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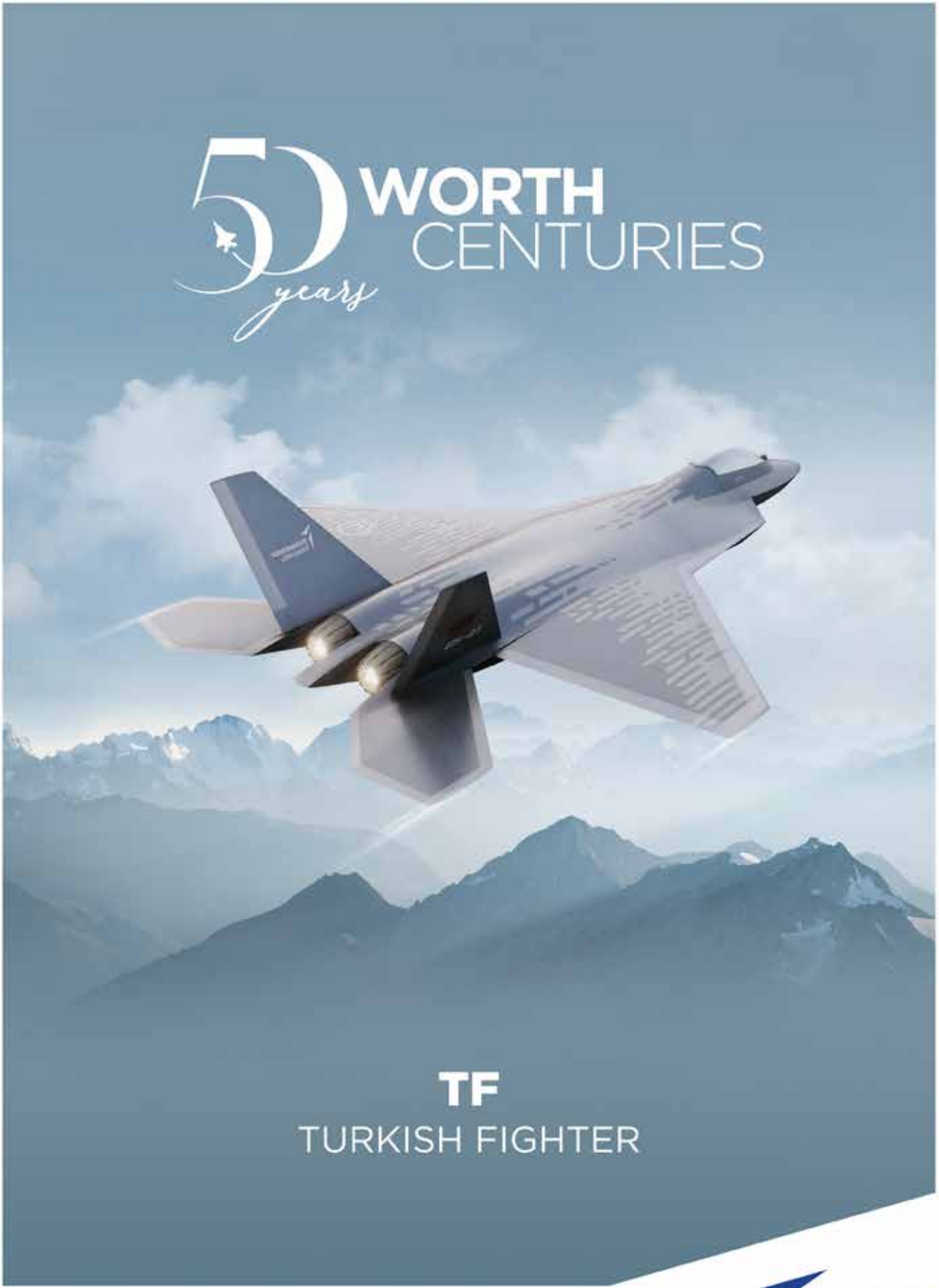

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Basım Tarihi
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Yayın Türü
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conte

6

Achieving a Great Financial Success in 2022, Turkish Airlines Plans to Bring US$17 Billion to Türkiye in 2023!

18

"Our Turboprops are the Most Efficient and Lowest Emission Regional Aircraft Today, Emitting 45% Jess CO2 than Similar-Size Regional Jets"

Will Air Cargo Continue to Fly High in the Aftermath of the Pandemic?

24

nts

30 Lithium Batteries Reducing Risk

32 Cargo Drones Becoming Fundamental Asset in E-Commerce

40 CargoTron PD250 Stretch your last-mile!

44 Who Will be the Winner of the Flight Between Pilots and Technology?

38 Whatever You See in the World is From Istanbul

54 Low Cost Flight, Business Class Lounge

Sustainable Transformation of Air Cargo is Driving Forward

Sustainability is the foundation for today's leading global framework for international cooperation – the 2030 Agenda for Sustainable Development, adopted in 2015 by the 193 Member States of the United Nations (UN). At the heart of "Agenda 2030" are the 17 Sustainable Development Goals (SDGs) and 169 associated targets laying out a path over 15 years to end extreme poverty, fight inequality and injustice, and protect the planet.

The development of long-term strategies and investments to achieve a sustainable industry is key to guaranteeing the future of air cargo. The industry is committed to positively impacting people and the planet while contributing to global prosperity and peace through industry partnership. Air cargo plays a vital role to sustain the world economy, inclusive growth, job creation and poverty reduction.

It is well known that IATA works to reduce air cargo's environmental impact with innovative technologies and improved operations and infrastructure. Reducing fuel and energy consumption, eliminating packaging waste, automating processes, and investing in lightweight materials positively impact economic performance and operational efficiency. Attracting, retaining, and developing diverse talent is a top priority for air cargo. IATA also works to ensure air cargo staff fulfill their potential in dignity and equality and a healthy environment. By its programs, Future Air Cargo Executives, Fly Net Zero, Cargo CO2 emissions measurement methodology , IATA is one of driving force of air cargo industry members to achieve the commitments on net zero carbon by 2050.

On the other hand, Whitin the light of Tiaca Sustainability program, the organization continues to track and assess the sustainable transformation of the air cargo industry through its annual industry survey involving supply chain partners from across the globe, within each industry sector and business size. Sustainability program covers 8 key objectives: Decarbonize, Eliminate waste, Protect biodiversity, Support local economies and communities, Improve lives and wellbeing Improve efficiencies and profitability, Attract, retain and develop employees and Build and nurture partnerships.

Key highlights of the report Tiaca sustainability report:

-64% of respondents state that the sustainability pressure has increased compared to last year, mainly driven by customers and regulators

-There is a clear link between ESG action and reputation report 85% of respondents

-75% emphasize that sustainability is more important than last year

-76% of companies have confirmed they have a sustainability strategy in place

More companies have dedicated teams and budgets to drive sustainability

-52% of companies produce a sustainability report

-9% of companies have indicated a reduction in energy consumption in their operations

-50% of companies have upgraded their fleets to cleaner aerial and ground vehicles

-Airlines, Ground handlers and Freight forwarders show largest

investment in the use of SAF to decarbonize

-Overall SAF commitments make slow progress and are led by large companies

-Airlines lead the way with single-use plastics reduction up by 16% from 2022

-58% of airports and 43% of freight forwarders have ramped up their efforts to combat wildlife trafficking

-52% of companies primarily airlines and ground handlers make efforts to improve local air quality

-Freight forwarders take the lead in reducing their noise impact

-More emphasis needs to be placed on the role the industry plays in creating economic value

Beyond the defined People, Planet and Prosperity categories, the report urges the industry to take the following actions: Set your sustainability agenda; Ramp up the sustainability resources; Address workforce challenges with people-focused strategy; Build trust in your business by joining the BlueSky program; Raise sustainability awareness; Get ready to address customer requests and regulation.

For a sustainable and better future, a good decision-making mechanism and an engagement with complex social, economic, and environmental challenges...

Enjoy the issue...

Ayşe Akalın
Editor in Chief

Achieving a Great Financial Success in 2022,

Turkish Airlines Plans to Bring US$17 Billion to Türkiye in 2023!

by İbrahim Sünnetçi

Turkish Airlines (THY), the flag carrier airline of Türkiye, was established on May 20, 1933, with an initial fleet of 5 planes and less than 30 personnel for air transporting passengers and cargo in the country and abroad. As the 9th largest airline company in the world in terms of fleet size with 412 aircraft (278 narrow body, 111 wide body, and 23 cargo planes), Turkish Airlines proudly waves our flag as a 5-star global airline company that flies to most countries in the world with an extensive flight network serving 342 destinations in 5 continents and 129 countries today (April 2023).

Prof. Ahmet BOLAT- Chairman of the Board and the Vahdetivücut Committee of Turkish Airlines

THY, which is preferred in the Civil Air Transport (CAT) sector for its flight safety, reliability, product range, service quality, and competitive position, has chosen to be a leading and globally active airline in Europe as its mission. THY's vision is:

- *Continuing the growth trend above the sector averages,*
- *Zero accidents and breakdowns,*
- *An exemplary service mentality in the world,*
- *Unit costs equivalent to low-cost carriers,*
- *Selling and distribution expenses below industry averages,*
- *Loyal customers who do their own booking, ticketing, and boarding operations,*
- *Personnel who know that the benefit from the institution is proportional to the added value they created,*
- *Commercial agility that creates jobs for Star Alliance partners and utilizes the potential offered by them,*
- *Stands out with its management that adopts modern management principles, taking into account the interests of its shareholders and all its stakeholders.*

Continuing to grow rapidly since its establishment, the flag carrier airline Turkish Airlines has 7 subsidiaries and 11 businesses under joint management, and the total number of employees, including subcontractors, has exceeded 75 thousand. THY improves its sustainability performance every year with investments, projects, and good practices by following global trends and innovations in the sector and carries out its activities to increase its positive impact on the world. THY, which is among the top 3 most well-known airline brands in the world, has increased its market share more than three times in the last 20 years and gained the most market share between 2010-2022.

THY's Operational and Financial Results in 2022

Having made a strong recovery after the first shock of the COVID-19 pandemic, THY distinguished itself from its competitors with its operational and financial results throughout 2022, thanks to its operational agility and the highly qualified workforce it maintained during the pandemic period. According to the statistics published by the International Air Transport Association IATA, while the global aviation sector reached 72% of its 2019 capacity in 2022, THY achieved a faster recovery compared to the sector, reaching 108% of its 2019 capacity in 2022.

While distinguished positively from the international aviation sector with its traffic results in 2022, THY also achieved great success with its financial results. According to the figures shared by THY, between January 1 to December 31, 2022, our National Flag Carrier increased passenger revenues by 28% and cargo revenues by 121% compared to 2019 and generated US$18.4 Billion in revenue. According to the statement made by THY to the Public Disclosure Platform (PDP), THY made 47,432 Billion TRY profit in 2022. With the strong recovery in demand and operational agility, THY increased its total revenues by 39% in 2022 compared to 2019, more than doubled its cargo revenues compared to 2019, more than tripled its Core Operating Profit compared to 2019 and achieved profitability above the sector average with its Operating Profit and 15.1% Operating Profit Margin. Despite the difficult conditions of the COVID-19 pandemic, THY has made a profit for the last 6 consecutive quarters and has become one of the most profitable airlines in the world in 2022.

At the beginning of 2022, while the effects of the COVID-19 outbreak still persist, rising geopolitical tensions have once again affected the aviation industry. The mutual closure of airspaces and the suspension of flights had a negative impact on both demand and costs for the aviation industry due to rising oil prices. In addition, operational difficulties


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occurred at European airports due to the lack of personnel. Despite all this, THY continued its operations uninterruptedly in 2022 with 394 aircraft, which are among the youngest and most modern fleets in the world, thanks to the highly qualified workforce it protected during the pandemic period and carried 71,818 million passengers in total, with 85.8% occupancy on domestic flights (25.8 million) and 80.1% on international flights (46.3 million), reaching 97% of the number of passengers in 2019 (74,282 million). In 2022, when the problems caused by the lack of personnel and infrastructure were felt to a large extent, Turkish Airlines continued its operations without interruption, much more successfully than European Airlines. According to IATA data, the aviation sector's global international flight ASK (Available Seat Kilometers) reached 65% of 2019 in 2022, while the European international flight ASK reached 80% of 2019. THY continued to differ significantly from peer airlines in the same period and exceeded the 2019 ASK figures by 10%. In addition, according to the European Organization for the Safety of Air Navigation (Eurocontrol), THY became the top airline with the most flights in Europe among network carriers in 2022. According to IATA data, in the third quarter of 2022, when flight operations intensified, European airlines canceled 6 times more flights than THY.

Despite the pressure of global inflation, THY continued its strong cost management by reducing its unit expenses excluding fuel by 2% in 2022 compared to 2019, and thus, THY's earnings before interest, taxes, depreciation, amortization, and restructuring or rent costs (EBITDAR) was approximately US$ 5.4 billion in 2022, pointing to its potential to generate cash. The number of Turkish Airlines personnel, which was 27,532 as of December 31, 2021, increased by 7% to 29,520 as of December 31, 2022.

THY's cargo revenues, which comprise 20% of total revenues, increased by 121% to approximately US$ 3.7 Billion between January 1 and December 31, 2022, compared to 2019. In February 2022, THY moved to the new cargo operations center SMARTIST at Istanbul Airport, which is the largest Cargo Terminal in Europe and the 3rd largest in the world. Turkish Cargo has quadrupled its market share in cargo transportation in the last 10 years (from 1.3% in 2012 to 5.2% in 2022) and increased its cargo revenue from US$1,317 Billion in 2017 to US$3,735 Billion in 2022. Turkish Cargo flies to 355 destinations in 132 countries with 21 cargo and 373 passenger aircraft. According to the 2022 data published by the International Air Transport Association IATA, Turkish Cargo clinched its success as the world's 5th largest air cargo carrier in the cargo market.

Chairman of the Board and the Executive Committee of Turkish Airlines, Prof. Ahmet BOLAT, made a statement earlier this year and expressed his goals regarding Turkish Cargo. "Leading up to our 2028 and 2033 strategies, we aim to increase the share of products and services with increased added value by improving our Turkish Cargo brand's

business model, as well as our infrastructure and technology investments. In addition to the conventional airport-to-airport transportation model, we are working on a logistics ecosystem. These efforts include existing markets and our products, but we also aim to grow and diversify in different markets through partnerships and investments where necessary. With all these investments and strategies, we aim to be one of the world's top 3 air cargo companies with our Turkish Cargo brand in the future."

