tour speed records are pending approval by the U.S. National Aeronautic Association and Fédération Aéronautique Internationale in Switzerland for recognition as world records. The two G700 production



test aircraft interiors showcase the industry's only ultragalley, with more than 10 feet/3 meters of counter space; a grand suite with fixed bed and bright, spacious lavatory with full vanity and shower; an ultrahigh-definition dynamic circadian lighting system; an all-new award-winning seat design; and the lowest cabin altitude in the industry at 2,916 ft/889 m when flying at 41,000ft/12,497 m.

The G700 delivers the most spacious, innovative and flexible cabin in the industry, plus all-new, high-thrust Rolls-Royce engines and the award-

winning Symmetry Flight Deck. G700 is touted as being the largest business jet in the its class. The dimensions

make it comfortable for 19 passengers. The baggage compartment can hold up to 28 bags. The Gulfstream G700 has a maximum range

(subject to headwinds, high altitude, hot temperatures, or higher capacity) of 7500 miles and a maximum speed of 690 mph



Gulfstream G700 at Istanbul. Tim Wood, Regional Vice President - Africa, Turkey & South Asia and Ayse Akalin, Editor in Chief of Aviation Turkey Magazine



Boeing 747 Legend Ends!

The final 747 off the production line was delivered to Atlas Air by the U.S. manufacturer Boeing. The great story of the Queen of the Skies, which began in 1967, has come to an end. The Boeing 747 has flown more than 23 million flights, totaling more than 118 million hours in the air, transporting 7.5 billion passengers since its first delivery in January 1970.

Since its maiden flight in 1969, the massive but elegant-looking Boeing 747 has performed a wide variety of services, including a commercial passenger airliner with a

capacity of nearly 500 seats, a cargo plane that transports tons of weight, a transporter for NASA's space shuttle, the world's largest fire-fighting aircraft, and Air Force One for U.S. presidents.

The 747-8, the newest variant of Boeing's Jumbo jet, is the longest commercial airliner in operation with a fuselage length of 76.2 meters. At cruising speed, a 747-8 can travel three football fields per second. The cargo version of the 747-8 can carry 10,699 solid-gold bars or about 19 million ping-pong balls, meaning 133.1 tons of cargo.

By connecting international cities that previously had no non-stop flights between them, the 747 helped democratize passenger flights and revolutionized the concept of travel. Airlines may not want the four-engine aircraft today, but the 747's remarkable legacy and huge contribution to the growth of industry cannot be overlooked.

How did the Boeing 747 idea come about?

Boeing's idea to build a giant passenger aircraft originated in 1965, when



by Muhammed Yilmaz

it lost the race to build a huge military transport plane for the U.S. Air Force to Lockheed Martin's C5A Galaxy. Under pressure from Pan Am, which required larger planes for overseas routes, Boeing decided to build a massive airplane that transported people instead of soldiers and equipment. Action was taken for a civilian aircraft powered by high-bypass turbofan engines,



Joe Sutter, Father of the 747

The Jumbo Jet 747 was designed by a team led by Joe Sutter, a legendary engineer who had worked on Boeing's previous commercial aircraft. Known as the "father of the 747," Sutter worked on numerous aspects of the aircraft, including finding an appropriate engine for it that wasn't available at the time and reducing its weight.

There was another crucial obstacle before they could start building the 747: Boeing didn't have a factory large enough to do the job. In 1966, construction work for what is now the Everett plant started. Time was so short that the company was able to complete building the plant head-to-head with the creation of the first mockup of the airplane. It took more than 50,000 Boeing employees in less than 16 months to build the first 747.

On September 30, 1968, after only 29 months of development and

production, the first 747 rolled out of the factory. The Boeing 747 was the first wide-body civil aircraft to be mass-produced. With a seating capacity of 524, the semi-double-deck four-engine aircraft was twice the size of the Boeing 707, which was widely used by many airlines at the time.

The fuselage was 68.5 meters long and the tail was as high as a six-story building. A second deck was incorporated into the design, extending from the cockpit to the first third of the fuselage, giving it a distinctive hump and inspiring nickname, the Whale.

Some airlines converted the second deck of the aircraft into a first-class cocktail lounge, while the lower deck sometimes featured lounges or even a piano bar. A 747 built for Singapore Airlines in 1976 and later decommissioned was converted into a 33-room hotel near Stockholm Airport.

The 747, as a first for airlines to figure out what to do with such a large

plane and how to fill it, set a new standard in aviation and mobility. Paving the way for mass air travel, the 747 contributed to lower prices. The deregulation of aviation in the late 1970s also contributed to this process.

Boeing 747's First Flight

The first 747 flight took place on February 9, 1969, with test pilots Jack Waddell and Brien Wygle sitting in the cockpit. A new era in aviation started with the first flight of 747 that day. Today, the first 747 produced welcomes visitors at the Museum of Flight in Seattle.

On January 22, 1970, Pan Am conducted the first flight of the 747, carrying passengers from New York to London with paid tickets. But this first flight was extremely exciting.

352 passengers and 20 crew members had to wait aboard for two hours at New York John F. Kennedy Airport for takeoff since Captain Pilot Robert Weeks realized that there was a problem in engine

which consumed less fuel by passing air around the engine core, enabling a farther flight range. Design work began and in 1966, with Pan Am placing a firm order for 25 747s, the 747 officially came about.

For Boeing, creating the 747 was a challenging task. A supersonic aircraft dubbed the 2707 was being designed at the time to compete with Concorde. It was risky enough to consider creating a completely new aircraft. But designing two at once sounded great. One would be the biggest, one the fastest. However, there was also the risk that if things didn't work out, the company might not survive.

ARTICLE



number 4 and decided to return to the parking position. After spending two hours, the passengers were taken to dinner at the terminal. Pan Am employees were working to fix the problem on board.

The happiest of those about this malfunction was a group of protestors who showed up at the airport claiming that the 747 would cause noise and environmental pollution. "We told you not to fly," the activists protested the passengers. After the problem was fixed, 20 of the passengers refused to board the plane. The 747 named Young America took off for London.

The first 747 entered service on Pan Am's New York-London route in 1970, but the timing was terrible. Shortly before the oil crisis in 1973, the 747 debuted during a recession that saw Boeing's headcount drop from 100,800 employees in 1967 to 38,690 in April 1971. When the 747-400, an updated variant of the 747, arrived in the late 1980s, the timing was much better, coinciding with the Asian economic boom of the early 1990s.

The last passenger version of the Boeing 747 was delivered in 2015. However, a number of airlines, such as the German national airline Lufthansa, Korean Air, and Air China, will continue to fly the 747 in various parts of the world.

Why Did the 747 Lose its Market Share?

Over the last 15 years, Boeing and its European rival Airbus have introduced more profitable and fuel-efficient wide-body airplanes with just two engines, replacing the four-engine 747s. The 747, one of the most iconic models in aviation history, has gradually lost market share as demand for a new generation of twin-engine airplanes that are more economical and more efficient than it.

A total of 1,574 747s rolled out from Boeing's production line. Updated versions of the queen of the skies were launched, including the 747-400 in 1988 and the 747-8 in 2005.

When the pandemic hit in the beginning of 2020, Boeing declared that it had made the difficult decision to stop production of 747 aircraft by 2022. Numerous carriers with Boeing 747s in their fleet also announced their decision to retire and remove these aircraft from their fleet during the pandemic for financial reasons.

Airlines to Maintain Carrying Passengers with 747s:

The Boeing 747 will no longer be produced, but the jumbo jet will continue to fly. The jumbo jet is more likely to be available, particularly on routes to the Asia-Pacific region.

Germany's national airline Lufthansa, the largest operator of the Boeing 747 in passenger configuration, continues to use 747s on numerous Far East routes such as Singapore, Tokyo-Haneda, Shanghai, and Washington.

South Korea's national airline Korean Air continues to operate flights from Seoul to Honolulu, Los Angeles, Atlanta, and Tokyo with Boeing 747-8. Another Korean airline, Asiana Airlines, uses Boeing 747-400 in its fleet for flights between Seoul and Changchun. The airline also offers eight premium business class seats on this aircraft.

Iran's Mahan Air also operates Boeing 747-400s from Tehran to Istanbul and Moscow. It's anticipated that Boeing 747s will operate for at least a few more years as passenger aircraft. Airlines such as Atlas Air, UPS, and Cathay Pacific Cargo also have a large number of Boeing 747 cargo versions in their fleets.

Boeing 747 Accident History and Statistics

Of the Boeing 747 aircraft produced to date, 64 have suffered irreparable damage and hull loss during their service life. 52 of these aircraft became unusable in various accidents. A total of 3746 people died in 52 fatal accidents involving 747s. 747 aircraft saw 32 hijacking attempts.

The 747's most dramatic accident occurred on March 27, 1977, at Tenerife Airport. Two 747s belonging to Pan Am and KLM collided on the runway, resulting in the deadliest disaster of all time. 583 people lost their lives.

The most recent 747 accident occurred on January 16, 2017. A 747, operated by ACT Airlines carrying freight for Turkish Cargo, ploughed through village near Bishkek, killing 37 people, mostly the residents of the village and four crew members.

The 747 was again the actor in Pan Am Flight 103, also called the Lockerbie bombing. On Wednesday, December 21, 1988, a Boeing 747 flying from London's Heathrow Airport to New York's John F. Kennedy International Airport was destroyed by a bomb near the Scottish town of Lockerbie. All 258 people on board and 17 people living in the town,

including 275 people, lost their lives and Libya was held responsible for the incident.

A quick review of other 747 accidents with the highest number of fatalities reveals that on August 12, 1985, a 747 of Japan Airlines crashed into a mountain during a Tokyo-Osaka flight, killing 520 people. On June 23, 1985, 329 people lost their lives in Air India's crash near Ireland, and Saudi Arabian Airlines' crash in India on November 12, 1996, killing 312 people.

According to aviation safety data, the survival rate of all fatal accidents involving 747s was 23.9%.

747s also preferred by Heads of State

747s have been employed all over the world for a variety of interesting purposes, such as transporting the space shuttle, launching rockets, putting out fires, and operating as flying casinos.

The 747 is also a popular choice for wealthy world leaders. The Saudi royal family owns four 747s, the Qatari government three, the Sultan of Oman two, and the U.S. Air Force six. Two of these are used as the U.S. presidential aircraft. The Turkish presidential fleet also includes a jumbo jet reportedly given as

a present by the Emir of Qatar in recent years.

Special Flight for the Final 747

Taking delivery of the final 747, Atlas Air operated a special "747" flight from Seattle to Cincinnati. This 6,500 km flight normally took under four hours. However, the pilots of this special flight immortalized the departure of the 747 from Seattle with an alternative flight route over the state of Washington.

The 747-8, belonging to Atlas Air, traced the shape of a crown and the "747" in the sky. The flight therefore took about 6 hours and 20 minutes. The pilots spent about two and a half hours for the "747" route along with the crown.

The Boeing 747 will never be built again, but the queen of the skies has left behind a legacy that spans more than 50 years. The 747 was a revolutionary change in air travel, not just a comfortable aircraft. Its ability to carry hundreds of people made air travel cheaper and mass travel possible, and its cargo version ushered in a new era for fast air freight.