Evaluating the results on his social media account, the CEO of Turkish Airlines, Bilal EKŞİ, said, "We have successfully completed the year 2022. We carried 71.8 million passengers and transported 1.7 million tons of cargo. We finished the year with 394 planes. We will achieve greater success in 2023."

Started its operations as a low-cost carrier (LCC) subsidiary of THY in 2008, AnadoluJet made its first international flight from Sabiha Gökçen Airport on March 29, 2020, and increased its international capacity share by 51% in 2022 compared to 2019. AnadoluJet, which has 64 aircraft in its fleet (as of December 31, 2021), flew to 168 destinations between January 1 and December 31, 2021, and increased its destinations to 180 between January 1 and December 31, 2022. AnadoluJet's occupancy rate between January 1 and December 31, 2022, is 82.9% (62% domestic and 38% international passengers), while 70% of AnadoluJet's international destinations are in Europe, and 30% are in the Middle East. According to the '2022 Results Investor Presentation' made by THY, AnadoluJet's targets for 2023 have been determined as follows:

- *Reducing low unit costs even more with 15 new generation aircraft that will enter the fleet in 2023,*
- *Increasing access to high-growth holiday destinations through direct international flights,*

• Growing in the segment of ethnic travel from Europe, the Middle East, and Central Asia to Türkiye,

• Reaching price-sensitive customers,

• Increasing the share of side incomes in total income via new products and product groups.

Undoubtedly, the Chairman of the Board and the Executive Committee of Turkish Airlines, Prof. Ahmet BOLAT, has a significant role in the performance of THY and AnadoluJet in 2022. After serving in various positions within the company for 17 years, Prof. Ahmet BOLAT, who took the post of Chairman of the Board and the Executive Committee in January 2022, made significant changes in Turkish Airlines in a short period from its employees to its fleet structure and from AnadoluJet to catering services. BOLAT made the following statement about AnadoluJet's performance in 2022 and its targets for 2023, "As you know, we began international flights with AnadoluJet in 2020. We added new generation aircraft to its fleet to support AnadoluJet's growth and make it more competitive. In order to meet the increasing demand, especially during the summer months, we added a total of 16 aircraft to AnadoluJet's fleet (7 B737-8 MAX, 7 A321NEO, and 3 A320NEO) and increased AnadoluJet's fleet to 64 aircraft in a short time. We are transforming AnaoluJet into a low-cost, practical, and economical airline. We will continue supporting AnadoluJet's transformation and growth both in domestic and international destinations with new-generation aircraft. In 2023, we will continue to add new generation aircraft to AnadoluJet's fleet that offers higher flight comfort and enable us to reach more passengers with their high capacity. By the end of the year, we will add 8 new-generation narrow-body aircraft to AnadoluJet's fleet, increasing the total number of aircraft to over 80. In the past, there were only 737-800s with 189 seats in AnadoluJet's fleet. By converting the next-generation A321NEOs to high-density configuration, we will further reduce unit costs and increase competitiveness."

In his statement to Anadolu Agency on December 27, 2022, BOLAT stated that AnadoluJet has nearly 30 new-generation aircraft and wants to find new aircraft to meet the growing demand. "We have 67 aircraft in AnadoluJet, which we have budgeted for this year. We want to increase the number of our aircraft because there is a high demand for domestic flights. From March, we will increase the frequency of AnadoluJet by 50% on domestic flights. At the same time, our international network is also growing. AnadoluJet will become an efficient and economical airline company, which we call a low-cost airline, in Sabiha Gökçen Airport."

Established with 100% Turkish Airlines capital in 2006 as one of THY's 7 subsidiaries and merged with Turkish Airlines HABOM Inc. in June 2015, Turkish Technic closed 2022 with the highest revenue figure in its history. According to Turkish Technic's 2022 financial reports (published by THY Press Office in March 2023), the company grew by 37% in 2022 compared to the previous year and earned US$1.42 Billion USD in revenue, increasing its market share to 1.9% in the same period. Thus, the company achieved the highest growth rate and earnings in its history.

Adding new capabilities every year in line with the needs of the aviation industry, Turkish Technic achieved many new achievements in 2022. In this context, the company completed the first base maintenance operations for Boeing 787 Dreamliner and Airbus A350 aircraft in 2022 and also carried out the first maintenance operation on Boeing 777-300 ER landing gears within the same year. Incorporating 1,193 aircraft part numbers in 2022, the company expanded its capabilities and the range of services it offers to its customers. Providing component and aircraft maintenance services to several airlines in different parts of the world,

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Turkish Technic continues its activities in its hangars at 5 different airports in Ankara, Aydın, and Istanbul (ATATÜRK, Istanbul, and Sabiha Gökçen Airports) in order to increase the number of foreign airlines it serves and its market share. In 2022, Turkish Technic provided base maintenance services to 649 aircraft and maintenance-repair services to 221 landing gear and 119,950 components.

Chairman of the Board of Directors and the Executive Committee of Turkish Technic, Prof. Ahmet BOLAT, made a statement about the performance of Turkish Technic in 2022. "Thanks to the capabilities that we have catered to the needs of the aviation industry and our maintenance capacity, we provide a perfect maintenance-repair service to our domestic and foreign customers. We left 2022 behind by achieving our goals and exceeding the growth level and income figures in the pre-pandemic period. We achieved great success in our company's history with a revenue of US$ 1.42 Billion and an operational profit of US$ 119 Million in the same period. We thank our customers for their trust in our company and express our gratitude to our employees for their perseverance and dedication."

THY's Fleet and 2023 Targets

As one of the youngest and most modern fleets in the world, Turkish Airlines' fleet consisted of a total of 370 aircraft as of the end of 2021 (246 narrow body, 104 wide body, and 20 cargo); it reached a total of 394 aircraft by the end of 2022 (263 narrow body, 110 wide body, and 21 cargo). In 2022, 31 additional aircraft were added to the fleet, including 13 x A321NEO, 8 x B737-8 MAX, 6 x A350-900, 3 x A320NEO, and 1 x B787 Dreamliner. As of December 31, 2021, the average age of the fleet is 8.0 years for wide-body aircraft, 8.7 years for narrow-body aircraft, and 9.8 years for cargo aircraft. The overall total is 8.7 years. In his statement in April, BOLAT pointed out that fleet structuring and Human Resources will again be the main themes in the "10-year Strategies and 2033 Targets" to be announced on April 13, 2023. "In short, we are planning a THY that will double in size but together with an Ecosystem that will triple in size with its contribution to the economy. "BOLAT said the following about THY's current fleet. "We currently have a fleet of 412 aircraft, including 278 narrow-body, 111 wide-body, and 23 cargo aircraft. We are the 9th largest airline company in the world by fleet size. In line with our growth strategy, we plan to bolster our main brand fleet with a total of 12 wide-body aircraft (7 x 787-9, 4 x A350-9, 1 x A330-200) and 3 narrow-body A321NEO for the remainder of the year. We currently have orders for 82 new generation aircraft, including 49 narrow-body and 33 wide-body, and we plan to receive these aircraft by 2028. In general, our enlargement goals are, of course, not limited to these orders. As part of our vision and strategies, we will definitely have new orders soon to reach our short, medium, and long-term goals."

In a statement to Anadolu Agency on December 27, 2022, BOLAT shared his assessment for 2022 and expectations and targets for 2023. BOLAT stated they plan to carry more than 88 million passengers and add 6 new destinations to their flight network in 2023 when they plan to earn US$17 Billion. "We will create 9-10 thousand new jobs that will support our 17% growth target. We plan to carry more than 88 million passengers in 2023. This year, we aim to increase the number of international flights to 293 by adding Denver and Detroit (USA), Katowice (Poland), and Palermo (Italy). We will increase the number of destinations to 348 by adding Yozgat and Bayburt (to our total flight network)." Referring to the latest situation in aircraft orders, BOLAT emphasized that the number of aircraft in the fleet will be increased to 427 by the end of 2023. "There were some problems with the manufacturers. These are about to end. In 2023, we aim for a 17-20% capacity increase in our already accepted budget."

THY's First Quarterly Performance in 2023

In the first week of April, Turkish Airlines (THY) announced its 3-month traffic figures, covering the period from January to March 2023. Accordingly, Türkiye's flag carrier airline, THY, carried a total of 6.1 million passengers in March 2023 and 17.1 million passengers in the 3-month period between January and March. THY's total number of passengers in March 2022 was 4.8 million, and 12.7 million between January and March 2022. Thus, THY achieved a 27.5% increase in the number of passengers this year compared to March 2022 and 34.7% in the January-March period.

THY's traffic results for March 2023 are as follows:

• While the number of transfer-transit passengers was 1.5 million in March 2022, it increased by 67.8% to 2.5 million in the same period of 2023.

• The total passenger occupancy rate increased by 6.1 points and became 81.9% in March 2023 compared to the same period in 2022. The international occupancy rate became 82.3%, while the domestic occupancy rate became 77.7% in March 2023.

• While the Available Seat Kilometers (ASK) was 13.8 billion in March 2022, it increased by 32.4% in the same period of 2023 to 18.3 billion.

THY's traffic results between January - March 2023 are as follows:

• While the number of transfer-transit passengers was 4 million between January - March 2022, it increased by %71.4 to 6.8 million in the same period of 2023.

• The total passenger occupancy rate increased by 11.1 points and became 81.3% between January - March 2023 compared to the same period in 2022. The international occupancy rate was 81.4%, while the domestic occupancy rate was 80.1% in the same period.

• While the Available Seat Kilometers (ASK) was 38.8 billion between January - March 2022, it increased by 33.3% in the same period of 2023 to 51.8 billion.

• By the end of March 2023, the number of aircraft in the fleet reached 411.

The data above does not include free passenger and cargo transports carried out between February 6 and March 31 due to earthquakes in Kahramanmaraş. In the relevant period, 433 thousand citizens, as well as search & rescue and aid teams, were carried to the region, 430 thousand citizens were evacuated, and 29 thousand tons of aid materials were sent to disaster areas.

Chairman of the Board and the Executive Committee of Turkish Airlines, Prof. Ahmet BOLAT, shared the following information about the THY's support in relief efforts after the earthquakes in Kahramanmaraş on February 6. "With the responsibility and awareness of being the flag carrier airline of our country, we mobilized all our resources right after the earthquake in Kahramanmaraş on February 6 and carried 433 thousand search & rescue teams and 16 thousand tons of aid materials to the region with over 2,400 flights so far. We also evacuated 430 thousand of our citizens. After the earthquake disaster, we took the responsibility to heal the wounds. In addition to our 2 Billion TRY donation to AFAD in cash, we started working with the Ministry of Environment, Urbanization, and Climate to construct 1,000 houses. By employing one person from 1000 families affected by the earthquake, we will add 1,000 people to the Turkish Airlines family." BOLAT also announced in a post on April 12 from his LinkedIn account that 500 children from the earthquake zone will be brought to Istanbul with their guardians and hosted for 2 days during the Feast of Ramadan. BOLAT also announced that they will give a net 15,000 TRY Holiday Bonus to all 75 thousand employees. "We gave Ramadan bonus last year, but it was in a narrower scope and was 5 thousand TRY. This year, we will give 15 thousand TRY to all our 75 thousand employees as an equal holiday gift to everyone, regardless of position or rank."

BioJet Fuel_ Turkish Airlines Airplane

Sustainability, Combating Climate Change and Using Sustainable Aviation Fuel (SAF)

Almost all of the airlines' emissions come from the combustion of aviation fuel. With over 100 operational optimization projects successfully implemented since 2008 to reduce the carbon footprint, Türkiye's flag carrier Turkish Airlines, saved 57,581 tons of fuel in 2022 alone, thus preventing the release of 181,379 tons of carbon emissions into the atmosphere.

THY is aware of the aviation industry's impact on climate change and the key role Sustainable Aviation Fuel (SAF) played in achieving its emission reduction target. Therefore, THY includes the use of Sustainable Aviation Fuel for long-term emission reduction in its plans and supports SAF R&D efforts to reduce and eliminate factors that may impact climate change. At the same time, THY expands and improves its fleet with young, fuel-efficient, and more environmentally friendly aircraft.

Directing its sustainability strategy under the umbrella of the Sustainability Committee established in 2021, Star Alliance member Turkish Airlines (THY) improves its sustainability performance every year with investments, projects, and best practices by following global trends and innovations in the sector and carries out its activities to increase its positive impact on the world. Turkish Airlines, which has made a name for itself in the national and international arena with its sustainability-oriented activities, was deemed worthy of the "Most Sustainable Flag Carrier" award as part of the "2022 Sustainability Award" organized by World Finance, one of the respected institutions of the international finance world. Working with a Zero Waste policy in the field of sustainability, THY won this award for having one of the most modern and youngest fleets in the world, its commitment to gender equality, its fuel saving, and emission reduction projects implemented under combating climate change, its support to R&D Projects in use of biofuels, its flexibility in the management of the pandemic process and strong financial performance. THY, together with Boğaziçi University, also won the Airline Sustainability Innovation of the Year award by CAPA - Centre for Aviation in 2022 for its support of the TÜBİTAK's MICRO-JET (Microalgae Based Sustainable Bio-Jet Fuel) Project, which aims to produce Sustainable Aviation Fuel (SAF) from microalgae.

MIKRO-JET Project aims to produce synthetic bio-kerosene from microalgae using hydrotreated fatty acids and hydrothermal liquefaction methods. This biofuel, which will be obtained from sustainable sources, will be used in the aircraft of the THY fleet following the engine tests to be carried out by Turkish Technic. The sustainable aviation fuel that Turkish Airlines will use provides a greenhouse gas emission reduction of up to 87% compared to the same amount of conventional kerosene fuel. When the project is completed, Türkiye's and Europe's first carbon-negative integrated biorefinery will become operational.

Türkiye's flag carrier airline, THY, has taken an important step by using Sustainable Aviation Fuel (SAF) on its Istanbul-Paris flight on February 2, 2022, to go beyond today's gains and create value in the future. THY currently uses SAF on certain flights. THY flies to destinations such as Paris, Oslo, Copenhagen, and Stockholm using environmentally friendly fuel. In this context, THY plans to expand the SAF, which it regularly uses on flights once a week, to different destinations with increasing frequencies in the future, within the limits of technical, regulatory, safety, and commercial applicability. THY signed the Global Sustainable Aviation Fuel (SAF) Declaration with the participation of Rolls-Royce and Airbus on October 7 during the Istanbul Airshow held in October 2022


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Interview with Mark Dunnachie,

Head of Commercial Europe & North America, ATR

Ayşe Akalın: First of all could you please inform us about ATR aircraft family?

Mark Dunnachie: The ATR family (ATR 42 and ATR 72) is made up of high-wing, six-blade twin turboprop aircraft, designed right from the start for efficiency on regional routes, which translates into low fuel consumption and CO2 emissions, along with maximum operational flexibility.

The ATR 42-600, with up to 50 seats, has the lowest trip cost in its category. It is the ideal local commuter and a low-risk solution for an airline to explore new markets. The ATR 72-600 is our larger module, with up to 78 seats. It offers the lowest cost per seat on the market. Both aircraft have the lowest fuel burn and CO2 emissions compared to other turboprops and regional jets: for instance, the ATR 72-600 burns 45% less fuel and therefore emits 45% less CO2 per trip compared to a regional jet.

Since our beginnings in 1981, we have grown our family with two variants of these two models. The first one being the ATR 72-600F, the only purpose-built regional freighter on the market, the first of which we delivered late 2020 to FedEx Express. It includes the latest generation avionics, a rear door optimised for freighter operations, and a large cargo door to accommodate unit load devices and outsized cargo. Its wide cross section allows for high modularity, to transport bulk, containers and palettes.

Finally, the youngest member of the ATR family is the ATR 42-600S. This Short Take-Off and Landing variant of the ATR 42 offers take-off and landing capabilities on runways as short as 800 meters. It offers new opportunities to the most remote communities, as it will be able to access over 1,000 underutilised commercial airports with runways that are less than 1,000 meters long. It is the only replacement solution for ageing aircraft with STOL performance.

To date, we have sold over 1,800 aircraft and delivered over 1,600, therefore playing a vital role to connect people and businesses in a sustainable and modern way.

Ayşe Akalın: Could you give us an overview of 2022 from ATR point of view in terms of orders, manufacturing, services and technology?

Mark Dunnachie: After three difficult years due to COVID, in a complex economic and geopolitical environment which led to industry-wide supply chain issues, ATR delivered 25 new and 11 pre-owned aircraft in 2022. Nonetheless, the global ATR in-service fleet is now close to pre-COVID numbers with 1,200 aircraft flying, and the current backlog stands at a solid 160 aircraft. 2022 was also a record year for us in terms of support and services with revenues close to 350 million $.

Last year saw 150 new routes created with ATR aircraft. As part of our commitment to decarbonisation, we performed the first 100% Sustainable Aviation Fuel (SAF) flight in history with a commercial aircraft, and our brand new PW127XT engine was certified and entered into service. At the same time, we successfully advanced the development of our aircraft family, completing the first test flight of the ATR 42 600S (Short Take-Off and Landing) and launching a feasibility study for our next generation EVO concept. These achievements showcase the commitment to connectivity, sustainability and innovation that ATR stands for.

Ayşe Akalın: What could you tell us about the international presence of ATR in regional aircraft market and the major international programs that you have been involved in recently? What key geographical markets are your next targets?

Mark Dunnachie: The best testimony of the strong role our aircraft are playing across the globe is in their success. We have a large and diverse customer base with around 200 operators who have chosen our aircraft. They are flown in 100 countries worldwide, on all continents. And we also operate on a global scale with sites in Paris, Toulouse, Miami, Singapore, Tokyo, Beijing, etc., which enable us to offer 24/7 support to our customers.

Traditionally, Asia Pacific has always been a strong market for ATR, accounting for 40 to 50% of our activity, however we see a lot of potential for the ATR to increase regional connectivity across the Turkish market. This has the immediate benefit of providing essential links to often remote communities but also in terms of feed in and out of the Istanbul hub. The importance of these vital links is clear when you also consider that a 10% increase in regional flights generates +6% local GDP, +5% tourism and +8% foreign direct investment.

We can also mention the United States, where regional connectivity is dropping and we strongly believe we can contribute to restoring these essential links. 32% of routes below 500NM operated in 2000 had stopped in 2021, and almost half of the aged 50-seater regional jets retired during the pandemic. Their replacement creates a sizeable opportunity for us, as the modernity of our product offering, environmental performance and adequacy on short thin routes makes them the perfect aircraft to serve small communities and create quicker and more sustainable connections between cities.

ATR's leadership is also demonstrated through our involvement in major French and European research and technology projects (PARIDES, EDG²E, Clean Aviation), the aim of which is to develop new disruptive aircraft technologies to support the European Green Deal and net-zero 2050 ambition. Our efforts towards these goals have been constant, leveraging the efficiency of our platform and using incremental innovations to reduce emissions even further.

Ayşe Akalın: What are your predictions for regional aircraft in terms of growth, challenges and opportunities? How do you see the regional aircraft market developing globally and how does ATR provide support?

Mark Dunnachie: As reflected in our 20-year market forecast, released at the Farnborough Airshow last year, we see a need for 2,450 new turboprop deliveries by 2041. The primary driver is the replacement market, accounting for 1,500 aircraft. These deliveries will also be driven by the entry into service of the ATR 42-600S, which will open new opportunities in the most remote areas. We will also continue to position ourselves on the freighter market, as we see a potential for 550 turboprop freighters in the up to 9 tonnes category. This forecast has been built considering current technology, but we estimate further growth from the early entry into service of 100% Sustainable Aviation Fuel propulsion, particularly in markets where sustainability issues are key. The high cost of fuel could spur a return to turboprops for short hauls currently served by jets.

The reinforcement of essential connectivity and domestic operations remain a fundamental part of the demand, particularly where costly ground infrastructure and lengthy sea travel are the only alternatives.

Ayşe Akalın: Can you elaborate on ATR' efforts and projects that focused on safe and sustainable aerospace? How would you summarize ATR' ongoing sustainability projects with global partners?

Mark Dunnachie: At ATR, our mission goes far beyond manufacturing aircraft. We aim to ensure that all communities across the globe can benefit from essential connectivity in the most responsible, reliable and affordable way. Our turboprops are the most efficient and lowest emission regional aircraft today, emitting 45% less CO2 than similar-size regional jets. Noise emissions are also well below current ICAO standards. As the whole aviation industry, we are committed to reaching net-zero carbon emissions and our low-carbon strategy is based on five pillars. First, we aim to achieve the 100% Sustainable Aviation Fuel certification of our aircraft by 2025, joining forces with Braathens Regional Airlines, Pratt & Whitney Canada and Neste. This will lead to 80% fewer CO2 emissions. In June last year, we were the first to fly a commercial aircraft with 100% SAF in both engines, demonstrating that the technology is ready. We have also further reduced the fuel consumption of our aircraft by introducing the new PW127XT engine. Everything in this engine means more efficiency and durability for our customers, as it enables a 3% improvement in fuel efficiency, a 20% reduction in engine maintenance costs, and a 40% extended time on wing, bringing the engine overhaul to 20,000 hours. Our customer Air Corsica is already operating it successfully, as this new engine is now standard for all new ATR deliveries. These are short-term solutions, but we are also very much working towards the future of regional aviation. Last year we have launched a feasibility study for our ATR 'EVO' concept, to enter the market by 2030. The plan foresees a renewal of the propulsion system with a hybrid capability, new propellers, improved cabin and systems, all of which will be eco-designed. The aim is to further reduce operational costs while offering a more responsible aircraft with higher performance.

To reduce emissions, we also collectively need to look at operations, implementing for instance the latest Air Traffic Management innovations. And we also look at the whole lifecycle of our aircraft, from design to recycling.

Ayşe Akalın: ATR participated at Istanbul Airshow in October 2022. Can you enlighten us about the current status of your cooperation, plans and activities in Türkiye?

Marc Dunnachie & Ayşe Akalın

Mark Dunnachie: We had the pleasure of attending the most recent Turkish Airshow in Istanbul and this allowed us to renew contacts and open new leads in promoting a wider use of ATRs across the region. The Turkish market holds strong potential to grow its domestic connectivity. The importance of linking small and remote communities has already been shown across the world and the Turkish market will be no exception. To ensure these essential services are served with the most efficient and lowest emission solution available today will bring real benefit to the communities served.

Ayşe Akalın: Like many other industries, digitalisation is transforming the aerospace sector. What can you tell us about your efforts and activities on digitalisation?

Mark Dunnachie: Digitalisation is also top of our agenda, be it in terms of improving our manufacturing processes, providing paperless operational documentation, or even further refining passenger experience. The ATR -600 cabin is the only one on the turboprop market offering in-flight entertainment solutions and USB charging power supply. Our approach is always to meet customers' needs and adapt to the requirements of their passengers, where it makes sense economically.

Ayşe Akalın: How is ATR addressing the future of flight in commercial aviation? What kind of new technologies do you see a demand for in the coming years? What R&D actvities to further meet the evolving needs of global customers? Which technology or trend do you think will have the biggest impact on the regional aircraft industry?

Mark Dunnachie: The future of flight is very much linked to environmental concerns and our capacity as an industry to take actions against climate change. As I said earlier, we are actively working with the whole aviation ecosystem towards net-zero. The introduction of disruptive technologies will be decisive to achieve this ambitious goal, and it is our collective responsibility to ensure that all airlines across the globe, even the smallest ones, even the ones serving the most remote communities, can access these new solutions to continue to provide essential links. Ensuring the availability of Sustainable Aviation Fuel in sufficient quantities will be the short-term challenge, while the longer term one will be related to the implementation of a whole infrastructure to support the entry into service of more complex technologies.

This is why we are considering mild hybridization for our EVO concept: we want to ensure that ATR continues to be the most advanced platform when it comes to low CO2 emissions, whilst also remaining the most affordable solution on the regional market.

We want to leverage innovation to offer both the most cost-efficient and sustainable aircraft, able to operate in places where infrastructure is still a challenge.

However, it's essential to highlight that more sustainable solutions already exist today, and it is also our responsibility as the world leader on the regional aviation market to continue conveying that message. Studies show that, even today, if all regional jets in Europe were replaced by turboprops, the reduction of CO2 emissions would be equivalent to the amount of CO2 removed by a forest of around 5000km².

Globalisation has deeply changed our approach to travel and created a greater need for quick connections to support our heartfelt desire to be connected, be it with relatives, friends or business partners. That said, the need for every community to have access to fresh produce, healthcare, education and culture has always existed, and we need to shape the future of aviation bearing in mind that for many

communities, aviation is a lifeline that connects them to the wider world, and that regional aviation plays a prominent role in territorial cohesion. Progress and sustainable development for all go through more connectivity, and it is our duty to make these connections ever more responsible so that they do not come at the expense of the environment, and that the very people relying on them can continue benefit from all the opportunities of a connected world, long into the future. This is why we are also working on solutions to further improve connectivity, through our Short Take-Off and Landing variant, the ATR 42-600S, but also through unpaved runway options.

Ayşe Akalın: Would you like to add a message for our readers?

Mark Dunnachie: At ATR it fills us with much pride to see the daily role that our aircraft play in linking people and communities all over the world and we look forward to expanding a similar partnership with Türkiye as it grows its domestic and regional flying. We are convinced that turboprops will play an increasingly important role in the future of aviation. They are both modern and low emission aircraft, already available today to help airlines address their sustainability challenges. They incorporate the latest avionic standards on the market, as well as cabin connectivity solutions and USB power supply. They offer storage, personal space and comfort levels equivalent to single-aisle jets, along with low levels of cabin noise, for maximum passenger comfort. They are also the lowest emission regional aircraft on the market, emitting 45% less CO2 than regional jets, and we will continue to push the boundaries of regional air transport, to offer even more sustainable solutions to connect people and businesses in a responsible way

Will Air Cargo Continue to Fly High in the Aftermath of the Pandemic?

by Muhammed Yilmaz

When the pandemic swept the globe, the effects on the aviation industry were severe. Demand for passenger flights plummeted dramatically. Global trade became dependent on the sustainability of cargo flights, and the e-commerce market exploded.

With nearly 50 percent of the world's air cargo carried in the belly holds of passenger aircraft (belly cargo), the drop in people's demand for travel due to the pandemic caused chaos. The sudden loss of half of the global air cargo capacity put the entire world on heightened alert. In response to this crisis, logistics companies sought alternative sources for air cargo transportation and airlines made necessary adjustments. Demand for converting passenger aircraft into cargo planes skyrocketed. On the other hand, the unprecedented pandemic that knocked the industry into a deep coma opened the door to a brand-new opportunity from within the industry.

The high demand for converting passenger aircraft into cargo planes this time created a supply-demand imbalance. The passenger-to-freighter conversion facilities were fully booked until 2026 due to demand that was much higher than they could accommodate.

Fortunately, the post-pandemic rebound was faster than anticipated. People's demand for travel rose sharply across the globe, which led to an increase in cargo volumes carried by passenger

aircraft. This took some pressure off the aircraft conversion market. With a combination of slot problems, staff shortages, and the fact that the aircraft scheduled for conversion started to carry passengers again, aircraft conversion companies, which were struggling to meet all the demand in the market, could breathe a sigh of relief. The passenger-to-freighter conversion market will unavoidably see a sharp decline in the next few years. But the same cannot be said for the air cargo market.

Even though the air cargo market figures have fluctuated over the last four years, it is certain that the industry will keep expanding in the future. With a 5.7% annual growth target for the years 2023 to 2028, the air cargo market is expected to reach a USD 413 billion industry by 2028, increasing by an additional USD 125 billion over the next five years.

Labor costs have been rising dramatically since the pandemic. Transportation issues caused by local COVID-19 restrictions affecting companies' production capacity, particularly in China, were a serious concern for the future, including the condition of export networks and the continuity of supply chains. But a few months ago, everyone breathed a sigh of relief when China also shelved its zero COVID policy and opened its borders to the outside world. Many more freighters will now be needed to support trends towards diversification of production and creating new links for the supply chain, both in and outside of China.

However, we will have to change our rhetoric over time when we want to take an x-ray of the air cargo industry. For instance, when analyzing the conversion figures from passenger to freighter aircraft, it will be more insightful to compare the figures with the pre-pandemic (more normal) era, rather than the pandemic period, when all-time highs were reached. Likewise, when comparing the growth of the overall air cargo market, we will be able to draw more rational conclusions if we take pre-pandemic levels as our benchmark. Otherwise, it would be incorrect to claim that our analyzes are realistic. In other words, in the coming period, even though the market growth appears to have slowed down compared to 2020-2021, and even 2022, it is essential to make a useful and sensible assessment in the coming period whether this is really the case. In the years to come, it will be useful to consider whether the rapid rises in the graphs of the recent past are organic or due to specific reasons.