We all owe the 747 a debt of gratitude for all it has contributed to the aviation industry. There might not be much time left if you haven't taken a 747 flight. Then, hurry up! 🚀



Global Aviation Journalists Gathered at IATA Media Days in Geneva

IATA's Global Media Days 2022 took place on 6th and 7th December 2022 at IATA's Geneva Headquarters. Aviation Turkey Magazine Editor in Chief, Ms. Ayşe Akalın is closely followed the conference where global aviation journalists attended to for our readers in Geneva.

The agenda included briefings on next year's economic and traffic outlook, sustainability, EU/US regulatory and policy, diversity, infrastructure

and airline industry retailing, among other subjects. In addition, there will be a deep dive into air cargo, covering lessons learned from Covid-19 Pandemic and challenges.

IATA Global Media Briefing started with the statements of Willie Walsh, Director General and Marie Owens Thomsen, Chief Economist.

During the press meeting, Willie Walsh, IATA's Director General: "Resilience has been the

hallmark for airlines in the COVID-19 crisis. As we look to 2023, the financial recovery will take shape with a first industry profit since 2019. That is a great achievement considering the scale of the financial and economic damage caused by government imposed pandemic restrictions. But a \$4.7 billion profit on industry revenues of \$779 billion also illustrates that there is much more ground to cover to put the global industry on a solid



by Ayşe Akalın

financial footing. Many airlines are sufficiently profitable to attract the capital needed to drive the industry forward as it decarbonizes. But many others are struggling for a variety of reasons. These include onerous regulation, high costs, inconsistent



Ayşe Akalın, Editor in Chief of Aviation Turkey Magazine and Willie Walsh, IATA Director General

zero goal, need to put in place comprehensive production incentives for SAF. It is what they did to successfully transition economies to renewable sources of electricity. And it is what aviation needs to decarbonize,” said Willie Walsh, IATA’s Director General.

from 6% GDP growth to close to 3% - this is a sharp slowdown. Long-term average global GDP growth is in the around 3.0 – 3.5%.

2023 is likely to slow further. Pent-up demand for travel has so far

protected the air traffic recovery in that demand has not been very sensitive to slowing growth, nor to high inflation.

This fortunate situation can be expected to wane gradually over the next year

government policies, inefficient infrastructure and a value chain where the rewards of connecting the world are not equitably distributed.”

“There was at least triple the amount of SAF in the market in 2022 than in 2021. And airlines used every drop, even at very high prices! If more was available, it would have been purchased. That makes it clear that it is a supply issue and that market forces alone are insufficient to solve it. Governments, who now share the same 2050 net

Following the Mr Willie Walsh’s speech, Marie Owens Thomsen , Chief Economist delivered a speech and mentioned that In 2023, airlines are expected to post a small net profit of \$4.7 billion—a 0.6% net profit margin. It is the first profit since 2019 when industry net profits were \$26.4 billion (3.1% net profit margin). In 2022, airline net losses are expected to be \$6.9 billion (an improvement on the \$9.7 billion loss for 2022 in IATA’s June outlook). This is significantly better than losses of \$42.0 billion and \$137.7 billion that were realized in 2021 and 2020 respectively. In 2022 the global economy slowed



Ayşe Akalın, Editor in Chief of Aviation Turkey Magazine and Marie Owens Thomsen, IATA Chief Economist



IATA-McKinsey Study Shows Imbalanced Aviation Value Chain

IATA and McKinsey & Company published a study of profitability trends across the aviation value chain showing that profitability varies widely by sector. The study also shows that in aggregate, airlines underperform on the financial return that an investor would normally expect.

While there is no clear path to rapidly re-balance the value chain, the study concludes that there are some key areas—including decarbonization and data-sharing—where working together and burden-sharing will mutually benefit all value chain participants.

Highlights from the Understanding the Pandemic's impact on the Aviation Value Chain study include:

Capital Destruction: Despite delivering consistent operating profits pre-pandemic (2012-2019), airlines collectively did not produce economic returns above the industry's Weighted Average Cost of Capital (WACC). On average the collective Return on Invested Capital (ROIC) generated by airlines was 24% below the WACC, collectively destroying an average of \$179 billion of capital each year.

Value Creation: Pre-pandemic, all sectors of the value chain except airlines delivered ROIC in excess of the WACC, with airports leading the pack in the absolute value of return by rewarding investors with

an average of \$4.6 billion annually above the WACC (3% of revenue). When viewed as a percentage of revenue, Global Distribution Systems (GDSs)/Travel Tech firms topped the list with average returns of 8.5% of revenues above the WACC (\$700 million annually), followed by ground handlers (5.1% of revenue or \$1.5 billion annually), and Air Navigation Service Providers (ANSPs) at 4.4% of revenues (\$1.0 billion annually).

Pandemic Changes: Although the pandemic (2020-2021) saw losses across the value chain, in absolute terms airlines' losses led the pack, with ROIC falling below the WACC by an average of \$104.1 billion annually (-20.6% of revenues). Airports saw ROIC fall \$34.3 billion below the WACC and generating the

largest economic losses as a percentage of revenue (-39.5% of revenues).

This research reaffirms that airlines improved their profitability in the years following the Global Financial Crisis. But it also clearly shows that airlines, on average, were not able to benefit financially to the same degree as their suppliers and infrastructure partners. Rewards across the value chain are also disproportionate to risk. Airlines are the most sensitive to shocks but have limited profits with which to build a financial buffer," said Willie Walsh, IATA's Director General.

The pandemic saw all players fall into economic losses. As the industry recovers from the crisis, the study's most important question is: can a more balanced distribution of

economic returns and risk be realized in the post-pandemic world?" said Walsh.

Several changes in the profile of airline economic returns are noted in the study:

While network carriers underperformed the low-cost sector (LCCs) pre-pandemic, average economic returns by network carriers exceeded those of the LCCs during the pandemic. The gap between the two, however has narrowed as the recovery progressed.

Airlines solely operating cargo flights have a profitable financial performance with an ROI of nearly 10%. Thus, the profitability of all-cargo carriers was the reverse of airlines carrying both passengers and cargo. By comparison, the performance of all cargo carriers is still well below the average ROIC for freight forwarders which began the crisis at nearly 15% of revenues and grew to 40% of revenues by 2021.

Regionally, it was clear that in aggregate North American carriers entered the crisis with the healthiest balance sheets and strongest financial performance. The picture of recovery was less clearcut in 2021, but having fallen the deepest in the crisis, the trajectory of the region's recovery is also the steepest.



Why do airlines generate insufficient economic returns?

An updated analysis of the forces shaping airline profitability originally done in 2011 with Harvard Business School's Professor Michael Porter demonstrates there has been little positive change.

Competitive Fragmented

Industry: The airline industry is intensely competitive, fragmented and subject to high barriers to exit with low barriers to entry.

Structure of suppliers, buyers and channels: A high concentration of powerful suppliers, the emergence of increasingly efficient alternatives to air travel, commoditized product offerings with low switching costs and a fragmented buyers' community are

characteristics of the operating environment.

"It is difficult to see how these entrenched forces will change significantly in the near term. In most cases the interests of those in the value chain are simply too divergent to work as partners to drive change that could meaningfully alter the profitability profile across the value chain. That is why IATA will continue to call





on governments to better regulate our monopoly or near-monopoly suppliers like airports, ANSPs and GDSs,” said Walsh.

Recent IATA polling shows public understanding of the need to regulate monopoly suppliers. Some 85% of consumers polled in an 11-country survey agreed that the prices that airports charge should be independently regulated, like utilities.

Cooperation

The value chain study also revealed some areas of common interest where greater cooperation would deliver benefits for all. Two of the examples noted in the study include:

Data-driven efficiency gains: Aviation generates vast amounts of data. At the operational level,

sharing data to build a more complete picture of how day-to-day decisions impact customers, airports terminals, airline schedules/ crew movements, and runway utilization is already helping to drive efficiencies for all industry players at some airports. This same principle can be applied across the industry to make better long-term decisions in areas including infrastructure development, process improvements, and skills development.

Decarbonization: Achieving net zero carbon emissions by 2050 cannot be done by airlines alone. Fuel suppliers need to make sustainable aviation fuels available in sufficient quantities at affordable prices. ANSPs need to provide optimal routings that minimize emissions. Engine and aircraft manufacturers

must bring to market aircraft that are more fuel efficient and take advantage of low or zero carbon propulsion means such as hydrogen or electricity. Those offering service in the airport environment will need to convert to electric vehicles.

There is no magic solution to rebalance the value chain. But it is clear that the interests of governments, travelers and other value chain participants are best served by financially healthy participants—and particularly airlines. A combination of better regulation and cooperation in areas of mutual interest could move the needle. And there are at least two areas ripe for collaboration and burden sharing—pursuing data-driven efficiency gains and decarbonization,” said Walsh.

IATA Establishes Modern Airline Retailing Program

IATA announced the establishment of the Modern Airline Retailing program to advance customer centricity and value creation in the airline industry. The transformation will be accelerated by a consortium of advanced airline adopters that will work together through IATA. Consortium participants include American Airlines, Air France-KLM, British Airways, Emirates, Finnair, Iberia, Lufthansa Group, Oman Air, Singapore Airlines and Xiamen Airlines.

In today’s environment, the customer experience

is affected by decades old standards, processes and technology and the airline industry must adopt modern retailing practices that will create additional value for travelers and reduce the hassles of increasingly complex passenger document checking requirements.

Modern Airline Retailing will solve this dilemma and unleash value creation opportunities by transforming airline distribution to a system of “Offers and Orders” that will parallel what most other retailers use.

“Our aim is to create value for travelers by meeting their needs. We know that passengers want a seamless digital experience; and they expect consistent service irrespective of how they



purchased their travel. With the strength of a global consortium of leading airlines behind us, the next few years are set to see an accelerated and comprehensive transformation of the customer experience,” said Muhammad Albakri, IATA’s Senior Vice President,

Financial Settlement and Distribution Services.

2022 SAF Production Increases 200% - More Incentives Needed to Reach Net Zero

IATA estimates that Sustainable Aviation Fuel (SAF) production will reach at least 300 million liters in 2022—a 200% increase on 2021 production of 100 million liters. More optimistic calculations estimate total production in 2022 could reach 450 million liters. Both scenarios position the SAF industry on the verge of an exponential capacity and production ramp-up toward an identified tipping point of 30 billion liters by 2030, with the right supporting policies.

Airlines are committed to achieve net zero CO₂

emissions by 2050 and see SAF as a key contributor. Current estimates expect SAF to account for 65% of the mitigation needed for this, requiring a production capacity of 450 billion liters annually in 2050.

Having agreed to a Long-Term Aspirational Goal (LTAG) on climate at the 41st Assembly of the International Civil Aviation Organization (ICAO) in October 2022, governments now share the same target for aviation’s decarbonization and interest in the success of SAF.

To date, over 450,000 commercial flights have been operated using SAF, and the growing number of airlines signing offtake agreements with producers sends a clear signal to the markets that SAF is needed in larger quantities, and so far in 2022, around 40 offtake agreements have been announced 🌱



URBAN AIR MOBILITY

A New Horizon (where no man has gone before)



In 2022 alone, Future Air Mobility¹ (FAM) industry (formerly, Advanced Air Mobility (AAM)) has attracted over \$3 billion² of investment. Although incredible by itself, this indicates a major decline in interest towards FAM when compared to the \$6.9 billion funding received in 2021. We left the peak of the Gartner Hype Cycle way behind. It is time to deliver...

cumulative disclosed industry funding totaled over \$15 billion. Almost 80% of this funding has centered on Urban Air Mobility (UAM) concepts, like air taxis and other passenger or cargo eVTOLs³.

Leading players of the industry, such as Archer Aviation, Joby Aviation, Lilium Air Mobility, and Vertical Aerospace, have raised \$2.8 billion in 2021, through Special Purpose Acquisition Company (SPAC) deals with a combined market cap of \$10.7 billion.

However, publicly traded FAM players lost 41% of their



Gartner Hype Cycle

valuation in 2022⁴. While this is a major correction in valuation, especially when compared to the over 20% decline in the S&P 500 for the year, it was less than the 62% decline among all SPACs. After this SPAC rush, the deal value and deal count shifted back towards venture capital in 2022, with 75% going through VC in the last six months, versus 50% in 2021.

There are several reasons for this deceleration, among which the global economic downturn, counts for the least. One major driver is the shifting of momentum towards the sustainable

aviation segment. It is also a fact that the leading players have recently raised big rounds and may be pausing before another big funding influx is needed. And there is always a probability that some of the funding, like that of internal R&D budgets of large aerospace OEMs, is not reported.

Therefore, the short-term slowdown in funding in 2022 should be considered merely a resumption of normal growth after a big spike in 2021.

As of December 2022, the orders the industry had received, (both firm and options, and letters of intent)

totaled approximately 12,000⁵ aircraft. Of that total, 80 percent were for manned FAM aircraft.⁶ Nevertheless, only 5% of these orders are firm. Currently, United Airlines is the leading customer with around 1,200 orders⁷ from Archer Aviation and Eve Mobility.

In its August 2021 Capital Markets Day Presentation, Lilium projected that in 2026 the estimated cost per passenger mile in its six-passenger eVTOL aircraft will be \$2.25. This is based on an average of 4.5 out of 6 passenger seats being filled (75% Load Factor), with 25 flights per day traveling at an average distance of 60 miles for a total of 10 flight hours per day.⁸ This gives \$180 per passenger, per trip.

Archer's investor deck suggests \$3.30 per seat mile on a 25-mile trip, so \$82.50 for the trip and seat, and

¹ Future Air Mobility (FAM) concept includes; drones, eVTOLs, supersonic/ hypersonic aircraft, and infrastructure such as unmanned traffic management (UTM) and vertiports.

² <https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/future-air-mobility-blog/future-air-mobility-major-developments-in-2022-and-significant-milestones-ahead>

³ Common name for electrically powered air vehicles with vertical take-off & landing capability.

⁴ <https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/future-air-mobility-blog/future-air-mobility-funding-continues-to-flow-after-outlier-year-2021>

⁵ It is important to note that the total number of airliners in operation today is around 25,000.

⁶ <https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/future-air-mobility-blog/a-milestone-year-for-future-air-mobility>

⁷ <https://www.cirium.com/thoughtcloud/advanced-air-mobility-snapshot-november-2022/>

⁸ <https://www.futureflight.aero/news-article/2021-11-15/counting-cost-urban-air-mobility-flights>

with a generous load factor assumption of 75% the trip cost per passenger becomes \$110 per passenger.

The aircraft can go more direct and a car trip might have an extra 20% distance or so, thus having to travel ~30 miles for the same trip. At the cost of ~\$1.50 and \$3.75 per passenger mile for basic and black car service and, the ride-hailing alternative would cost \$45.00 and \$112.50 per trip and passenger, respectively. The IRS allowance for private cars is \$0.56 per mile, thus the trip allowance for a personal car would be \$16.80⁹

With similar load factors, an airliner would cost nearly \$0.10 per passenger mile¹⁰ and a 5 minute helicopter ride is around \$14 per passenger mile between Manhattan's West 30th Street Heliport (KJRA) and John F. Kennedy International Airport (KJFK).¹¹

eVTOL manufacturers claim their costs will be competitive compared to alternative luxury modes (i.e. Black Car and Helicopter), but with aircraft sold \$2-\$3 million apiece, operating in the weather, and with mediocre social acceptance, time will tell if the foreseen load factors and daily cycles will be attained to maintain the claimed costs.

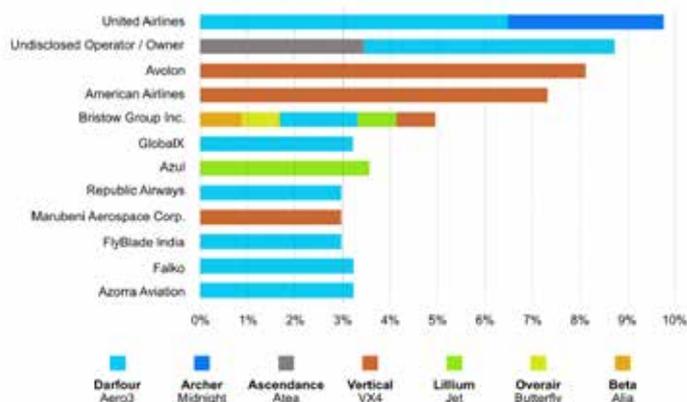


To say that the development of electric aircraft that can take off and land vertically (eVTOLs) has exploded over the past years wouldn't be an exaggeration. Currently, VFS¹² claims to have more than 760 eVTOL concepts cataloged in its unique World eVTOL Aircraft Directory. It's also worth noting that 120 of these were registered in 2022 alone. This clearly shows the growing momentum in this

Transport Mode	Cost per passenger mile
Airliner	>\$0.10
Personal Car	\$0.56
Ride-Hailing	\$1.50
eVTOL	\$2.25 - \$3.30
Black Car Service	\$3.75
Helicopter	\$13.95

emerging industry. In just a couple of years, we've seen a huge number of new eVTOL designs, as well as eVTOL-

related developments, such as vertiport concepts and specific air traffic management software¹³.



FAM sales by manufacturer and buyer

⁹ <https://www.linkedin.com/feed/update/urn:li:activity:6838189454776258560/>
¹⁰ <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/a-better-approach-to-airline-costs>
¹¹ <https://www.flyingmag.com/evtol-air-taxi-passenger-prices/>
¹² Vertical Flight Society <https://vtol.org/>
¹³ <https://www.autoevolution.com/news/over-750-evtol-concepts-worldwide-registered-to-this-day-208133.html>

ARTICLE

Last year major milestones covered by leading companies were as follows:



The Civil Aviation Administration of China (CAAC) announced that the Special Conditions for Type Certification of eHang's EH216-S aircraft have been formally adopted. In 2023 eHang is expected to commence pilotless passenger transportation operations in China.



Volocopter's four-seater VoloConnect aircraft completed its first flight. The VoloConnect, an electric fixed-wing passenger aircraft capable of vertical take-off and landing, could enter into service as early as 2026. Volocopter also flew its two seat electric Volocity air taxi for the first time in France in June during an air show at the Le Bourget airport. The German eVTOL manufacturer have plans to have an operating air taxi service in Paris in time for the 2024 Olympic Games.



In January 2022, Joby received both FAA Special Airworthiness Certification and U.S. Air Force Airworthiness Approval for its second pre-production prototype aircraft.

Also in October, Delta Air Lines entered into a long-term partnership with Joby to launch eVTOL aircraft services. The airline also made an upfront equity investment in Joby totaling \$60 million, with the possibility of expanding that investment to \$200 million.



Lilium's technology demonstrator, Phoenix 2, achieved a full transition from hover to wing-borne flight in September. Following that, Lilium closed a \$119 million capital raise—a concurrent private placement and registered direct offering (RDO). Participants included existing shareholders, strategic partners, and new investors.

In November, after much anticipation, Archer unveiled its production aircraft, Midnight, to the public. Midnight will have the same basic configuration as the company's Maker testbed. Also the first successful transition—from vertical lift to full wing-borne flight—of Archer's demonstrator aircraft took place in the same month.



Eve revealed a full-sized mock-up of the cabin of its eVTOL aircraft for the first time at the Farnborough Airshow. Eve also disclosed the signing of a Letter of Intent with Embraer and BAE Systems that includes a potential order of 150 of Eve's eVTOLs.



Vertical Aerospace provided company updates in a letter to shareholders, including plans to perform a series of tethered hover flight tests following receipt of a piloted permit from the UK's Civil Aviation Authority.



Two U.S. Air Force pilots became the first Airmen to fly an electric aircraft with military airworthiness approval—the BETA-ALIA. BETA Technologies also partnered with the National Institute for Aviation Research (NIAR) and the FAA to conduct a 50-foot drop test on a full-scale battery system designed for an electric aircraft. The BETA-designed battery pack absorbed the load with no significant damage at the cell or pack level.



Designing and manufacturing an airworthy eVTOL aircraft at scale is a formidable challenge, involving a large number of innovations, potential hazards, and regulatory

barriers to cross. However, this is now the reality facing eVTOL aircraft developers worldwide.

In 2019, EASA (European Union Aviation Safety Agency) introduced two categories for eVTOL certification, namely

Basic and Enhanced. VTOL aircraft that are certified in the Category Enhanced would have to meet requirements for continued safe flight and landing and be able to continue to the original intended destination or a suitable alternate vertiport after a failure. While for Category Basic only controlled emergency landing requirements would have to be met, in a similar manner to a controlled glide or autorotation.

On the other hand, FAA's (Federal Aviation Administration) proposed airworthiness criteria do not call out any obvious changes to the safety levels in Part 23¹⁴ but require the aircraft to be capable of continued safe flight and landing following failures, including loss of thrust, not shown to be extremely improbable.

In FAA's Part 23, "extremely improbable" typically equates to a probability of catastrophic failure of 10⁻⁷, one in 10 million or 10⁻⁸, one in 100 million flight hours. Whereas, EASA wants developers of commercial air taxis to substantiate that likelihood to ten to the

minus nine (10⁻⁹) or one in a billion flight hours, the same standard to which transport category aircraft including jetliners are held.

As a result, eVTOL developers at different sides of the Atlantic face the prospect of unequal hurdles on their paths to market.

This is a value computed through numerical analyses used to support the certification of aircraft systems. The choice of numerical safety objective could have a significant impact on the time and cost involved in certifying an eVTOL aircraft, which would disproportionately impact startups with limited resources and would hand a clear advantage to legacy players like Airbus and Boeing with deep pockets and no particular rush to certify an eVTOL.

As an entirely new tool in the transportation portfolio of a city or region, Future Air Mobility (FAM) is a complex ecosystem made of many parts - i.e. vehicles, infrastructure, operators, and MROs - that have to be concurrently developed and deployed

to lead to the industry's success.¹⁵

For the FAM industry, a few factors are worth monitoring over the coming year:¹⁶

- Players need to finalize and freeze their designs to build conforming prototypes and begin the testing required to meet certification timelines for the middle of this decade.

- To meet timelines for entry into service, both manufacturers and suppliers will have to focus on building out their production systems in 2023—for instance, by pouring concrete and installing tools and equipment.

- For drone delivery, larger middle-mile cargo drones could depart on their first commercial missions.

- Industry structure will be important to track in 2023, particularly mergers and business closures.

- 2023 will need to see a range of new infrastructure projects, including vertiports and facilities that support novel propulsion designs based on battery-electric charging and

hydrogen, for the industry to remain on track to meet its target for operations.