Due to the significant political and economic uncertainties affecting the entire globe, the performance of the air cargo industry has declined compared to the record highs reached in 2021. The fact that governments in developed countries are determined to continue measures to combat inflation by cooling the overheating economies could result in cargo volumes declining by around 5.6% in 2023 compared to 2019. The good news for the air cargo market, however, is that productivity and total revenue for 2023 will continue to be significantly higher than pre-pandemic levels.

As the global aviation industry deals with geopolitical tensions, ongoing conflicts, inflationary pressures, labor problems, and operational issues in the aftermath of the Covid-19 pandemic, the performance of the air cargo market in this chaotic environment is praiseworthy.

Before concluding, a brief look at the Turkish

air cargo market shows that ACT, ULS, and MNG, the three major cargo companies operating in Türkiye, have the wind at their backs. These companies took advantage of the opportunities arising from the pandemic and increased their investments, resulting in balance sheets that have hit the highest levels in their histories. Turkish Cargo is of course the other significant player in the Turkish air cargo market, aside from these three companies. Let's take a quick glance at Turkish Airlines' financial statements to examine Turkish Cargo's position.

Turkish Airlines ended 2022 with a net profit of USD 2.7 billion. Since 2020, Turkish Airlines has managed to achieve net profit for the sixth consecutive quarter, despite numerous pressing problems experienced worldwide. In 2022, Turkish Airlines' total revenues reached a historic high of USD 18.4 billion, 39 percent above 2019 figures. The share of air cargo in this is undeniable. Cargo revenues, which account for 20 percent of total revenues, saw a rise by 120 percent in 2022 compared to 2019, totaling to approximately USD 3.7 billion. However, cargo revenues fell by USD 280 million compared to 2021. Having quadrupled its market share in cargo transportation in the last 10 years, Turkish Airlines became the fifth largest air cargo carrier in the world in 2022 according to IATA statistics. Turkish Cargo flew to 355 destinations across 132 countries with 21 freighter and 373 passenger aircraft. The SMARTIST-related investments made for Turkish Cargo at Istanbul Airport are paying off in spades. The goal for the near future is to rank among the top three. Reaching the top of the global air cargo market will then become a natural goal if internal dynamics within Turkish Airlines, political developments in the country, talks for the incorporation process, and external variables create an appropriate ground for this.

If the air cargo market is able to reach its forecasted annual growth target of 5.7%, the world will require 1.7 times more freighter fleet than it has today. To summarize, we can expect strong growth signals both in the air cargo industry and in the passenger-to-freighter aircraft conversion market. While all this is happening, it is useful to closely monitor the state of the e-commerce market, because it is possible that the market growth will considerably accelerate. In the meanwhile, we continue to follow the developments in the sector closely with great interest

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IATA's World Cargo Symposium to Focus on Sustainability, Safety and Digitalization

IATA World Cargo Symposium is focused on sustainability, safety and digitalization this year. Session tracks will cover several key aspects of safety, sustainability, and digitalization:

•*Lithium batteries*

•*ULD and operations*

•*ESG reporting in air cargo*

•*Reducing plastic waste in the air cargo industry*

•*Attracting and retaining talent*

•*E-commerce*

•*Air cargo market dynamics*

•*Digital distribution and booking*

•*Digital Cargo and ONE Record*

"Air cargo is operating at nearly pre-pandemic levels. But the way it operates has changed dramatically. This is due to a convergence of economic and geo-political forces, continuing priorities on improving sustainability, safety, and reliability, as well as emerging opportunities with new markets, technologies, and digitalization. This year's WCS will explore how to keep air cargo profitable while addressing these priorities, challenges, and opportunities," said Willie Walsh, IATA's Director General.

Willie Walsh, and Brendan Sullivan, IATA's Global Head of Cargo will be speaking at the event along with:

-Ahmet Bolat, Chairman of the Board of Directors and the Executive Committee, Turkish Airlines

-Mehmet Tevfik Nane, Chairperson of the Board of Directors of Pegasus Airlines and Chair of the IATA Board of Governors

-Kendra Kincade, President and CEO, Elevate Aviation

-Marco Bloemen, Managing Director Accenture and Head of Seabury Cargo

-Steve Smith, President & CEO, Airlink

-Turhan Ozen, Chief Cargo Officer at Turkish Airlines

Willi Walsh - Director General of IATA

Air Cargo's Humanitarian Efforts

The WCS program will also include a special session on the vital role of air cargo in humanitarian efforts. This session will have a particular focus on recent efforts to deliver aid to the people of Türkiye and Syria affected by the devastating earthquakes in the region.

"Air cargo plays a critical role in delivering aid to those in need. The industry's recent mobilization to provide support to the people of Türkiye and Syria affected by the tragedy is the latest example. With this year's WCS being hosted in Türkiye, it's the perfect opportunity to reflect on the role that air transport plays so that airlines are even better prepared for the next humanitarian crisis," said Brendan Sullivan, IATA's Global Head of Cargo.

The WCS program will be complemented by a series of workshops, including:

•The benefits of competency-based training through IATA's Competency-Based Training and Assessment Center (CBTA Center) and how it helps to improve workplace safety and performance.

Brendan Sullivan - Global Head of Cargo at IATA

•Improving performance on key market segments using IATA Center of Excellence for Independent Validators CEIV programs (CEIV Pharma, CEIV Live Animals, CEIV Lithium Batteries and CEIV Fresh).

•How DG AutoCheck, CargoIS, Net Rates and CO2 Connect, are assisting the industry in decision making and cargo compliance, towards improving safety and efficiency.

•An interactive E-Commerce Think Tank to identify how more transparency in e-Commerce would benefit stakeholders.

•Building the next generation of talent at the Future Air Cargo Executives Summit (FACES)

IATA Air Cargo Innovation Awards 2023

The winner of the fourth edition of the IATA Air Cargo Innovation Awards which recognizes new solutions, concepts and ideas that contribute to air logistics' digitalization, sustainability, safety and security will also be decided at WCS.

"Innovation holds the key to development, sustainability and success in the air cargo industry and we are committed to recognizing and unlocking its potential. The latest edition of the IATA Air Cargo Innovation Awards supports this objective with more than US $20,000 to the winners. Imagination is the only limit to the range of ideas that can be submitted. Based on our past competitions, we expect to see a plethora of creative solutions," said Brendan Sullivan, IATA's Global Head of Cargo.

To recognize the creativity of start-ups and innovators that often lead industry transformation while also honoring the work of well-established corporations, the 2023 IATA Air Cargo Innovation Awards have two separate categories:

-Start-ups and innovators *(newly created companies, individuals, and small companies with less than 25 staff members)*

-Corporate participants

Three finalists will be invited to present their projects during the conference. Delegates will then vote for their preferred innovation and the winners will be announced at the closing plenary of WCS.

Lithium Batteries Reducing Risk

In the Global Media Days of IATA, David Brennan Head, Cargo Safety & Dangerous Goods made a speech on Lithium Batteries.

David Brennan

David Brennan underlined that Lithium batteries are classified as dangerous goods based on the inherent hazards of the lithium cells and batteries and the dangerous goods regulations address the risks that are posed by lithium batteries in transport.

All lithium cell and battery types must pass up to 8 different tests as specified in the United Nations (UN) Manual of Tests and Criteria. These tests include an altitude simulation where lithium cells and batteries are subjected to a reduced pressure equivalent to 50,000 ft (15,200 m) for 6 hours, and a thermal test where cells and batteries are stored for at least 6 hours at a temperature of 72°C (161.6°F) followed by 6 hours at -40°C (-40°F), repeated 10 times. Cells and batteries are also subjected to vibration, shock, short circuit and crush tests. These tests are designed to verify that the cell and battery types are safe to transport. The manufacturer of lithium cells and batteries is required to develop and implement a quality management system to ensure that the cells and batteries being manufactured all meet the same specifications as those subjected to the design type tests.

Manufacturers and subsequent distributors of lithium cells or batteries, including equipment containing lithium cells and batteries, must make available a test summary that identifies that the cells or batteries have passed the applicable tests set out in subsection 38.3 of the UN Manual of Tests and Criteria.

The regulations on the transport of lithium batteries take a risk-based approach regarding the type and size of lithium batteries that are permitted as cargo on a passenger aircraft versus those that are restricted to carriage on a cargo aircraft. All shipments of lithium metal batteries and lithium ion batteries when shipped by themselves, i.e., when not packed with the equipment the battery powers or installed in equipment, are restricted to carriage on a cargo aircraft. Lithium ion cells and batteries are required to be shipped at a state of charge not exceeding 30% of their rated capacity. In addition, shipments are restricted to carriage on a cargo aircraft where the weight of lithium batteries in a package exceeds 5 kg. This applies to all shipments including where the packages contain lithium batteries packed with the equipment the battery powers and lithium batteries installed in equipment.

It is the shipper's responsibility, as with all dangerous goods, to sign a declaration that the dangerous goods have been prepared in accordance with and meet all applicable provisions of the regulations. The airlines take this legal declaration as evidence that, in the case of lithium ion batteries, they are in a state of charge not exceeding 30% and that the battery design has passed all the required UN tests. If the shipper fails to comply with the regulations and this is identified, then the airlines report the incident to their regulatory authority. It is expected that the regulatory authorities then take appropriate action against the shipper for non-compliance.

Airlines are required to conduct a safety risk assessment that includes consideration of the hazard posed by cargo, mail and baggage that will be carried, the quantity of these that will carried on an aircraft, where they will be loaded, as well as the risks posed by the entities in the supply chain that offer cargo and mail, which may include lithium batteries that have not been properly prepared in accordance with the regulations. Having identified the potential risks, the airline then must develop and implement mitigations that reduce the risks to a level that is acceptable to the airline. Based on the identified safety risks, these mitigations could include such things as: additional screening of cargo and passenger baggage to identify lithium batteries that are not permitted or that do not comply with the regulations and the use of aircraft containers that are capable of withstanding a fire involving lithium batteries to supplement the fire suppression capabilities of the aircraft.

Cargo Drones Becoming Fundamental Asset in E-Commerce

Originally viewed as a piece of sophisticated military technology or a hobbyist's tool, the Unmanned Aerial Systems (UAS) industry, with a US$14.1 billion global market value, has established a presence in the corporate world over the past years. As innovators explore new uses, businesses across industries realized that drones have multiple commercial applications, some of which go beyond basic surveillance and recording purposes.

by Saffet UYANIK

Expanding rapidly in recent years, the commercial use of drones, also known as Unmanned Aerial Systems (UAS), presents new opportunities to businesses and governments for commercial and recreational purposes. Initially viewed as sophisticated military technology, the commercial use of drones has increased dramatically due to their ever-expanding capabilities. Businesses around the world have increasingly turned to drones for a variety of commercial applications, and they are already using them to transform some industries. UAS technology can help to accomplish time-consuming and challenging tasks while reducing costs and potential risks. There is a growing trend to adopt drones to replace existing solutions that involve humans, such as the inspection of powerlines or wind turbines. Over the past few years, drones have been utilized in certain sectors, most notably construction, agriculture, and insurance. As useful tools for engineers, drones can reach remote and difficult-to-access areas quickly and provide data

for an overview of a given situation. Drones serve as an extension of the operators and assist in the accomplishment of various tasks as promptly as possible, saving time, personnel, and money. Insurance companies use drones to inspect damaged assets, and farmers use them to monitor crops and collect soil data. Drones are also utilized for the monitoring of livestock and locating missing persons. As technology evolves and matures, innovators explore new uses. Drones with mission-specific payloads are also used for delivering lab samples from medical clinics to hospitals or to perform accident prevention and response to offshore refineries.

In addition, leading tech giants like Amazon heavily invest in drone services such as drone taxis and drone deliveries, while some companies focus on providing Internet connection to remote areas with specially equipped drones. According to The Library of Parliament (the main information repository and research resource for the Parliament of Canada), drones used for recreational purposes currently represent the largest civilian market in terms of the number of units sold; however, commercial drones are projected to be the fastest-growing segment of the civilian market in terms of revenue. It is estimated that 74% of the drones sold are used for recreational purposes, and 26% are used for non-recreational purposes. The American multinational investment bank and financial services company Goldman Sachs Group predicts that military, recreational, and commercial drones will represent a US$100 billion market opportunity between 2016 and 2020. Supporting this statement, according to the Association for Unmanned Vehicle Systems International (AUVSI), the drone industry in the U.S. will result in the creation of about 100,000 jobs and have an US$82 billion impact on the economy by 2025.

Another potentially immediate economic impact of the drone industry comes in the form of job creation. As commercial drone usage increases, the number of operators and technicians will also increase accordingly to maintain this billion-dollar industry. According to Global management consulting firm McKinsey & Company, the United States is a particularly strong source of commercial growth, with the value of drone activity rising from US$40 million in 2012 to about US$1 billion in 2017. Thanks to the increasing interest in commercial drone usage, start-ups have attracted more than US$3 billion in funding for new UAS applications, while OEMs have received almost half that amount of around US$1.4 billion. By 2026, McKinsey estimates that commercial drones will have an annual impact of US$31 billion to US$46 billion on the country's GDP, and the developments within the United States could signal how commercial drone usage and investment will proceed in other markets.

Delivery & Cargo

Cargo drones come in different sizes with different load and performance capacities, from small drones for delivery services to much larger aircraft that are capable of mixing both VTOL (Vertical Takeoff and Landing) and conventional flight. They are typically equipped with powerful sensors and next-generation software. With cargo drones, companies can deliver goods to customers in remote areas or in congested urban areas where traditional delivery methods may be more challenging or slower. Additionally, cargo drones can help reduce delivery costs and increase the speed of delivery, which can improve customer satisfaction and loyalty. Google (Alphabet Inc.) and Amazon are making

Zipline Autonomous Delivery System

significant investments in drone technology to expand the reach of commercial drones. Drone-based delivery services constitute one of the most obvious applications.

Delivery by drone is perhaps the most visible use case of this trend in the supply chain. So far, drones typically deliver high-value products like medication and blood. However, progressive technology developments have expanded their potential use in delivery logistics, helping alleviate pressure in the supply chain caused by more e-commerce orders. These can be classified into several delivery categories. Hub-to-hub or warehouse deliveries are mainly used for short distances. The drones deliver industrial goods or products to a pre-defined delivery hub located within a firm's premises or within a warehouse. The service is performed purely for internal process optimization and efficiency gains. Last-mile supply chain deliveries are mainly used for short-to-medium distances. This service utilizes drones to deliver industrial products or goods to nearby customers or partners. The drone can take off from either the company's premises or a traditional delivery truck. This approach is particularly appealing in rural areas, where delivery trucks have to serve several locations, leading to longer lead times. By utilizing drones, lead times can be reduced, and the service's overall cost structure can be improved.