- Additional funding will be important in 2023 for players to continue on this journey. This could come in direct investment in OEMs, or through partnerships in which parties such as suppliers, investors, or customers take on investment.

- Another big step forward for the FAM industry was taken in 2022, and 2023 will bring more developments in technology and regulation, as well as greater clarity about the industry's direction.

In the long term, the FAM industry has the potential to revamp transportation, and there is nothing wrong with being optimistic about its future as long as the stakeholders collectively instill social desirability of AAM as opposed to acceptance. That is the go/no-go factor regarding the future of FAM. The industry needs to promote the desirable traits of AAM while looking to mitigate the undesirable ones.¹⁷

¹⁴ Airworthiness Standard for Normal Category Airplanes which address normal, utility, acrobatic, and commuter category aircraft the normal category is limited to airplanes that have a seating configuration, excluding pilot seats, of nine or less, with a maximum certificated takeoff weight of 12,500 pounds (5,670 kg) or less.

¹⁵ <https://aamrealityindex.com/>

¹⁶ <https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/future-air-mobility-blog/future-air-mobility-major-developments-in-2022-and-significant-milestones-ahead>

¹⁷ <https://www.futureflight.aero/news-article/2022-01-04/experts-call-sharper-focus-and-more-delivery-big-talking-electric-aviation>

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AutoGyro Delivers Three Cavalon Sentinel Gyroplanes to the Turkish Gendarmerie

AutoGyro GmbH, the world-leading gyroplane manufacturer from Germany, hands over three Cavalon Sentinel gyrocopter aircraft fully equipped with a unique package of police systems and cameras to the Gendarmerie of the Republic of Türkiye (Turkish Jandarma). Once deployed, the AutoGyro aircraft will support traffic monitoring and aerial surveillance in rural and urban areas for the General Directorate of Security in Türkiye as well as wildfires survey and control.

At the handover ceremony

on January 31st at Hildesheim Airfield in Germany, Gerald Speich, Chairman of the AutoGyro Board, stated: "The Turkish, German and Ukrainian teams have been working on this government procurement project for two and half

years, and have been building these unique gyroplanes for over three months. Today's event is a culmination of this immense international teamwork, and involved every person in the AutoGyro Team. We are the only manufacturer

in the gyroplane sector complying with all major national regulations, and our aircraft comply with the highest worldwide safety requirements. AutoGyro is immensely proud that our aircraft will be supporting the Turkish Jandarma for





many years to come, providing an effective, low cost solution to their policing needs.”

After two days of acceptance trials at AutoGyro Headquarters in Hildesheim, Germany, the Jandarma Acceptance Team, together with Sky Olympos (AutoGyro’s official distributor in Türkiye), formally received the three aircraft from AutoGyro during the January 31st ceremony, with representatives from the Industrial and Commercial Chamber of Lower Saxony, Civil Aviation Authority Lower Saxony and Niedersachsen Aviation attending. The three Cavalon Sentinel were prepared for dispatch and commencement of aerial operations afterwards.



“This successful delivery not only highlights the innovative excellence of AutoGyro. It also marks the huge step that AutoGyro has made in the design, configuration and supply of gyroplanes for commercial and government use,” Gerald Speich continues.

- The Cavalon Sentinel is AutoGyro’s premium side-by-side seat model, powered by the ultra-reliable and low fuel burn Rotax 915iS engine.

- *The gyrocopter aircraft has an operational range of four hours,*

- or approximately 600 kilometers.

- *It carries special customer-defined equipment including a high-res day-, night- and infrared camera system with real-time data link. This system provides a best-in-class solution in day and night conditions.*

- *By officially adding AutoGyro gyroplanes to the Jandarma’s aircraft fleet, the aircraft and parts become available to other NATO member countries through NATO’s procurement system.*

A gyroplane is not a helicopter or a traditional

winged aircraft, providing a vehicle platform complimentary to both. They are inherently safe aircraft, with a very broad speed range. They can be flown very slowly, even to zero kilometers per hour, making them an excellent observation platform perfect for border or highway patrols or wildfire spotting. Gyroplanes have a significantly lower carbon footprint compared to helicopters and generally offer a cost-efficient and environment-friendly alternative for commercial aerial tasks.



Will India Replace China as the Aviation Industry's Growth Engine?

by Muhammed Yilmaz

Following months of negotiations, Air India, which is restructuring under the umbrella of the Tata Group, announced that it has signed deal to purchase 470 new aircraft, worth more than \$100 billion at list prices. Unsurprisingly, the orders were split between two giant manufacturers, Airbus and Boeing.

Air India will buy 250 aircraft from Airbus and 220 from Boeing. The orders placed with Airbus

include 210 single-aisle A320neo family and 40 wide-body A350s. The order package for Boeing comprises 190 737 MAXs, 20 787 Dreamliners and 10 777Xs.

This historic order, which comes at a time when international air travel is seeing a significant uptick following COVID-19, seeks to make Air India one of the biggest carriers in the world.

The global civil aviation industry owes its growth in the 2010s to China. China became a critical

market for the two giant manufacturers Airbus and Boeing and acted as a catalyst for the industry's growth. Now, considering the recent developments in India, the question on the minds of almost the entire industry is the same: "Will India take over China's role in the 2010s for the growth of the aviation industry in the 2020s?"

A Noteworthy Detail in the Order Package: Pratt & Whitney

Given the Tata Group's plans to revive Air India, such a record order

package has long been anticipated. When we look at the details of the package, the 34 orders for the A350-1000, whose sales figures have not been very good thus far, are quite remarkable. However, the choice of engines for the 400 narrow-body aircraft that were purchased was the most notable detail.

Compared to 800 Leap engines, Air India ordered zero Pratt & Whitney Geared Turbofan (GTF) engines.

The industry's confidence in GTF's performance is evident in this decision from India, especially in light of all the recent concerns that have been raised.



India is a Sleeping Giant!

India is a huge country of diverse lifestyles, but it is also a sleeping giant. The country is projected to grow at an average annual rate of over 10% over the next 10 years. The growth trend is particularly seen among the middle class. This might have an impact comparable to what China had ten to fifteen years ago. When the 2008 financial crisis plunged giant aircraft manufacturers into deep turbulence, China almost all alone kept them alive. The most significant component of this positive impact of China on the industry is its population. China's demand has increased to the point where it now consumes a quarter of all passenger aircraft built worldwide each year.

For the aviation industry, India is a huge market. There is an established market with a large number of low-cost airlines. However, it is difficult to claim that Indians have been able to enjoy the benefits of their aviation industry investments thus far.

How will Boeing-Airbus Approach India?

Air India's orders have not yet been finalized and entered the order books of the manufacturers.



Only letters of intent have been signed as of yet. Consequently, the status of the orders is unclear. A portion of the aircraft in the package will come from leasing companies. It is possible that the A350-900s will come from those previously manufactured for Aeroflot, and likewise, some of the 737 MAXs will come from aircraft that the Chinese haven't yet received.

It is highly uncertain whether Airbus and Boeing, which have been experiencing supply chain issues for a long time due to the pandemic and the subsequent sanctions imposed against Russia, will be able to satisfy Indian demand when it becomes official.

Air India's orders seem to be spread over enough time to avoid additional pressure on Airbus' and Boeing's supply chain. Putting aside the

A350-900s for Aeroflot, A350-1000s will start arriving towards the end of the 2020s. The same applies to the A320neo and A321neo. These will start to join the fleet in small quantities in 2027 at the earliest. Deliveries will increase gradually. Therefore, it would be wrong to claim that Air India's orders will make the current supply chain issues worse.

The good news for Airbus from this order package is that there may be a long-term demand boom for high-capacity narrow body aircraft. Another positive development for the overall industry is that the demand for wide-body aircraft is on the rise again. We have seen this most recently with the order for 100 787 Dreamliners placed by the U.S. United Airlines. We may soon see a significant increase in A350 order from Riyadh International Airlines

(RIA), which is getting ready to launch in Saudi Arabia.

The orders from Air India have led to new decisions within both Boeing and Airbus. Following Air India's order, American manufacturer Boeing has decided to expand its investments in India. To increase support for airlines and improve logistics, Boeing has invested \$24 million to establish a support center for airlines. The center, which is anticipated to hire nearly a hundred people, will offer technical workshops to improve aircraft performance.

Boeing estimates that the fleet sizes of Indian carriers will nearly quadruple between 2019 and 2041. Boeing recognizes the need for a more robust service network in the world's fastest growing aviation market.



Airbus, on the other hand, has taken action to increase the monthly production of its wide-body aircraft. The company's move is reportedly to be part of its strategy to profit from the rising demand for long-haul travel around the world as well as Air India orders.

During the pandemic, Airbus was forced to reduce the production of its wide-body aircraft due to the severe impact of travel restrictions and border closures, and airlines attempted to cancel or postpone previously placed aircraft orders.

Airbus is expected to increase the monthly production of the A350 from five to six, and the A330neo from two to three. These figures, however, are significantly lower than pre-pandemic production levels. Ten A350s and four A330neos were produced each month prior to the pandemic.

For now, Airbus has no plans to establish a final assembly line in India. Airbus currently manufactures aircraft at its Mobile plant in Alabama, the U.S., and in Canada, France, Germany, and China. No new plants are expected to be established.

This decision could make it more difficult for Airbus to realize its goal of getting a bigger share of the pie in the Indian market. For the time being, the European manufacturer intends to stave off this process by expanding its supplier network in India and increasing the volume of business it offers to them. It's uncertain whether this strategy will be viable in the long run.

India Should Solve the Visa Problem!

The weakness of Air India, a kind of state-owned company that was quite

inefficient and very poorly managed, was very well exploited in the last couple of decades, which was one of the factors in the growth of the Gulf airlines. Therefore, Air India must compete with the Gulf carriers if it wants to revive and succeed. And this is a very challenging goal for them. This can only be accomplished with a solid strategy over a long period of time. And perseverance is a must in following this strategy. At this point, the Indian bureaucracy needs to get rid of its idle state. The long clearance procedures required even for the smallest issues, the difficulty in getting slots at Indian airports, and numerous other issues create a significant waste of time and reluctance.

In the past, India had one of the most stringent regulations governing aviation services as part of its strategy to defend Air India. But now, Air India will

need improved bilateral relations as a country if it truly wants to grow and become one of the top carriers in the world. This also entails India's opening up to the outside world, which will consequently create more competition.

The criteria for obtaining a visa and the complete visa procedure are further examples of how complicated the Indian bureaucracy is. If India wants to create a bridge between home and abroad, it must solve the visa issue. Obtaining an Indian visa is quite complicated. It is not one of those countries where you can board an aircraft whenever you want and obtain a visa at the airport. Therefore, it appears that Air India will face significant issues due to this protracted bureaucratic process, even if the business becomes much more effective and lucrative following the aircraft orders.

If we look at recent history, there are many negative instances, such as Jet Airways, SpiceJet, Kingfisher, and the list goes on. One of the reasons why Boeing produced many MAXs and was unable to deliver them was that some of the aircraft were built for Indian airlines that went bankrupt. In other words, a challenging process awaits Air India in every sense.

Come, Make in India!

Focusing on domestic production has been a new trend and topic of discussion in India. Realizing that they are a huge market not only for the defense industry but also for commercial aircraft, Indians are developing various strategies to replace Airbus and Boeing aircraft with ones they design and manufacture themselves.

Over the last decade, the slogan in the country has been clear: "Make in India!" This slogan exudes a strong sense of self-confidence. India is a market that Western defense companies have long been interested in. However, the lack of sufficient infrastructure makes doing business in this country challenging.

India recently increased its military expenditures from \$64 billion to \$72 billion, a rise of 12.5%. This budget is substantial. India currently has the third-largest military budget in the globe.

The procurement allocation in this is \$20 billion. However, the majority of this \$20 billion is reserved for the domestic industry. If you are a domestic supplier or have a successful joint venture in India, it is simple, otherwise it is challenging. Because a maximum of \$5 billion out of \$20 billion is accessible by foreign suppliers.



In conclusion, finding a domestic partner is essential if you want to succeed in India.

India is a quite complex country. It is China's rival and Russia's ally. Unlike China, U.S. defense companies can sell to India. Boeing and Lockheed Martin have developed significant bilateral relations in India over the last two decades. Both have major joint ventures with Tata, a giant Indian corporation, and have projects in the pipeline. Boeing is building the P8 for India, the Apache fuselage is produced in India and exported to the world. The equipment for the Chinook helicopter is manufactured there. Lockheed Martin produces the tail part of the C-130 in India. Likewise, Airbus has quite large operations in India. Even though these are all critical parts and components of aircraft, they do not make up the entire aircraft.

Recently, there has been some strain on India's budgets as well. Especially the currency has been depreciating a lot. In the previous year, the Indian Rupee's worth against the US Dollar decreased by about 10%.

This is one of the reasons why domestic initiatives are prioritized. Because countries with tight budgets invest their resources in producing goods. That's what countries like Malaysia, Spain, Italy is also doing. When budgets get tight, instead of buying or borrowing from foreign competitors, the defense budget is used as a domestic investment, which boosts the economy. Jobs are created, technology and skills are developed. Since taking office, Modi's focus has been on funding domestic initiatives.

No one wishes to ignore the enormous promise of the Indian market. It is challenging for India to get

what it needs in such a short amount of time, especially if issues arise with China or Pakistan. Countries like India are sometimes considered to have a "slippery slope." Wheels can fall off if there is a minor shift in the government or in the policies.

Although India has had issues with its infrastructure for a long time, it is evident that both the infrastructure and the expertise of Indian businesses have significantly improved over the past 20 years. So perhaps things are changing.

Let's conclude by answering the question we posed at the outset. It is uncertain whether India will replace China in the 2010s and take the burden of the aviation industry on its own. However, it is certain that we will be discussing much more about Indian aviation industry in the following 20 years than we ever thought ➔

Book Introduction: Ottoman Air Force: Major Erich Serno and Mission Report

(translated and annotated by Emir Öngüner, Emin Kurt)



by Dr. Emir Öngüner
Freelance Researcher in
Aviation History

The First World War lasted for four years and witnessed numerous conflicts with land, naval, and air platforms on several fronts. As a result of the cooperation with the German Empire within the framework of the German Military Mission, the Ottoman Empire received support from German officers for the modernization of its army. One of the fundamental pillars of this support, which has not been emphasized much until now, is military aviation. Erich Serno, one of the officers from Germany, left a significant impact on the course of the war as the Commander of the Ottoman Aviation Squadrons, which he assumed in 1915 after his duty as the Director of Ayastefanos (Yeşilköy) Aircraft School. Serno's post-war reports covering 1914-1918 were translated into Turkish for the first time by us and interpreted and annotated with various sources.

He was born in Büchow-Jüterbog in 1886. In 1906, he started to serve as a Lieutenant in the Prussian Army in Kolmar. In 1911



The book published by Kronik Kitap in November 2022 by Dr. Emin Kurt and Dr. Emir Öngüner

he was sent to Berlin to receive flight training and was awarded the German aviators' certificate and Prussian military pilot's badge in 1912. He was appointed to the flight unit in 1913 and commanded the aviation squadrons established at Döberitz and Metz. He was rewarded by the Crown Prince of Prussia for his success in

the air exercise in Austria in 1914. When World War I began, he conducted one of the first reconnaissance flights on Germany's western front. He was sent to Türkiye within the framework of the Ottoman Military Mission at the end of 1914 and was appointed to the Yeşilköy Air Base in February 1915. On March 18, 1915, before the naval

operations, he conducted a reconnaissance flight off the coast of Çanakkale with Lieutenant Commander Karl Schneider. He was appointed as the commander of the Ottoman Air Force on November 1, 1915. In 1916, he was briefly tasked with reforming the aeroplane section of the Bulgarian Army. He was promoted to Major in 1917. After being assigned to Germany for seven months in 1918, he personally took part in all fronts as a member of the Ottoman Army and participated in some operations as a pilot. He received many medals and awards for his achievements, and after the armistice, he returned to Germany. He became a civilian after the war and worked as a manager in companies such as Aquila, Arado, and AEG in Germany. Following the Second World War, he moved to West Germany with his family and began to write his memoirs in 1958. He died in 1963.

Introduction letter by Prof. Gültekin Yıldız, Dean of the Military Academy of the National Defense University:

Since the last quarter of the 19th century, when it was decided to reform the Ottoman Army like its European counterparts, military relations between Prussia and the Ottoman Empire gained momentum, as did other European states. German infantry and artillery officers were among the first foreign advisers of Asâkir-i Mansure-i Muhammediye (The Mansure Army/ The Victorious Soldiers of Muhammad), which was established with the abolition of the Janissary Corps in the middle of 1826. Captain Helmut K. B. von Moltke, who would later rise to the position of Chief of the General Staff in Germany, was one of them. After the establishment of German political unity and the victory of the German Army against France, the Ottoman government, like many other states, chose the German Army as a model for its land forces. While the German generals and officers restructured the organization and training of the Ottoman land forces, weapons and ammunition imports from Germany also increased significantly. The Turkish-German military affinity, which became evident during the reign of Sultan Abdülhamid II, continued in the following Second Constitutional Era and turned into a friendship in arms with the start of the First World War in 1914.

During the World War, which was called the "Great War" at that time, German officers were appointed to the commanding positions of the Ottoman General Staff and large units for the first time. German experts took part in numerous technical matters, from the management of the military logistics system to the manufacture of ammunition, from the reinforcement of the military fortifications to the management and administration of the air force.

The book in your hand brings to light the report of Major Erich Serno, who led the Ottoman Air Force, which was established at almost the same time as its counterparts in the world, on his mission to Türkiye, as well as flying with a crescent and star badge in the First World War. Major Serno took command of the Ottoman Aviation Squadrons throughout the war, except for a brief time when he served on the European Eastern Front, and he carried out important activities for the development of Ottoman aviation and increasing its effectiveness on the fronts.

Although Serno's mission report was previously published in foreign history journals, it was not published in Turkish. Some foreign publishers did not remain faithful to the original report of



Major Erich Serno, Commander of the Ottoman Air Force
(İclal & Tunca Örses Special Collection)

Serno's mission, and their publications also required a full-text Turkish translation. Turkish military aviation history researchers Emin Kurt and Emir Öngüner, who jointly undertook to publish Serno's mission report, which is a crucial shortcoming for the contemporary Turkish military aviation history literature, not only translated the original text into Turkish but also created a critical publication by commenting and criticizing some of Serno's statements with the footnotes they added to the text.

I sincerely congratulate our colleagues and the Kronik Kitap publishing house for publishing this first-hand text about the establishment period of Turkish military aviation and our aviation activities in the First World War, and I hope that this book will be evaluated appropriately by our military history researchers.

From the publisher's newsletter:

The Turkish-German military affinity, which started in the 1830s and became evident during the reign of Abdulhamid



The back cover and the publisher's introductory letter

the first time. Major Erich Serno was one of them and was appointed as the commander of the Ottoman Air Force.

Except for a brief time when he served on the European Eastern Front, Major Serno carried out important activities for the development of the Ottoman Air Force, which was established at the same time as its peers in the world, and to increase its effectiveness on the fronts. In addition to flying with a crescent and star badge in the First World War, he also led the Ottoman Air Force.

Major Erich Serno's personal file from the German Military Archive (Bundesarchiv - Militärarchiv), which is included in the book "Ottoman Air Force," contains photographs taken in Türkiye, his mission report, and memories of his flight training in Germany. Providing important information about Turkish military aviation, Serno's report is published in Turkish for the first time.

Translated from the original text in German by aviation experts Emir Öngüner and Emin Kurt, who added rich footnotes and compared them with Turkish sources, the "Ottoman Air Force" is a primary source for aviation activities in the First World War as well as the establishment period of Turkish military aviation.

II, continued in the Second Constitutional Era and turned into a friendship in arms with the start of the

First World War in 1914. During the World War, which was called the "Great War" at that time, German

officers were appointed to the commanding positions of the Ottoman General Staff and large units for



AVIATION HISTORY WITH AVIATION TURKEY

Lilium Teams with Collins Aerospace to Build New Innovative Inceptor System

Lilium N.V., developer of the first all-electric vertical take-off and landing (eVTOL) jet, has teamed with Collins Aerospace, to design, develop, and build the Lilium Jet's inceptors – the innovative sidestick system used by the pilot to control the aircraft. Collins is a leader in technologically advanced and intelligent solutions for the global aerospace and defense industry and a Raytheon Technologies business.

The Lilium Jet inceptors will provide safe and intuitive handling qualities, easy access to functionalities, and an aesthetic, ergonomic design. While

integrating all conventional mechanical and electrical flight controls into two sidesticks, the Collins system brings a new piloting philosophy for single pilot operations in the eVTOL realm. The system will also be designed to bring significant space and weight savings compared to conventional sidesticks.

Lilium's collaboration with Collins continues the company's strategy of teaming up with established tier one aerospace suppliers to support certification and prepare the industrial ramp-up. As part of the supplier agreement, Collins, with its extensive

experience in developing and certifying inceptors for commercial jets, will certify the Lilium Jet's inceptors to commercial aviation standards.

Yves Yemsi, Chief Operating Officer at Lilium, said: "Our partnership with Collins Aerospace allows us to reap the benefit of five decades of experience in flight deck controls. Our two companies' collaborative development approach allows us to re-imagine the cockpit and pilot experience, and further strengthens our path towards certification and commercialization."

"Our extensive experience innovating sidestick design is key when tackling the challenges of redefining the entire flight control philosophy for single-pilot aircraft in this new market of advanced regional air mobility," said Jean-François Chanut, vice president and general manager of Collins Aerospace Propeller Systems. "This innovating and exciting partnership with Lilium is a first step in defining the right solutions toward more automated, sustainable and safe operations for the future of flight"





Embraer's Phenom 300 Becomes World's Best-Selling Light Jet for 11th Consecutive Year

For the 11th consecutive year, Embraer's Phenom 300 series has become the world's best-selling light jet, according to the General Aviation Manufacturers Association (GAMA). Embraer delivered 59 Phenom 300 series light jets in 2022 to achieve this milestone, and to date, the series has accrued more than 700 deliveries.

The Phenom 300 series is in operation in 36 countries and has accumulated nearly one million, eight hundred thousand flight hours. These achievements highlight the company's reputation for safety, quality, continual aircraft improvement and innovation, with best-in-class capabilities, including range, speed, cabin pressurization, and industry-first technology.