Drones can also be used for intracity or intercity deliveries (long distances). Drones are used in this scenario to transport goods from a company's location in one city to another city or within a larger metropolitan area (known as intra-city transport). However, due to existing range limitations, economic constraints, and regulatory challenges, this particular application is still in its early stages of development. Despite these challenges, if successful, this service has the potential to revolutionize the cargo industry.

Several companies have already received approval to use drones for delivery purposes. For instance, logistics companies UPS and Wing, which is owned by Alphabet, have begun testing drone delivery services. In particular, UPS delivers medical supplies by drone to a hospital campus in Raleigh, North Carolina, while Wing uses drones to deliver small packages over short distances in Virginia. Zipline, a US medical product delivery company, has also leveraged drone technology to deliver medical supplies in Rwanda and Ghana. Due to Rwanda's challenging terrain, poor road conditions, and long rainy season, Zipline's air delivery system is more efficient and cost-effective than traditional road transport. Their drones are small electric fixed-wing aircraft that can fly up to 180 km on a single charge in any weather. To make deliveries, the drone descends to a low altitude and drops the package to the ground, slowed by a parachute-like air brake. According to Zipline, they have made over 200,000 deliveries to date, with an average delivery time of around 30 minutes. The company has reported a significant decrease in the time it takes to deliver medical supplies, from hours or days to just minutes, which has had a positive impact on patient outcomes.

Clearly, small cargo drones are primarily known for their ability to deliver small packages, but their

Nuuva 300 - Revolutionary long-range large-capacity heavy-weight autonomous eVTOL

potential extends beyond that. Many logistics organizations currently rely on human personnel to monitor inventory in facilities, particularly on shelves for pallets. This is a time-consuming and costly process that can be automated using drones. Drones can quickly perform tasks such as assessing and confirming stock counts and vacancy rates on shelves without the need for large warehouse vehicles like aerial work platforms to examine the higher shelves. With whole fleets of drones operating autonomously, only one worker is needed to manage and assess flagged circumstances. This reduces the need for a large workforce and allows companies to check stock more frequently, increasing warehouse management system (WMS) accuracy and optimizing facility operations. While small cargo drones are commonly used for small package delivery, they have the potential to revolutionize inventory monitoring and management in warehouses.

Apart from the cargo capacity, there are other advantages of cargo drones. Throughout history, land transportation has played a crucial role in the supply chain process. However, for transporting goods over long distances and for exports, airplanes have taken over. But now, with their potential to dominate the airspace, drones could become the go-to method for transporting goods, surpassing even commercial flights. This could have significant benefits for crowded cities, where cargo transportation currently contributes to 20% of the traffic and 30% of the pollution. The use of cargo drones for delivery could help reduce carbon emissions and improve environmental sustainability. Compared to traditional delivery methods such as road transport, cargo drones have a lower carbon footprint and produce fewer greenhouse gas emissions. Moreover, the use of cargo drones could reduce the need for large delivery trucks, which could reduce traffic congestion and improve air quality in urban areas.

Delivering commercial items, food, or medication packages with drones is an eco-friendly solution that can significantly reduce CO2 emissions and carbon footprint. According to the US Environmental Protection Agency, the transportation sector in the US was responsible for 31% of GHG emissions in 2021, with delivery trucks alone emitting approximately 415 million metric tons of carbon dioxide per year, accounting for a quarter of all transportation emissions. In contrast, drones operate on lithium-ion batteries and consume less energy per hour, resulting in a smaller carbon footprint. However, the amount of GHG emissions associated with cargo drones depends on the payload capacity of the drone used for delivery. Cargo drones with smaller payload capacities emit fewer grams of CO2 equivalent per package than electric trucks and larger cargo drones. Improving the energy efficiency of warehouses and reducing electricity generation from carbon-intensive fuels can further enhance the benefits of drone delivery. As a result, the demand for cargo drones is projected to increase significantly in the coming years as the world seeks to lower carbon emissions in transportation.

As drone technology continues to evolve, cargo drones could become even more advanced and capable. For instance, some companies are exploring the use of artificial intelligence and machine learning algorithms to enable cargo drones to make autonomous decisions and navigate complex environments. Furthermore, the use of solar-powered batteries could extend the range and endurance of cargo drones, allowing them to travel longer distances and operate in more challenging conditions. The drone industry has been transformed by the rapid progress and advancement of autonomous and AI technologies. These two technologies work in tandem to enhance drone capabilities. Autonomous drones can collect data from their surroundings through sensors and process and interpret it without human intervention. AI is responsible for making decisions and controlling responses based on this data. By integrating information from multiple sensors, drones can become smarter and better equipped to understand and act on their environment. These technological advancements not only lead to new applications but also improve efficiency and reduce the cost of cargo deliveries, making drones a significant contributor to the economy. As drone functions become more autonomous and intelligent, the benefits and efficiencies will continue to increase. Furthermore, the emergence of attractive cargo drone applications creates a promising and sizeable market, which is of interest to investors.

The cargo drone market is projected to grow from US$ 534 million in 2022 to US$ 17.9 billion by 2030, with a CAGR of 55.1% in that period. This growth can be attributed to the rise in demand for on-site, on-time industrial delivery and emergency supplies, as well as a significant change in the regulatory framework that enables the operation of autonomous drones beyond visual line-of-sight. The continued development of disruptive technologies, especially autonomous and artificial intelligence, will further contribute to the strong growth.

According to data from the German-based international management consultancy Roland Berger, this growth has attracted investors, with venture capital (VC) rising continuously in recent years. VC funding in cargo drone startups, both in terms of deal frequency and dollar value, initially picked up pace in 2015 (US$172 Million). It then grew rapidly to reach a first major peak in 2019 (US$515 Million). After a dip in 2020 (US$247 Million), funding exploded in 2021 to US$1,311 Billion. The decline in 2020 is linked to the COVID-19 pandemic, which in turn expedited many fundamental trends. One of these was sustainability, which fueled the passenger drone investment craze and spread to the cargo sector. The AAM sub-segment was also affected by COVID-19, as the number of VC deals declined from its peak in 2019, indicating a direct impact on investor outlook. Despite the 2021 surge in investment to unprecedented levels, the deal size remained relatively steady and failed to rebound.

On the other hand, the diminishing price of lithium-ion batteries has helped to optimize drone cost and performance. And just as costs have fallen, battery densities have increased. It is thought that densities are improving by almost 10% a year, leading to lighter, more powerful batteries and smaller drones with higher lifting capability. According to Roland Berger's analysis, the ion-battery back costs vs. batter density figure, the prices in USD per Kw/h are expected to be reduced between the year 2023 to 2030 from 101 USD to 58 USD. The rapid improvements in battery technology will allow drones to fly farther for longer, leading to many new use cases and applications and unlocking untapped value for the drone industry.

The logistics delivery network can be significantly enhanced with the integration of cargo drones, allowing for the seamless flow of goods between distribution centers and business and production sites. However, the true potential of drone technology can only be realized with the widespread adoption of autonomous operations and full utilization of AI. Encouraging advancements in the field indicate a promising future for the industry, despite the challenges it faces. Commercial cargo delivery via drones is highly promising, with projections from Morgan Stanley indicating a possible US$1.5 Trillion industry by 2040. While the use of drones for passenger transportation may take longer to become a reality, the market disruption caused by this technology suggests it could eventually become feasible

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Whatever You See in the World is **From Istanbul**

Turkish Cargo released new commercial films depicting the opportunities offered to the global economy by its mega hub SMARTIST, which is interconnecting the world.

Raising the bar continuously for success by combining its global flight network of more than 340 destinations with Türkiye's unique geographical advantage; Turkish Cargo operates from its state-of-the-art facility, SMARTIST, which is one of the most advanced cargo hubs in the world. The global brand showcases its strength and potential with a series of three commercial films.

The first film tells about the transoceanic journey of a Barramundi, grown in South Asia and served within the same day at a restaurant in New York. The second film depicts the arrival of a valuable ceramic vase, owned by a Chinese dynasty and auctioned off in Paris, France. Telling about the story of the journey of a Kiwano, grown in Africa, the third film sets in a greengrocer counter in Tokyo. As the characters cannot hide their amazement at hearing that the products originating from all over the world have all arrived from Istanbul, the ends of each film highlight

SMARTIST as "The logistics hub of the globe".

Turkish Airlines Chairman of the Board and the Executive Committee, Prof. Dr. Ahmet Bolat, stated; "We, as Turkish Airlines, have covered a remarkable distance and made great achievements in the course of our journey throughout our country's aviation history as its national flag carrier. We have always distinguished ourselves from our competitors with our service quality beyond expectations along with our strong foundation and agile structure. We built SMARTIST, our mega cargo facility that ranks among the largest hubs in the world. With this strategic investment, we have become the bridge of trade between east and west."These achievements stem from not only our unique geographical advantage, but also due to the strategy drawn up in line with the vision, namely "the Future is in the Skies", created during the early days of our country's aviation."

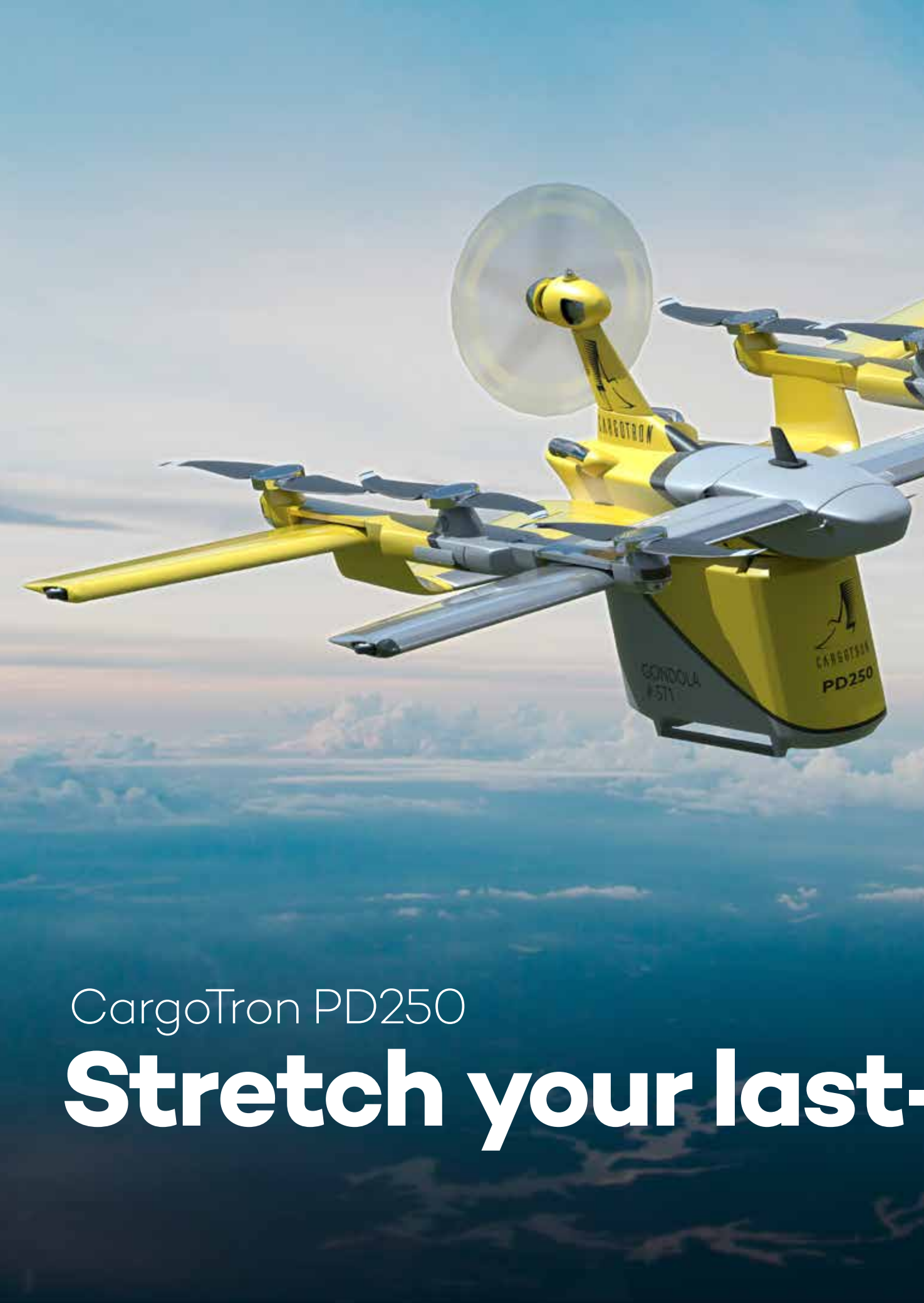
As the year 2023 is the 100 th anniversary of our country's foundation, this year carries a special

significance for us. As part of the targets of Türkiye for its 100th year, we as Turkish Airlines are committed to deliver much more by taking courage from our accomplishments in the past. We have been turning Istanbul into the logistics center of the world with the investments we make and the strategies we have created."

SMARTIST; The Logistic Center of the World in Türkiye

Having been designed as the largest industrial building under single roof at Istanbul Airport, SMARTIST is strategically located. At the crossroads of continents, the hub is situated at a flight distance of 4 hours to more than 50 countries worldwide. A very wide range of products, from automotive to perishable goods arriving from all corners of the world to the SMARTIST hub, are then distributed worldwide through Turkish Airlines extended network. Furthermore, the mega facility also stands out with its logistics, storage and smart system technologies. Coupling the leadership of Turkish Cargo in terms of flight network, infrastructure and unprecedented geographical advantages of Istanbul, SMARTIST has become an indispensable gateway for international trade.

Providing the best connections in terms of transportation to production and trade centers in the world, Turkish Cargo has been developing attractive opportunities with its high-quality service approach to meet the needs of its customers and industry partners. By developing tailored and practical solutions for the ever-increasing demand for logistics, the global air cargo brand aims to provide support to exporters as well, while promoting regional and global trade.