"It's no coincidence that the Phenom 300 is once again the best-selling light jet in the industry," said Michael

Amalfitano, President & CEO of Embraer Executive Jets. "For 11 consecutive years, it has continued its strong momentum in the market and outperformed for our loyal customers—whether through best-in-class range and speed, or by offering the highest residual value of any aircraft in the market. This distinction is a true testament to Embraer's ability to deliver the ultimate experience to its customers through truly innovative aircraft."

The Phenom 300E sets the highest standard of excellence in the light



jet category. In terms of performance, the new, enhanced Phenom 300E is even faster, capable of reaching Mach 0.80, becoming the fastest single-pilot jet in production, and able to

deliver a high-speed cruise of 464 knots and a five-occupant range of 2,010 nautical miles (3,724 km) with NBAA IFR reserves.

Additional technology enhancements include an avionics upgrade featuring a runway overrun awareness and alerting system (ROAAS)—the first technology of its kind to be developed and certified in business aviation—as well as predictive windshear, Emergency Descent Mode, PERF, TOLD, and FAA Datacom, among others.



THC to Expand AW139 Helicopter Fleet to Boost SAR Services, EMS and Corporate Transport in the Kingdom of Saudi Arabia

THC confirms the intention to further expand the presence of the AW139 fleet adding six helicopters plus 20 options within the next 18 months. Once delivered, these latest aircraft will bring the THC's AW139 fleet to 49 helicopters.

THC (The Helicopter Company) will further expand its fleet of Leonardo AW139 intermediate twin engine helicopters to reinforce search and rescue (SAR), Emergency Medical Services (EMS) and Corporate transport in the Kingdom of Saudi Arabia. At Heli-Expo 2023 (7-9 March) in Atlanta, Georgia, the Company announced its willingness to engage negotiations to procure additional six units to the existing fleet plus 20 options. By the time all these latest AW139s are delivered, THC will have a total fleet of 49 AW139s carrying out a range of missions including emergency medical service, search and rescue and corporate transport in the country.

Gian Piero Cutillo, MD Leonardo Helicopters, said "We're pleased with the level of confidence shown



by a leading operator like THC in our technology and mission capabilities by this latest announcement of fleet expansion plan. The AW139 is supporting their service capability growth programme for key missions, including SAR, EMS and Corporate transport and we're proud to play our role for the communities they will serve."

The world's most important helicopter programme since its certification in 2004 and the bestselling type in its category, the AW139 has logged orders for nearly 1300 units from more than

290 customers in over 80 countries to date. The fleet of more than 1130 units in service has logged in excess of 3.6 million flight hours to date. The type has proven extremely successful in the Middle East with over 170 units sold across the region for the widest scope of missions including corporate transport, emergency medical service, search and rescue, law enforcement, offshore transport, government duties. The AW139 delivers outstanding capabilities, technology and safety to meet stringent requirements

from operators for tasks in harsh conditions to maximize effectiveness. The type features state-of-the-art avionics with advanced navigation and collision avoidance systems to enhance situational awareness and reduce pilots' workload, unmatched speed, power margins and overall performance, the widest cabin in its category featuring high modularity for rapid reconfiguration, a unique 60+ min run-dry capable main gear box for enhanced reliability and safety and up to 1000 certified kits.



Pegasus Expands the Use of Sustainable Aviation Fuel (SAF) on Domestic Flights

Pegasus Airlines and Petrol Ofisi have decided to strengthen and continue their collaboration, which is critical for sustainable aviation. The collaboration, which started in 2022, will continue in 2023 and 2024 with increasing SAF volume at İzmir Adnan Menderes and Ankara Esenboğa Airports.

Pegasus, Türkiye's digital airline, and Petrol Ofisi, Türkiye's energy infrastructure group, have decided to strengthen and continue their collaboration, which is critical for sustainable aviation. With the new agreement, Pegasus Airlines will increase the volume of Sustainable Aviation Fuel (SAF) to be supplied by Petrol Ofisi in 2023 and 2024 and will continue to operate domestic flights using SAF. Pegasus Airlines and Petrol Ofisi will continue this collaboration at İzmir Adnan Menderes and

Ankara Esenboğa Airports with increasing volumes in 2023 and 2024, with plans to expand it across the country during the same period. As part of the collaboration, the volume of SAF used in 2022 is expected to increase threefold in 2023 and up to tenfold in 2024. Produced from 100% renewable waste and waste feedstock such as edible oil and animal fat waste, Neste MY Sustainable Aviation Fuel™ (SAF) can be used in aircraft engines or fuel infrastructure without any modification.

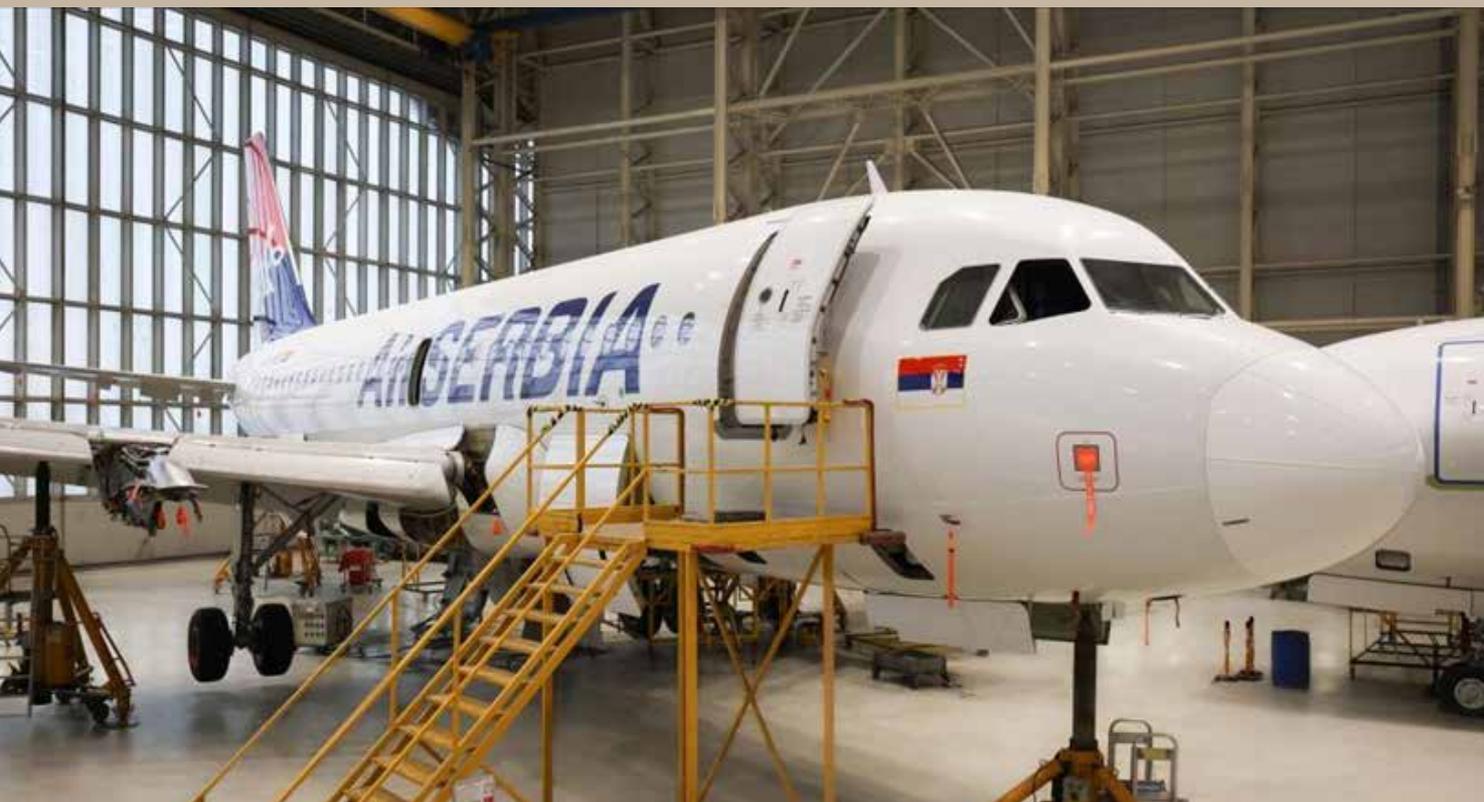
Speaking about the collaboration, Güliz Öztürk, CEO of Pegasus Airlines, said: "As Pegasus Airlines, we continue our efforts to support sustainable aviation in line with the International Air Transport Association's (IATA) 'Net Zero Carbon Emissions by 2050' decision. In order to achieve this goal, it is of great importance to increase the use of SAF produced from

environmentally friendly and sustainable sources with low carbon emissions. We have decided to strengthen and continue our cooperation with Petrol Ofisi, which has been refueling our aircraft with SAF since March 2022. We aim to expand our cooperation geographically in Türkiye in the next two years. We will continue to work with all our strength to support sustainable aviation."

Commenting on the agreement, Petrol Ofisi Group CEO Mehmet Abbasoğlu said, "As Petrol Ofisi Group, we continue our investments and collaborations that will pioneer the sectors in which we operate and provide real added value to the future of the national economy without slowing down. I am proud to say that Petrol Ofisi Group is one of the most important drivers of aviation in Türkiye and the region. In the aviation

sector, where we have been providing services for more than half a century, we provide fueling services at 72 airports in Türkiye under our PO Air brand and provide services to more than 250 airlines worldwide, servicing more than a quarter of a million aircraft annually. This huge operation is a compelling reason for us to take steps for the benefit and future of our industry and our stakeholders. We are therefore very pleased to strengthen and continue this cooperation with Pegasus Airlines, which we believe is vital to the aviation industry, and to invest in a sustainable future."

Pegasus Airlines' first domestic flight using SAF in Türkiye was conducted between İzmir Adnan Menderes Airport and İstanbul Sabiha Gökçen Airport on March 1, 2022, in cooperation with Petrol Ofisi.



Turkish Technic to Provide Base Maintenance Services to Air Serbia

Turkish Technic, a leading provider of maintenance, repair and overhaul (MRO) services has signed an agreement with the flag carrier of Serbia, Air Serbia, for the base maintenance services of four Airbus A320 family along with an A330 aircraft.

In accordance with the contract, base maintenance of the first Airbus A320neo aircraft has commenced at Turkish Technic's Istanbul Ataturk Airport facilities. Its Certificate of Release

to Service will be issued in the first week of February. The other aircraft within the scope of the contract will be taken to service at Istanbul Ataturk Airport facilities in the upcoming months.

Commenting on the new agreement, Mikail Akbulut, CEO of Turkish Technic, said: "We are delighted to strengthen Turkish Technic's partnership with Air Serbia and aim to continue building on our relationship further for the years to come. With a strong history of

supporting Airbus aircraft around the world, Turkish Technic is pleased to offer one of the best quality and reliable MRO services to Air Serbia."

We continuously strive for operational efficiency and an even better travel experience for our passengers. Accordingly, we made a partnership with Turkish Technic and entrusted them with the maintenance of several aircraft of our Airbus fleet. We strongly believe this contract is the beginning of a great partnership

between our companies," said Jiri Marek, Air Serbia CEO.

Operating as a one-stop MRO company with high-quality service, competitive turnaround times, comprehensive in-house capabilities at its state-of-the-art hangars, Turkish Technic provides maintenance, repair, overhaul, engineering, modification, tailor-made PBH and reconfiguration services to many domestic and international customers at five locations.



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Boeing Awarded NASA Sustainable Flight Demonstrator Contract

NASA has selected Boeing and its industry team to lead the development and flight testing of a full-scale Transonic Truss-Braced Wing (TTBW) demonstrator airplane.

The technologies demonstrated and tested as part of the Sustainable Flight Demonstrator (SFD) program will inform future designs and could lead to breakthrough aerodynamics and fuel efficiency gains.

When combined with expected advancements in propulsion systems, materials and systems architecture, a single-aisle airplane with a TTBW configuration could reduce fuel consumption

and emissions up to 30% relative to today's most efficient single-aisle airplanes, depending on the mission. The SFD program aims to advance the civil aviation industry's commitment to reaching net zero carbon emissions by 2050, as well as the goals set forth in the White House's U.S. Aviation Climate Action Plan.

"The SFD program has the potential to make a major contribution toward a sustainable future," said Greg Hyslop, Boeing chief engineer and executive vice president of Engineering, Test & Technology. "It represents an opportunity to design, build and fly a full-scale experimental plane, while solving novel

technical problems."

Ultrathin wings braced by struts with larger spans and higher-aspect ratios could eventually accommodate advanced propulsion systems that are limited by a lack of underwing space in today's low-wing airplane configurations. For the demonstrator vehicle, Boeing will use elements from existing vehicles and integrate them with all-new components.

NASA's funding through the SFD Space Act Agreement totals \$425 million. The SFD program will also leverage up to \$725 million in funding by Boeing and its industry partners to shape the demonstrator program and meet the resource

needs required. Separately, Boeing's previous internal investments for recent phases of sustainable aviation research total \$110 million.

The TTBW airframe concept is the result of more than a decade of development supported by NASA, Boeing and industry investments. Under previous NASA programs including the agency's Subsonic Ultra Green Aircraft Research program, Boeing conducted extensive wind tunnel testing and digital modeling to advance the design of the TTBW. Early conceptual studies started under NASA's Environmentally Responsible Aviation program.

Air India Selects Up to 290 Boeing Jets to Serve Its Strategy for Sustainable Growth

Boeing and Air India announced the carrier has selected Boeing's family of fuel-efficient airplanes to expand its future fleet with plans to invest in 190 737 MAX, 20 787 Dreamliner and 10 777X airplanes. Along with a comprehensive set of aviation services, Air India is advancing its fleet strategy to sustainably address South Asia's rapidly growing market for domestic and international air travel.

The agreement between Boeing and Air India includes options for 50 additional 737 MAXs and 20 787-9s. When finalized, this will be the largest Boeing order in South Asia and a historic milestone in the aerospace company's nearly 90-year partnership

with the carrier. The order will post to Boeing's Orders and Deliveries website when final.

Air India has also contracted with Boeing Global Services for lifecycle support services, including digital solutions, spare parts and landing gear exchange programs, pilot and maintenance technician training, aircraft modifications and other services.

The 737 MAX will provide flexibility across Air India's domestic and international network while reducing fuel use and emissions by 20% compared to the airplanes it replaces.

The 737-8, seating 162 to 210 passengers, depending

on configuration, and with a range of 3,500 nautical miles, is the market's most versatile single-aisle airplane, capable of operating profitably on short- and medium-haul routes.

The 737-10, the largest airplane in the 737 MAX family, offers the best per-seat economics of any single-aisle commercial jet, seating 188 to 230 passengers, depending on configuration with a range of 3,100 nautical miles.

Air India has benefited from the efficiency and flexibility of the 787 Dreamliner family with an existing fleet of 27 787-8s. The larger 787-9 will provide increased capacity, greater range and

25% better fuel efficiency compared to earlier generation jets.

The flagship 777-9 – the world's largest and most efficient twin-engine jet -- will be the largest airplane in Air India's fleet, enabling it to fly passengers non-stop and in enhanced comfort to almost any long-haul destination.

Unmatched in every aspect of performance, the 777X features a spacious cabin, new custom architecture and innovations from the 787.

With new breakthroughs in aerodynamics and engines, the 777-9 will provide 10% lower fuel use and emissions and 10% lower operating costs than the competition.





Falcon 10X Interior Receives Another Prestigious Product Design Award

Dassault Aviation's latest addition to its large-cabin business jet family, the ultra long-range Falcon 10X, received the Chicago Athenaeum award for Good Design.

"These and other awards received by our rapidly expanding fleet are eloquent testimony to the unparalleled design and engineering prowess possessed by our company," said Chairman and CEO Eric Trappier. "No other business jet OEM is capable of blending leading-edge aircraft technologies, particularly in the realm of flight aerodynamics and digital flight control, with the most innovative and creative features of interior design."

The award, bestowed by the Chicago-based Museum of Architecture and Design in cooperation with the European Centre for Architecture Art Design and Urban Studies, is the second in the past year to be received for the 10X's innovative interior design. The aircraft earlier won a coveted Red Dot award, sponsored by The Design Society of the U.K. It was also shortlisted for the International Yacht & Aviation Awards in the private jet interior category.

These prizes are among the most distinguished in the design world, and a sought-after mark of brand excellence.

The 10X, currently in development, will be the largest purpose-built business jet on the market. The aircraft's 2,780 cubic feet cabin will offer a unique blend of spaciousness, quiet and physical comfort while offering the only modular design of any jet in its category. With the help of sensory design, interior lighting, sound dampening and other advanced interior design techniques, the cabin seeks to make passengers forget they are even airborne, as if they were in a "penthouse in the sky."

Parts production for the 10X is currently in full swing and industrial teams are gearing up to begin final assembly of the first aircraft.

Dassault's Falcon 7X and 2000S were also given Good Design awards in previous years for specially designed cabins, crafted in collaboration with BMW Group Designworks USA.

Air New Zealand and Embraer to Collaborate on Next Generation Sustainable Aircraft Programs

Air New Zealand has signed an agreement with Embraer to join its Energia Advisory Group – a group of airlines, lessors, manufacturers and other aviation experts advising Embraer’s Energia project developing sustainable aircraft for the future.

Embraer also becomes a long term partner in Air New Zealand’s Mission Next Gen Aircraft initiative, working alongside Air New Zealand to accelerate the development and introduction of zero emissions aircraft technology for regional fleet in New Zealand. The companies will work together on the design

requirements for next-generation sustainable aircraft. Air New Zealand is a unique airline with complex mission and fleet requirements with significant domestic business, connecting customers and cargo to 20 different regions around New Zealand.

Air New Zealand Chief Sustainability Officer Kiri Hannifin says the airline has bold sustainability goals that won’t be met by a ‘business as usual’ approach. Mission Next Gen Aircraft aims to accelerate the technology and infrastructure needed to decarbonise our domestic flights, by

joining forces with the world’s leading aircraft developers, innovators and infrastructure providers.”

“We want to be a leader in the roll out of zero emissions aircraft in New Zealand. Having Embraer as one of our long-term partners will grow our collective understanding of zero emissions aircraft technology as it develops and will give them the confidence they are developing a product that’s viable for us.”

“As the global leader in regional aircraft, Embraer is ideally positioned to bring disruptive technologies to smaller

aircraft first. Air New Zealand, operator of a large, complex, and diverse regional network, is the perfect collaborator and we’re proud to be a part of this initiative” said Arjan Meijer, President and CEO, Embraer Commercial Aviation.

“Smaller, regional aircraft are going to be the first platforms on which new fuel and propulsion systems can be introduced effectively. Embraer looks forward to contributing to Air New Zealand’s initiative and also adding their expertise and requirements into Embraer’s Energia project.”





Heart Aerospace Selected as Long-Term Partner for Air New Zealand's Mission Next Gen Aircraft

Swedish electric airplane developer Heart Aerospace is pleased to announce it has been selected as a long-term partner for Air New Zealand's Mission Next Gen Aircraft partnership for the replacement of the airline's Q300 domestic fleet with a more sustainable option from 2030.

Heart Aerospace was selected alongside Airbus, ATR, Embraer, and Universal Hydrogen. Air New Zealand's Mission Next Gen Aircraft was created to accelerate the development of zero emissions aircraft technologies, as well as the infrastructure required to make these a reality for commercial aviation in New Zealand.

As a long-term partner, Heart Aerospace will

over the coming years work alongside Air New Zealand to make flying these aircraft a reality. "Air New Zealand is truly leading the way with its efforts to reduce emissions from air travel, and we are impressed by the diligence with which they approach this challenge. We could not be prouder to have been selected as a long-term strategic partner on their journey towards net zero. At Heart Aerospace we say the real innovation is getting it done, and together we will," said Anders Forslund, co-founder, and CEO of Heart Aerospace.

Air New Zealand's Chief Sustainability Officer, Kiri Hannifin says "Air New Zealand has bold sustainability goals that won't be met by a 'business

as usual' approach. Mission Next Gen Aircraft aims to accelerate the technology and infrastructure needed to decarbonise our domestic flights, by joining forces with the world's leading aircraft developers, innovators, and infrastructure providers."

"We want to be a leader in the roll out of zero emissions aircraft in New Zealand. Having Heart Aerospace as one of our long-term partners will grow our collective understanding of zero emissions aircraft technology as it develops and will give them the confidence, they are developing a product that's viable for us."

Heart Aerospace is developing the ES-30, a regional electric airplane with a standard seating

capacity of 30 passengers driven by electric motors with battery derived energy. The ES-30 will have a fully electric zero emissions range of 200 kilometers, an extended range of 400 kilometers with 30 passengers and flexibility to fly up to 800 kilometers with 25 passengers, all including typical airline reserves. Heart Aerospace expects to deliver its first ES-30 aircraft in 2028.

"We firmly believe that the collaborative approach is the only way to ensure we have a sustainable future for aviation," said Simon Newitt, Chief Commercial Officer at Heart Aerospace. "Together we will be able to bring an affordable, accessible and responsible product to the flying public of New Zealand".



Singapore Airlines Provides Unlimited Free Wi-Fi Onboard

Singapore Airlines has launched free and unlimited in-flight Wi-Fi service for all Business Class passengers, as well as PPS Club members and PPS Club supplement card holders. In addition, KrisFlyer members can now enjoy three free Wi-Fi plans when traveling in Premium Economy Class and two free Wi-Fi plans when traveling in Economy Class.

Non-KrisFlyer passengers and members who may have exhausted their free package can take advantage of Singapore Airlines' new and attractively priced Wi-Fi plans.



Horizon Aircraft Successfully Completes Hover Testing of VTOL Aircraft Prototype

Horizon Aircraft an hybrid electric Vertical Take-off and Landing (VTOL) aerial vehicles company, announced today that it has successfully completed initial hover testing of its "Cavorite X5" scale prototype on 4th January 2023.

Brandon Robinson, CEO of Horizon Aircraft said, "this aircraft has exceeded expectations during initial hover testing. It is extremely stable, is capable of full hover at only 65% power, and has hovered with 20% of its fans purposely disabled in order to test system redundancy. This is a large-scale aircraft, with a 22-foot wingspan, over 15 feet in length, and capable of speeds over 175 mph. It continues to yield valuable data that is constantly improving our full-scale design."