CargoTron PD250

Stretch your last-

-mile!

by Emre Yazıcı

As demand shifts further and further towards e-commerce and online shopping, many businesses both large and small are responding by shifting more of their focus to the online marketplace which has led to an increase in sales that must be delivered by less-than-truckload, or LTL freight shipping. Because of this, demand for express LTL shipping services to timely deliver products to customers is increasing. Delivery by small drones, which was expected to meet the demand both in urban and rural areas, had risen and fallen during recent years. Small drones will stay as an option for deliveries in rural areas where the population is scarce and ground delivery is not practical. But they are not suitable for the task in densely populated areas, where the demand is high.

According to Drone Industry Insights (https://www.linkedin.com/pulse/drone-delivery-small-big-cargo-drone-industry-insights/), the combination of direct, first-mile/ last-mile, mid-mile/ feeder, and hub forwarding will be a key component for the logistics and success of drone delivery.

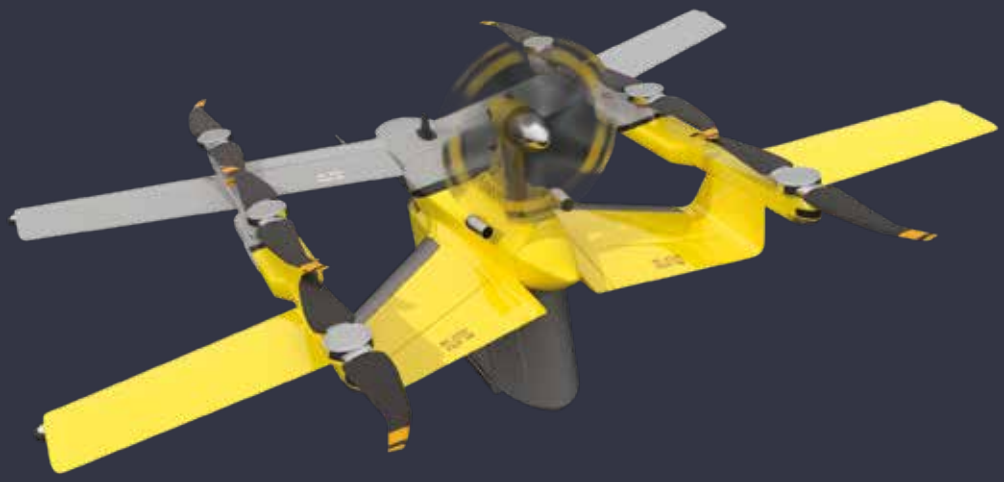
PD250 is CargoTron's offer to revolutionize time-sensitive, LTL, and B2B cargo delivery. It is designed to blur the concept of the last-mile by operating between Logistic Service Providers' (LSP) regional or consolidation hubs and Third Party Logistics Providers' (3PL) or customers' premises.

CargoTron has realized that a "single-step-to-customer" (unimodal) drone solution to urban cargo delivery is not practical. Any good solution should consider the existing practices - and of course, the human element. Therefore, we started from scratch, made our market research, and designed a "system", which addresses the needs of the regulator, owner, operator, ground crew, customer, and community.

PD250 is a "1-tonne vehicle" with a payload capacity of 250 kg and a range of 600km. It bears a removable (captive-carry) cargo-pod solution that may vary in shape to match the nature of the cargo. This eliminates the limitations of an internal cargo bay and provides flexibility for differing customer requirements in payload and volume. It is possible to introduce wider or longer cargo pods as necessary.

The overall efficiency of any eVTOL solution in an "urban air mobility" (UAM) scenario, is very much determined by the ground infrastructure needs, which may amount to 50% of all costs. Minimizing the landing footprint help reduce special requirements for ground infrastructure, and hence the cost. Thanks to down-folding wings, the PD250 may serve any business

that can accommodate a 13-meter diameter area in their backyards, loading bays, car parks, rooftops, etc. for safe take-off and landing. That is about one-third of the landing area required by the competition. Because PD250 can land very close to the final delivery point, a simple electric vehicle can take the cargo pod and deliver parcels either on-site or off-site to businesses and consumers, thereby easing last-yard delivery issues (bi-modal solution).



Ground safety is of paramount importance especially as the PD250 can operate from confined areas. These areas may include personnel not part of the logistics ground operation, therefore -beyond the requirements dictated by Civil Aviation Authorities, any rotating elements (i.e. both lift and cruise propellers) are positioned above head height to avoid any inadvertent interaction.

The "Plug-in Hybrid" powerplant allows for replacement with other and greener (i.e. smaller carbon footprint) alternatives, as opportunities arise. These include fuel-cell based or full-electric applications as and when the technology catches up with mission requirements.

PD250 puts proven technologies together in an innovative way to serve the cargo transport needs of business customers located up to 600 km from each other. It stands in the crowd by flying faster than quadrotor competitors, with a footprint of almost one-third of the lift+cruise competitors. For each kilogram of cargo transported, it significantly outpaces the rest in efficiency.

The long-range capability that comes with the hybrid powerplant, and the large cargo capacity bring in the flexibility for alternative missions, such as humanitarian/emergency aid, coastal surveillance, offshore oil platform, and wind-farm applications.

The CargoTron PD250 provides an environmentally conscious and novel approach to express, LTL cargo, particularly in urban areas for B2B transactions.

Visit https://cargotron.co.uk for more

Who Will be the Winner of the Flight Between Pilots and Technology?

by Muhammed Yılmaz

Professional organizations and pilot unions have declared that single-pilot operations, which have been discussed frequently recently, pose a threat to flight safety, and joined forces against the implementation of this practice.

The world's largest pilot organizations have united to manifest that profitability should not take priority over flight safety. They called on airlines and aircraft makers to rethink their plans for single-pilot ops. The coalition intends to take joint action against global regulators, including the International Civil Aviation Organization (ICAO).

The International Federation of Air Line Pilots' Associations (IFALPA), whose founding mission is "to promote the highest level of aviation safety worldwide and to be the global advocate of the piloting profession," represents over 150,000 pilots in nearly 100 countries. The coalition formed by the representatives from the European Cockpit Association (ECA), with 40,000 members, and the Air Line Pilots Association (ALPA), the world's largest pilots' association across the Atlantic with more than 67,000 members from 39 airlines across the US and Canada, has similar objectives and argue that single-pilot operations will lead to a significant increase in workload of the pilots.

The joint statement, signed by ALPA President Jason Ambrosi, IFALPA President Jack Netskar and ECA President Otjan de Bruijn, claims that technology, no matter how sophisticated,

is not a replacement for pilots on the flight deck. It argues that the control of an aircraft by two pilots remains the most important safety features of an aircraft. It acknowledges that pilots can troubleshoot system failures and provide backup, bridge technological gaps, and adapt to unanticipated situations and emergencies in real time.

The statement emphasized the significance of having a team of at least two qualified, experienced, trained, and rested pilots in the cockpit. It also emphasized that the aircraft, its systems, the regulations, and standards applicable to flight, and the procedures followed by pilots are all deliberately designed for a team working together on the flight deck.

The objection to single-pilot operations is supported by various international pilot communities, including those under the umbrella of airline alliances such as the Star Alliance Pilots Association, Oneworld Cockpit Crew Coalition, and SkyTeam Pilots Association. TALPA, the Turkish Airlines' Pilots Association, also announced on social media that they support two pilots at all times on the flight deck for flight safety.

More than 40 countries, including the UK and Germany, have in recent months formally asked ICAO to help make single-pilot operations a safe reality. ICAO, a specialized agency of the UN focused primarily on promoting safe and effective air transport, has been researching new operational concepts such as full automation and extended minimum-crew operations for many years. However, it recognizes right away that public and pilot support will be crucial to change the two-pilot norm in commercial aviation. The primary requirement set forth by the EU for ICAO approval of single-pilot operations is that all flight safety controls be at least as efficient as those conducted by two persons.

The first step in transition to single-pilot operations will be to allow solo piloting when aircraft are cruising, except for takeoff and landing. With this step, one of the pilots in the cockpit will control the aircraft while the other will rest. By alternating breaks in this manner, a two-person crew could fly longer routes without the help — and expense — of an extra pilot.

The flight could be fully automated with minimal oversight from a pilot in the cockpit, according to experts working on this matter. The system could detect if the pilot for whatever reason became incapacitated and then land the aircraft by itself at a predetermined airport.

The European Union Aviation Safety Agency (EASA) has also started collaborating with aircraft manufacturers to examine the necessary regulations for such concept. EASA is making studies on whether one pilot could be removed for part of the flight or completely without compromising safety. Necessary work is being carried out on extended minimum-crew operations, which could be a step for single-pilot operations. EASA has previously stated that single-pilot flights could begin as early as 2030.

European manufacturer Airbus has tested autonomous flight concepts many times with its A350-1000 test aircraft, including emergencies, landings, and take-offs. However, Airbus continues to support two-pilot operations for the time being.

Aircraft manufacturers and airlines see single-pilot operations as a step towards pilotless flights. Boeing and Airbus' ultimate goal is to develop autonomous systems that can operate commercial aircraft safely and efficiently without human intervention, potentially lowering operational costs, and satisfying the growing demand for air travel.

These developments have not been well received by the pilot community. Tony Lucas, President of the Australian and International Pilots Association, raised his concern that a single pilot may not be able to cope with any emergency case.

The Air France A330 that crashed into the Atlantic Ocean in 2009 while en route from Rio de Janeiro to Paris is frequently given as an example against single-pilot operations. The argument that there should always be two pilots in the cockpit is based on the fact that the captain pilot, who was resting in the cabin, came to the cockpit 90 seconds later and that the aircraft went into an unrecoverable aerodynamic stall.

Opponents focus on the benefits of single-pilot operations. In addition to cost savings in recruitment, training, and pilot salaries, what makes the idea appealing is the possibility to deploy pilots more freely, allowing airlines to overcome recent staff shortages.

The continuous development of technology makes remote support for airplanes more likely in the future. Actually, this is where the aircraft business has been heading for decades. In the 1950s, commercial airplane cockpits were much more crowded than today. Each aircraft had a cockpit crew of five, including the captain pilot, co-pilot, flight engineer, navigator, and radio operator. However, except for the two pilots, the other three seats in the cockpit were be replaced by computers. This evolution in the cockpit over time is whetting the appetite of pilotless cockpit advocates.

Some industry professionals think that a transition to single-pilot operations is unlikely to occur anytime soon. Willie Walsh, IATA's Director General, is one of them. "I don't expect to see a move to single-pilot operation, if ever, in the next 15, 20, maybe 25 years," Walsh said last December.

Thanks to robust safety management systems, air travel has become the safest mode of transportation today. To introduce single-pilot operations, the technological and regulatory basis for changes in procedures needs to be established. It is not yet clear what the scenario would look like in case of a problem with a pilot operating alone in the cockpit. There are many challenges that must be resolved before this concept can be implemented, from the development of Artificial Intelligence (AI) and Machine Learning (ML) algorithms to the improvement of sensor technologies, from infrastructure issues in communication and data sharing to cyber security concerns.

The most significant challenge, however, is convincing people against autonomous aircraft. Experts believe that the psychological barriers to its feasibility outweigh the technological ones. We already have the necessary technology for single-pilot operations. Its implementation depends on both the authorities and passengers feeling comfortable. For pilotless commercial operations to be widely adopted, getting people to trust the concept is perhaps the biggest challenge. Safety, security, and liability concerns are also being seriously addressed to increase public confidence in this novel (and scary) technology

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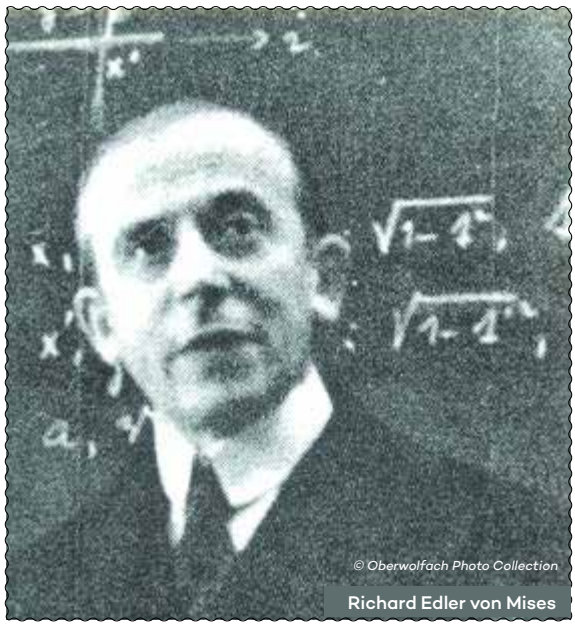
An Aircraft Designed by Professor Richard Von Mises from Istanbul University for World War I:

Mises-Flugzeug (1916)

by Dr. Emir Öngüner
Freelance Researcher in Aviation History

Richard von Mises (1883-1953), who greatly contributed to various branches of applied mathematics and engineering, worked in many academic institutions throughout his career, and produced several well-known publications. Von Mises, who received his engineering training in Vienna and later became a professor at the University of Berlin, made a name for himself with his studies in applied mathematics. The regime-change in Germany also affected von Mises, and he served as a faculty member at the Mathematics Institute of Istanbul University between 1933 and 1939. Like some foreign scientists who fled Türkiye as World War II drew near, von Mises accepted an offer from the United States and resumed his studies at Harvard University up until his passing.[1]



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Richard Edler von Mises

Having published 32 scientific papers during his stay in Türkiye, von Mises wrote an important article for the book Beiträge zur Flugtechnik (Contributions to Flight Technology) published in 1937 in honor of the 25th anniversary of the Vienna Technical University Aeromechanics Laboratory: "Ein 600 PS - Grossflugzeug vom Jahre 1916" (600-Horsepower Aircraft of 1916)[2]

During World War I, von Mises, who served as a reserve officer in the Austro-Hungarian Aviation Troops, started this project in November 1915 upon an order from Major Ludwig Leidl. On July 4, 1916, the first flight test was conducted at Aspern Airport. Although the aircraft had been designed and built for almost 20 years, no papers about the project were made available until 1937. In the first paragraph, von Mises stated that he created this article by gathering his own recollections with the drawings and technical details he acquired from various sources.

The article consists of the following subsections:

1.Project

a)Engine Layout

b)Weapons

2.Outline of the Design

a)Aerodynamic Fundamentals

b) Mass Distribution

c) Static Calculations

d) Propeller

e) Tail Assembly

3.Designing and Prototyping

4.Tests

In April 1915, the Land Forces Command ordered two V-type 300 horsepower engines from Austro-Daimler. The engine was planned to be positioned vertically rather than horizontally on the chassis, and the power transmission was planned to be positioned on the propeller axle at 90 degrees to the shaft with the help of a bevel gear. The engines would be located at the front and rear of the pilot cabin. The front engine would

[1]The most detailed study of von Mises' career in Türkiye is compiled in the presentations given by the author of this article on 10.03.2021 and 12.03.2021 at the invitation of the Department of Mathematics, Faculty of Science, Istanbul University:

- An Engineer and Mathematician in the Berlin-Istanbul-Harvard Triangle: Richard von Mises (1883-1953)

- A Brief Overview of Richard von Mises' Studies at Istanbul University (1933-1939)

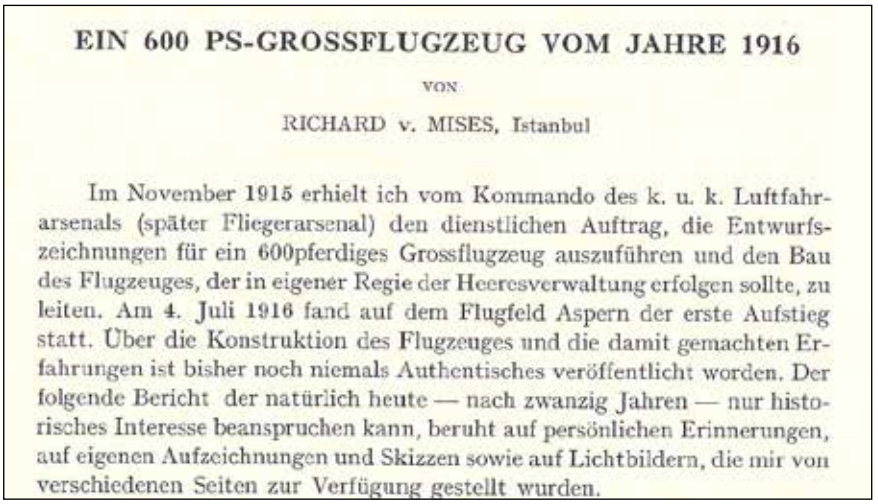
[2]Katzmayr, R. (ed.), Beiträge zur Flugtechnik: Denkschrift zur Erinnerung an die vor 25 Jahren erfolgte Inbetriebnahme des Aeromechanischen Laboratoriums der Lehrkanzel für Luftfahrt an der Technischen Hochschule Wien, 1937, Springer Verlag, s. 17-25.

drive the tractor propellers and the rear engine would drive the pusher propellers. The wingspan of the aircraft was calculated as 22.6 m, fuselage length as 15.4 m, wing area as 118 m2, empty weight as 3080 kg, and loaded weight as 4720 kg.

This concept was intended to be a bomber and weapon bays were designed in the nose and center fuselage. Since it was quite large, two machine gun compartments were placed in front of and behind the pilot's cabin in order to reinforce it in air-to-air combat. In addition, it was also discussed to place a horizontal machine gunner underneath the fuselage.

It was decided to use airfoil profile number 32, one of the models tested by Gustave Eiffel in his own wind tunnel in Paris. However, as it would be tested on a very large aircraft, von Mises aimed to lessen the center of pressure movement of this profile and modified it to a slightly S-shaped design.

All aerodynamic data tests of the selected airfoil were performed at the Aeromechanics Laboratory in Vienna under the leadership of Prof. Richard Knoller. Within the framework of the theoretical calculations, a power loss of 5 percent due to the gearbox was anticipated at an effective engine power of 640 horsepower, and the maximum cruise speed was determined as 41.5 m/s (≈150 km/h). Altitude to



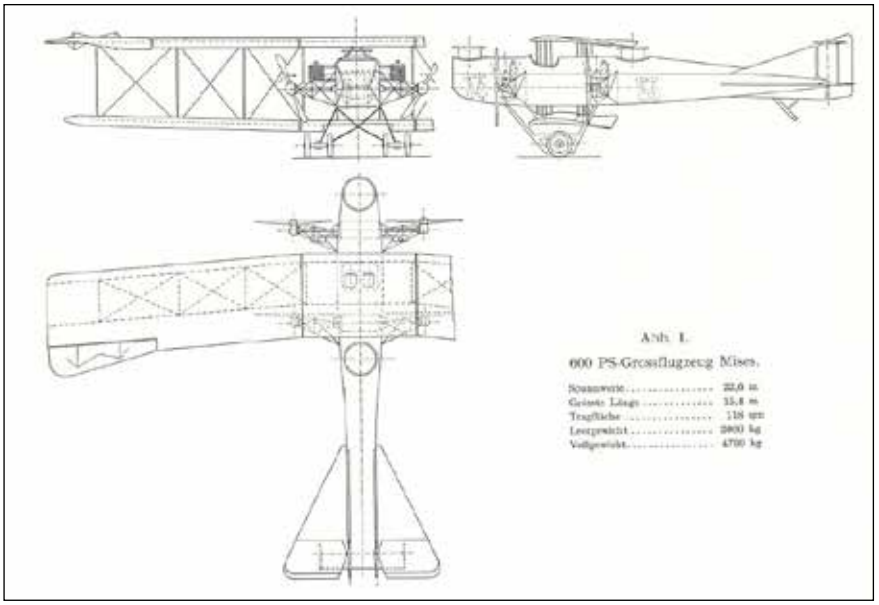
EIN 600 PS-GROSSFLUGZEUG VOM JAHRE 1916

VON

RICHARD v. MISES, Istanbul

Im November 1915 erhielt ich vom Kommando des k. u. k. Luftfahrarsenals (später Fliegerarsenal) den dienstlichen Auftrag, die Entwurfszeichnungen für ein 600pferdiges Grossflugzeug auszuführen und den Bau des Flugzeuges, der in eigener Regie der Heeresverwaltung erfolgen sollte, zu leiten. Am 4. Juli 1916 fand auf dem Flugfeld Aspern der erste Aufstieg statt. Über die Konstruktion des Flugzeuges und die damit gemachten Erfahrungen ist bisher noch niemals Authentisches veröffentlicht worden. Der folgende Bericht der natürlich heute — nach zwanzig Jahren — nur historisches Interesse beanspruchen kann, beruht auf persönlichen Erinnerungen, auf eigenen Aufzeichnungen und Skizzen sowie auf Lichtbildern, die mir von verschiedenen Seiten zur Verfügung gestellt wurden.

The article of von Mises prepared in Istanbul about the aircraft he designed

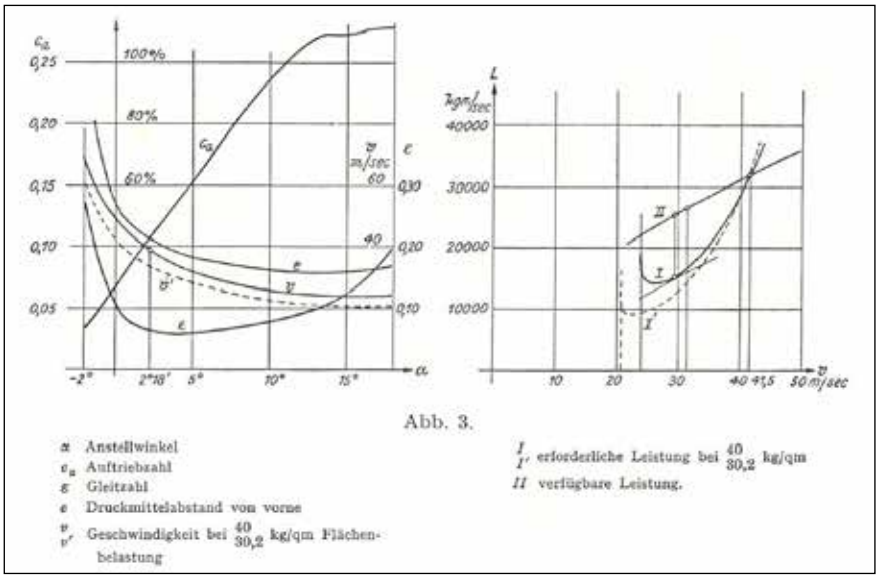


Technical drawings and some data of the Mises aircraft

Eiffel's airfoil profile number 32 modified by von Mises

1000 meters was calculated as 7 minutes 40 seconds at a speed of 29 m/s.

The weight of fuel, oil, and water to be used in the aircraft is 820 kg. With a cruising speed of 150 km/h and a climbing time of 30 minutes, the operational radius is 300 km. The engines supplied by Austro-Daimler weigh a

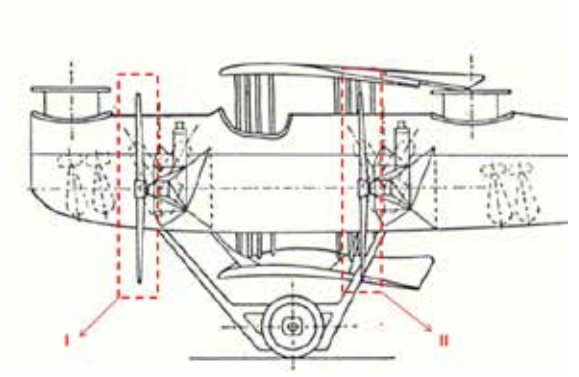


Analysis of parameters such as cruising speed, engine power and lift-to-drag ratio based on theoretical calculations

total of 1448 kg together with the gearbox, cooler, and propellers. The 118 m2 load-bearing surfaces are made of materials weighing 4.9 kg/m2. The fuselage weighs 435 kg, the tail assembly 165 kg, and the landing gear, which is highly complicated to design, 370 kg. For the second prototype, it was planned to integrate 3 machine guns and 7 bombs of 50 kg each into the design. With a crew of four, a payload of 820 kg was considered, and thus a total maximum weight of 4720 kg was obtained when the payload (including fuel) was added to the specific weight of 3080 kg.

As of 1915, there was no sufficient and trustworthy mathematical basis for calculating static forces as well as aerodynamic forces. Karl Josef Saliger, a young engineer, should be mentioned here. He carried out in-depth studies on aircraft statics at the outbreak of the war. He published two significant papers in the Österreichische Flugzeitschrift, issues 5/6 and 13/14 of 1916, both under the pseudonym "Rethingg", Unfortunately, he was killed in the summer of 1917 in a crash with an airplane of his own design. The static calculations of this aircraft were the work of Saliger.

The most critical feature of this design is the interaction between the front and rear thrust power due to the back-to-back positioning of the propellers The propellers at the rear should have a greater camber at equal rpm, as they will be operating in the wake of the front propellers.In Prof. Knoller's laboratory, experiments were carried out on a 1:100 scale model and a suitable design was strived to be achieved. The axial planes



Position of front (I) and rear (II) propellers (side view)

of both propellers with a diameter of 2800 mm are located at a distance of 3350 mm.

The rudder and ailerons were developed by considering the moment of inertia of a fully loaded airplane, based on the experience gained from earlier aircraft. The horizontal and vertical stabilizers were designed in pairs. As a result, the rear end of the fuselage was tapered horizontally unlike conventional airplanes. The ailerons were placed at the tips of the upper wing to maximize their efficiency in strong air flow. The elevator and rudder were balanced in such a way that the pilot would fly an airplane of this size as if he were controlling a regular airplane.

When the manufacturing process for the aircraft, which was intended to be flown in a short period of time, started, it was discovered that there were no available staff. This was due to the fact that all equivalent institutions were busy with the current projects assigned to them by the army, and there was no chance that they would discontinue their ongoing tasks. Engineers Karl Josef Saliger and Hugo Gutmann (who had worked for the Deutz factory in Cologne before the war) and Engineer R. Gabriel were involved during the design process. The M.A.G. Engine Factory (Magyar Általános Gépgyár) undertook the engine assembly and related works.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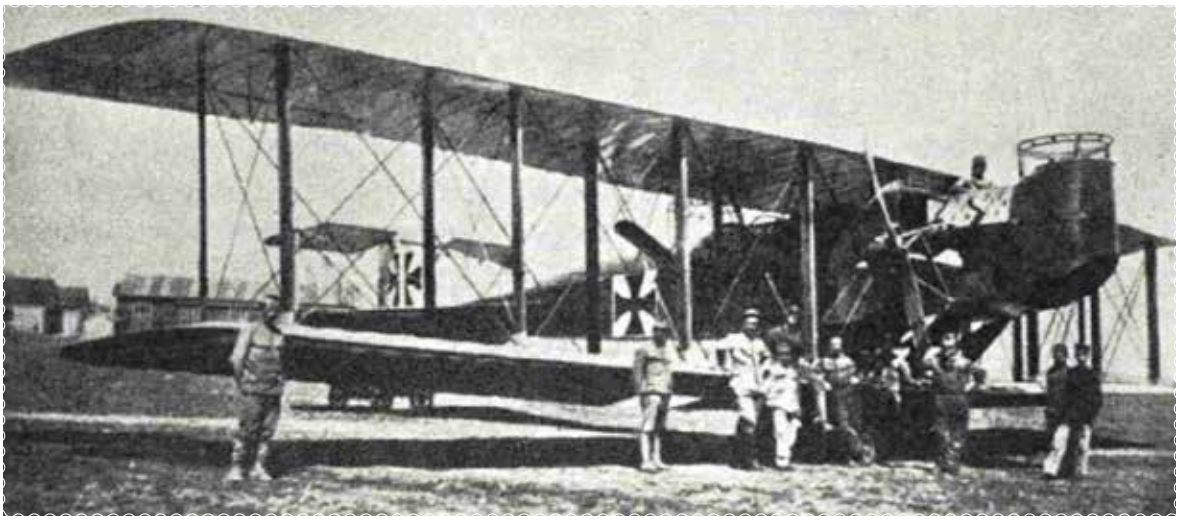


First flight-ready version of the Mises aircraft, June 1916

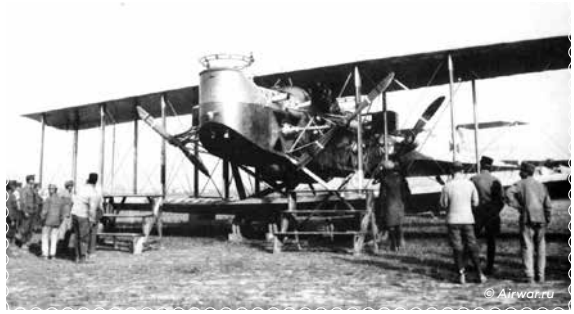
In this factory, Engineer Stanislaus, a younger and capable designer, took over the project after Engineer Okanyi. These engineers and numerous others did their best throughout the entire process.