Horizon's innovative and patented eVTOL concept allows the aircraft to fly 98% of its mission in a very low-drag configuration like a traditional aircraft and is one of the only eVTOL aircraft currently able to do so. Flying most of the mission as a normal aircraft is safer, more efficient, and will be easier to certify than radical new eVTOL designs. The full-scale aircraft will also be powered by a hybrid electric system that can recharge the battery array in-flight while providing additional system redundancy.

Horizon Aircraft plans to move to transition flight testing in Q1 2023 at the world class ACE Climatic Wind Tunnel located near Toronto, Ontario.

Flow Chemistry Joins Forces with AI to Optimise Production of High-Energy Liquid Fuels, The Clee Project

The CLEE Project, funded by the French Defence Innovation Agency in October 2022 and led by Alysophil, MBDA and Inria, is aimed at the continuous-flow* production of high-energy liquid fuels, as well as new fuels, driven by artificial intelligence. On 14 February 2023, in Strasbourg, the partners in the project unveiled promising initial results, along with a first sample of the reference fuel, produced in Alysophil's laboratory.

The CLEE Project*, which emerged from an MBDA Innovation Lab in 2019, was born out of a need—to make maximum use of the energy generated by a fuel, and to control its availability—and an encounter with the French SME Alysophil, founded in 2018. This foresight project seeks to remove the various obstacles to the future evolution of fuels for air-breathing jet engines, particularly in the field of missile propulsion.

After discussions between MBDA, Alysophil and the French Ministry of the Armed Forces, based on a theoretical feasibility



study conducted between 2019 and 2021, a funding programme was set up by the French Defence Innovation Agency (AID) under the RAPID initiative (for Régime d'Appui à l'Innovation Duale, Dual Innovation Support Scheme). Inria then joined the project in order to contribute its scientific expertise.

The project has the dual objective of producing a laboratory demonstrator and paving the way for industrial scale-up. Within five years, a user such as MBDA France could have an industrial installation, controlled by artificial intelligence and located in a “maritime”

container, enabling it to produce up to 10 tonnes of fuel a year to meet its own needs. This continuous-flow chemistry unit could, by virtue of its design, be adapted to produce other fuels in a safe and flexible manner.

In October 2022, teams from MBDA, Alysophil, Inria and AID came together to jointly define the need, identify and exploit the databases, then select and optimise the fuel production algorithms. The initial results of the project are very tangible, with a first sample of the reference fuel produced and analysed in the Alysophil

laboratory. The second phase of the project—the construction of the pilot chemistry unit—is already underway and will enable the production of a laboratory demonstrator within two years, in preparation for the industrial scale-up.

Denis Gardin, VP Innovation and Future Technologies at MBDA: “This study provides further proof of the possibilities offered by artificial intelligence; its ability to discover new molecules by simulating millions of combinations dramatically increases the speed at which we identify new products, as well as their effectiveness.

Beyond the interest that AI represents for controlling chemical reactions in continuous flow, it also enables MBDA and Alysophil to discover new ways to improve the performance of future missiles still further, and also to adapt the tool to produce other fuels.”

Philippe Robin, President of Alysophil: “This partnership combines the know-how of three organisations that are experts in their own fields, with the aim of discovering new fuels and producing them locally in a safer and more environmentally responsible way. This initiative is supported by the Defence Innovation Agency, which shares our conviction that supply chains for strategic substances need to be secured through local, flexible and resilient production.”

Frédérique Segond, Director of the Inria Defence and Security Mission: “The CLEE project is fully in line with two of Inria's priority areas of application, namely Defence and the Environment. It also illustrates perfectly the duality of Inria's technologies, by applying natural language processing (NLP) techniques to chemistry. Through this collaboration, Inria Defence and Security is pursuing its objective of supporting France's industrial ecosystem, by meeting the application needs of a DTIB firm—MBDA—and supporting the scientific approach of a French SME, Alysophil.”



Ankara to Abu Dhabi

Wizz Air started direct flights between Ankara and Abu Dhabi. Ankara Esenboğa Airport welcomed the first flight of Wizz Air from Abu Dhabi, the capital of the United Arab Emirates, with a ceremony. Wizz Air will operate flights between the two capitals three days a week.

With the first flight of Wizz Air from Abu Dhabi was a total of 219 passengers arrived in Ankara with the Airbus A321 type aircraft. Wizz Air will operate scheduled flights between Ankara and Abu Dhabi three days a week, on Tuesdays, Thursdays and Saturdays.

Scout will Operate Embraer E190-E2

Scout, the low – cost subsidiary of Singapore Airlines, will be adding nine new Embraer E190-E2 aircraft to its fleet to support its network growth strategy.

The E190-E2, which is the latest variant of Brazilian Aircraft manufacturer Embraer's popular line of regional jets, will be the first of such aircraft type for SIA Group.

The first aircraft is scheduled for delivery to Scout in 2024, with the other eight to be progressively introduced by the end of 2025.

Scout will be the first Singapore carrier operate the E190-E2, which is the latest variant of Brazilian aircraft manufacturer Embraer's popular line of regional jets.



Digitalizing Operations to Achieve More with Less

Faced with increased disruptions, baggage mountains, and staff shortages, airports and airlines are ramping up their investment in technology to digitalize their operations and speed up the passenger journey by offering more self-service options.

SITA's 2022 Air Transport IT Insights report, published, reveals that with the post-pandemic recovery CIOs want to ensure operations are as agile and resilient as they are efficient, with IT solutions seen as central to their success. This has spurred an acceleration of digitalization, with airlines and airports looking to key technology solutions to fortify their operations against disruption while automating the passenger experience. The industry's IT spend is projected to continue its steady year-on-year growth trend since 2020 to support this push for digitalization, with a full 96% of airlines and 93% of airports expecting their IT spend to stay the same or increase in 2023 compared to 2022. Last year airline and airport IT spend rose to an estimated 37 billion USD and 6.8 billion USD respectively.

Airlines are placing great emphasis on IT tools



to manage irregular operations and provide the best passenger experience possible even amid staff shortages. Over the next three years, 90% or more of airlines are investing in IT service management enhancement and disruption warning systems, as well as business intelligence initiatives for aircraft turnaround management, passenger processing, and baggage processing. Business intelligence solutions are at the forefront of airport IT investment priorities too, with 93% or more planning business intelligence initiatives for asset management and flight operations by 2025. The emphasis on agility, adaptability to disruption, and prompt communication with customers and stakeholders is clear; by 2025 half of airports are

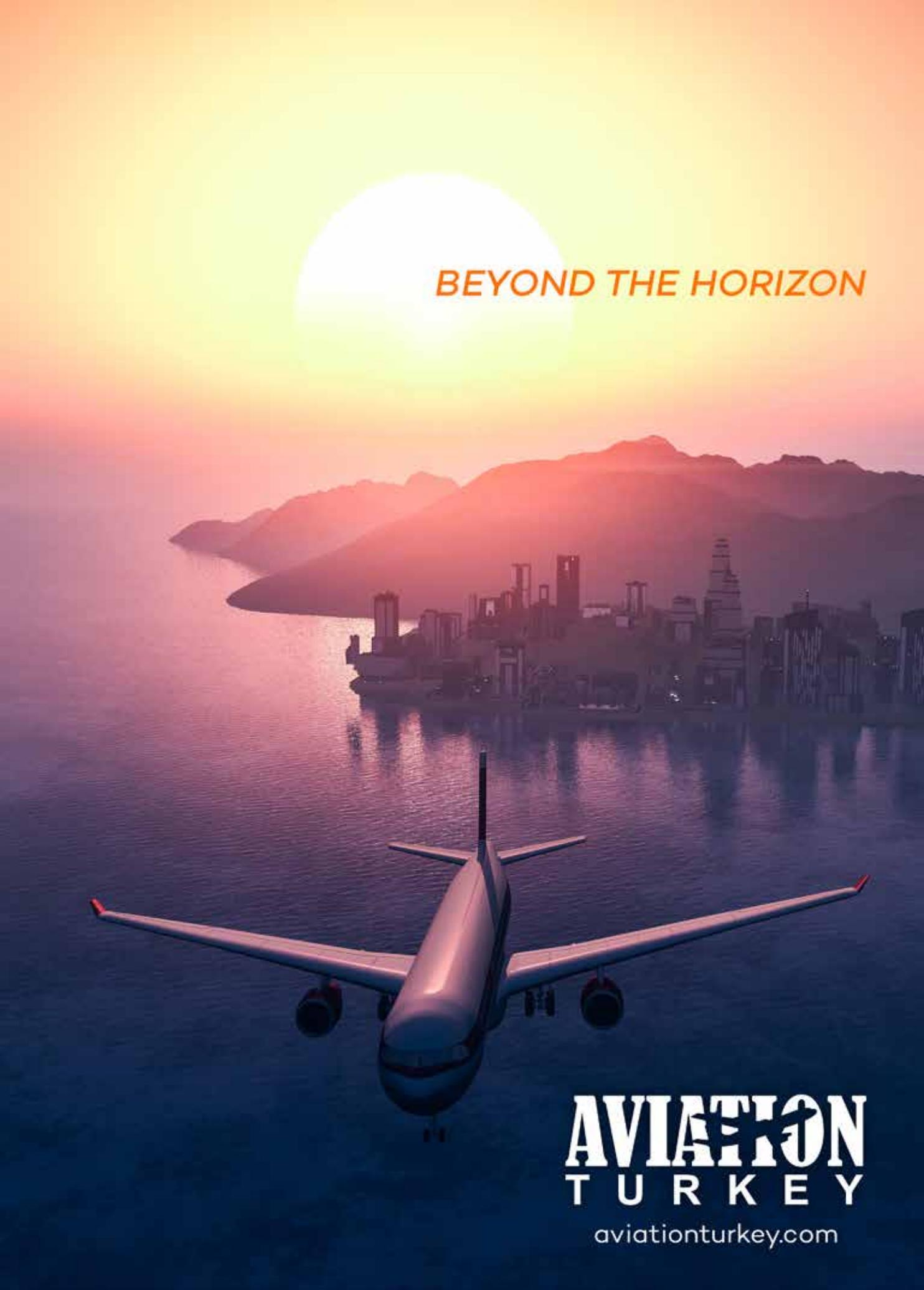
seeking to implement automated predictive alerts prior to flight disruption events as well as business intelligence initiatives to enable scaling of operations based on demand.

Both airlines and airports are investing in key technologies to smooth the passenger experience across every step of the journey, to help curb bottlenecks and in turn allow redistribution of key staff resource to focus on more complex tasks. Biometrics and self-service technologies are seeing major emphasis.

Airlines have identified self-service technologies as key to helping manage irregular operations, and this remained their top investment priority in 2022, with touchless solutions and biometric ID management following closely.

To support effective baggage management and empower passengers following a period of significant disruption, a majority of airlines plan to provide real-time baggage tracking information to passengers by 2025.

Airports are similarly prioritizing self-service initiatives, placing strong emphasis on self check-in and self-bag drop, with 86% planning implementation by 2025. Airports' implementation of a secure single biometric token across all touchpoints has surged from just 3% in 2021 to 39% in 2022, with over half planning implementation over the next three years. This signals a strong commitment to the next-generation travel experience where passengers can breeze through the airport using their face as their boarding pass.



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