The project's unlimited financial resources and von Mises' freedom to exercise his power were the two most critical advantages. Colonel Uzelac, the commander of the Imperial Army Air Force, was personally involved in the project and was always supportive. All demands for the manufacturing of components and for experiments were welcomed. The current condition of the industry, which was very active due to the war, was taken into consideration when planning all actions.

The aircraft was built by Österr.-Ungar. Flugzeugfabrik Aviatik GmbH, which set up a special plant in Essling, near the airport in Aspern. Raw materials and staff were supplied by the company and all parts were manufactured according to the technical drawings. Von Mises' assistant, Engineer Plattl was personally involved in the entire process.

In January 1916, the technical drawings of all components were completed, and the manufacturing process started. First, the construction of the main fuselage began. In mid-March 1916, the initial engine and transmission tests were conducted. On May 7, 1916, the engine and gearbox were mounted on the fuselage and on May 19, 1916, steady-state propeller tests were performed. On June 1, 1916, the aircraft was rolled out of its hangar but due to a design error, the landing gear was damaged and had to be replaced. On June 23, the error was fixed, and the aircraft was ready for flight tests. On the other hand, the manufacturing of the second prototype, which differed slightly from the first, was started immediately.

The first test flight was piloted by Engineer Sattler, with von Mises himself in the cabin as an observer. On July 2, 1916, about six months after the first drawings were made, the Mises aircraft took to the skies for the first time. Von Mises noted down his findings during the test flights, and some improvements were made to certain mechanical components.



The Mises aircraft being inspected by the technical team

Throughout this process, von Mises voiced his concern that interest in giant-sized aircraft would wane. Such concepts were more complex, heavy, and laboriously built than the aircraft actively used in operations. Von Mises claimed that at the time, such an aircraft had never been employed in combat by any country. Smaller combat aircraft were more efficiently used in operations.

By the end of October 1916, the manufacturing of the second prototype was completed and First Lieutenant Lányi was assigned to conduct the test flight. Von Mises was unable to participate in the test flights of this prototype

as he was on another assignment. On November 23, 1916, the technical report prepared by pilot Lányi drew the following conclusions:

1.The aircraft can taxi on the ground at 900 rpm.

2.The landing gear's springs are strong. Pneumatics needs to be improved.

3.Maneuverability during taxi is excellent.

4.The maximum power of a single engine is sufficient to lift the aircraft off the ground. It can fly horizontally with a single engine.

5.The aircraft can be controlled easily. Once it pulled to the left due to a strong wind, but it could be corrected with a counteract.

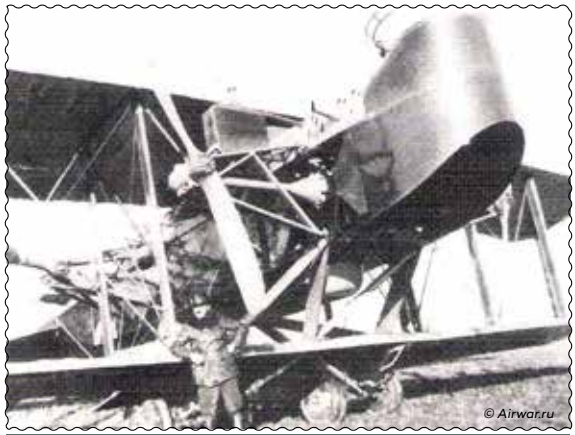
6.The rudder stability is excellent.

7.The elevator is more responsive compared to those on large Brandenburg type airplanes.

8.All rudder surfaces can be easily controlled without much force.

9.The airplane can land easily. The landing gear appears to be strong enough.

10.Flaw: The engines are overoiled and shutting down is difficult.



Test pilot Sattler with the first prototype 30.07

The second prototype was delivered to the army around January-February 1917. However, by 1917, the state of the air combat, the challenges in the R&D and manufacturing process of large-sized aircraft, and the overburden of industrial institutions led to a gradual decline in interest in such designs. In July 1917, Von Mises emphasized that the manufacturing of such large aircraft should definitely be abandoned when he considered the technical issues he was confronted with in terms of aircraft supply.

Antal Lányi who flew the second prototype

It is important to draw attention to a small detail that Von Mises did not mention in his article. The two prototypes produced were given an official code: Aviatik 30.07 Gr.I and Aviatik 30.17 Gr.II. Some sources state that a third model coded 30.18 Gr.III was also manufactured. However, there is no available information that this model has ever flown. When the second prototype 30.17 Gr.II crashed in April 1918, the 600-horsepower aircraft program was cancelled. Since von Mises was working on another project at the time, he was unable to intervene, even though he was the chief designer.[3]

20 years later, while he was a professor at Istanbul University, von Mises penned the aforementioned article, remembering those days, and concluding it as follows:

"...Thus, the timeless endeavor that began in 1916 came to nothing. However, this experience can take its humble place in Austrian aviation history, which is rich in indigenous work and has had a significant impact."

[3]*Additional sources on the project and the aftermath:*

-Keimel, R., Österreichs Luftfahrzeuge: Geschichte der Luftfahrt von den Anfängen bis 1918, H. Weishaupt Verlag, 1981,

-Keimel, R., Luftfahrzeugbau in Österreich: Von den Anfängen bis zur Gegenwart, Aviatik Verlag, 2003,

-Airwar.ru - Mises Gr. III: http://www.airwar.ru/enc/bww1/misesgr3.html, son erişim: 05.03.2023.

by Şebnem Akalın

Low Cost Flight, Business Class Lounge

Every flight, every journey begins with a story written by each passenger through their personal experience with the airport, airline, and the city. It begins from the moment you see the airport departure sign until the airplane touches down on the runway on your way back home.

Even with the thrill of buying the plane ticket, securing your hotel reservation, anticipation builds as you daydream about places you have decided to visit and your tastebuds are eager to experience new types of food; all of this excites us before the holiday. The real excitement truly begins the moment you step into the airport, and you feel like you could be another person for couple of days in an unknown city.

In this article we've captured our passenger perspective for you on board Pegasus airlines as we travelled to experience the unknown. Pegasus airlines is one of Türkiye's successful low-cost airlines. Our three-hour flight started from Sabiha Gökçen airport enroute to Cologne-Bonn airport.

As Pegasus Airlines is a low-cost airline, it is very important to plan your holiday by paying close attention to the packages you receive and their contents. We first took the most basic packages and then shaped them as we wanted. In doing so, the flight can be enriched with content depending on your preferences and will be very comfortable. If you have the idea to go to your destination with less luggage and turn back with more, low-cost airlines allow you do that. You are able to increase your weight allowance on the way back home and pay accordingly in advance to avoid any hassles.

Make your low-cost airline most like to Premium class...

As humans we enjoy the freedom of choice and the prospect of advantages in life, and this should also be available in every moment of our lives. So why should that matter less when traveling? I don't know if it's because we chose it ourselves, but Pegasus airlines' food always tastes better to me, especially if you're celebrating a special day, the cake served on board is delicious.

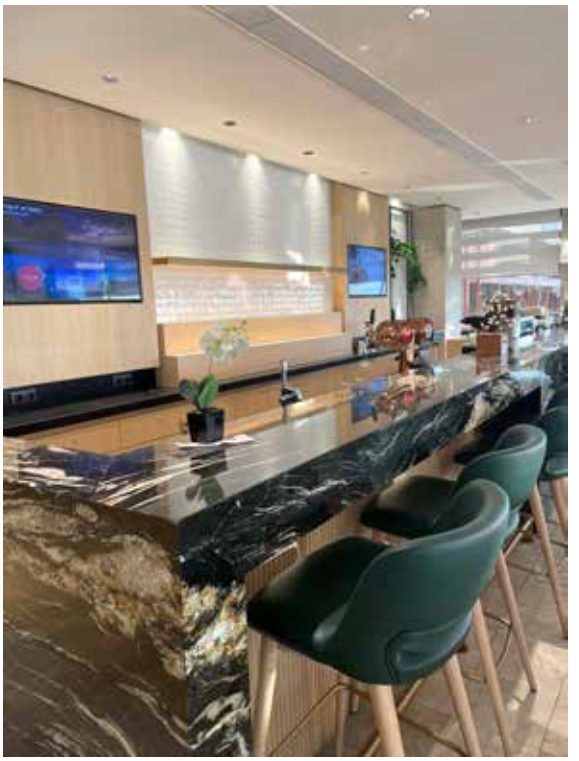
However, the main meal options are somewhat limited on board so if you are a frequent flyer, it is very likely that all passengers are eating the same meals. Alcoholic or non-alcoholic drink options were also reasonable, but few were loaded for purchase, and some seats were served in turns, so the choices were considerably reduced.

Airport...

I have always loved airports, it always seems like they are the key to saving a memory, the key to the door that opens with new excitement and memories to new places.

If you want to travel low cost but live the experience of Business Class in the airport, here is an essential tip; get into a lounge. Some of the lounges will require some travel cards or bank cards and you'll need to make a reservation. Before this trip, I enjoyed the Plaza Premium Group

Bosphorus Lounge, one of the 2 Lounges in the International Terminal. Plaza Premium Group brought a new face to the Sabiha Gökçen Airport with two Lounges. Sabiha Gökçen airport has a relatively smaller Lounge due to the fact that it is a city airport, but it hosts many travelers at every time of the day with its resting areas and food court. These types of lounges are relatively quiet compared to other points of the airport. These lounges were renovated and completely made from scratch to operate with a reservation system. While awaiting your boarding time, you can taste the delicious food as you wish from the open buffet, sip your coffee in the morning or enjoy a glass of wine accompanied by your afternoon snack. If you don't want to miss your flight by relaxing too much, be sure to check your flight status from the conveniently located arrival/departure screen displays.



And now we are seated on the plane, boarding has been completed and we've heard the voice on the intercom say 'cabin crew slides armed and cross check' we are ready to fly... Our flight took off smoothly as we settled into the seats we had chosen and purchased beforehand. Then the comforting voice of our female pilot provided an announcement from the cockpit. Pegasus Airlines is one of today's airlines that places a high level of importance on Gender Balance, and the voice coming from the cockpit deepened our trust in both the airline and our pilot.

Our journey begins with the Airbus 321 Neo aircraft named Zeynep Ela.

The seats were wide enough and clean. If you are traveling with a low-cost airline, knowing that comfort is limited and you want the best situation possible, the best will be determined by your own preferences. If you place an order for your flight in advance, your order will be delivered to you correctly, but on our flight we were informed that there were not many options left for the passengers who didn't preorder and would order in flight, and sometimes there was nothing left or very little to choose from. Keep in mind, especially since the plane that flies to Cologne in the morning, taking passengers on the return, returns to Türkiye, the food and drinks that are loaded from the airport are sold out on the outbound flight, and unfortunately, there won't be many options in terms of eating and drinking, and of course, it may not be very pleasant.

We had ordered hot meals, sandwiches, and a celebration cake for this flight in advance and during our flight we had kind of a small party with sparkling wine and the other drinks we ordered. Unfortunately, we couldn't have the second round of drinks as the availability of items loaded was limited, but enough to enjoy the flight. The crew was incredibly kind, caring and smiling. As we all know the cabin crew is always there for our safety, providing comfort and assistance during the flight.

Here we are... Cologne.

Cologne is one of the greatest cities in Germany, situated on the Rhine and with the presence of Cologne Cathedral, this city is absolutely worth a visit. This Gothic cathedral was laid on the Feast of the Assumption of Mary on 15 August 1248. The previous building was apparently no longer deemed impressive enough to house the remains of the Three Wise Men, which Archbishop Rainald von Dassel had brought to Cologne from Milan after the latter city was conquered in 1164. Because of these relics, the cathedral became one of the most important places of pilgrimage in Europe. Its two massive towers have dominated the city's skyline since their completion in 1880. At 157.38 meters, the northern tower is 7cm taller than the southern one. The cathedral covers almost 8,000 square meters of floor space and can hold more than 20,000 people. Due to the building's impressive Gothic architecture, the shrine of the Three Wise Men, the outstanding stained-glass windows and the many other important works of art, UNESCO declared Cologne Cathedral a World Heritage Site in 1996.

The city is also a city of culture with its many museums. The Chocolate Museum is one of the sweetest museums and is one of the first stops for travelers, the reason is that there is no better reason than starting a holiday sweet. While visiting the Chocolate the museum, you'll walk through a 10-meter-high tropical garden of live cacao trees, learn more about the production of chocolate and observe the casting process of chocolate figures.

You will also see the five-thousand-year history of cocoa, covering the mystical ceremonies of Central America and the luxury drink of the European aristocracy through to the instantly available treat that it has become today.

When you are done eating chocolate, you can visit Ludwig Museum or The Roman-Germanic Museum. Our first stop was the Roman-Germanic Museum. This museum is located in the city of Cologne and carries the traces of Roman history that you often feel and notice while walking on the streets of the city. It is one of the stops you should take time for.

The Romano-Germanic Museum was opened in 1974 on the former site of a Roman urban villa just to the south of the cathedral. It was the result of the fusion of two collections owned by the City of Cologne: The Roman collection that, since 1935, had formed the Roman and Germanic Departments of the Wallraf-Richartz Museum, and the collection of the Prehistoric Museum, known since 1926 as the Museum of Prehistory and Early History.

Museum Ludwig is so close to the Romano and Germanic Museum, and you can literally step into it in just a few minutes. If you're an art lover, Museum Ludwig is one of the places you absolutely need to visit in Cologne.

At Museum Ludwig on display you'll discover the world's third-largest Picasso collection, masterpieces of Expressionism and the New Objectivity style, photographs from the beginnings of photography to the present day, works by significant representatives of the Russian avant-garde, and contemporary art. Museum Ludwig established its Photography Collection in 1977 and has become one of the first museums of modern art to permanently include photography as an art form in its inventory of exhibits. The Ludwig collection comprises 70,000 photographic works, ranging from the beginnings of photography to the present day. Selections from the total inventory are presented on a rotating basis in order to preserve the photosensitive display pieces over the long term.

If you are tired of visiting museums and need a break for a cup of coffee, a nice lunch or a couple of drinks, you have many choices. As the city has different cultures, you'll find restaurants for every kind of taste. But I suggest you try German cuisine; you can try beer houses for local tastes and beers. Specifically order Kölsch and enjoy the view of the river.

Cologne is a nice city and worth visiting. The best times for visiting the city is Spring and Autumn but in winter we had great time visiting museums, tasting great food in cozy restaurants. Don't miss out on talking a walk on Hohenzollern Bridge at sunset and be sure to visit the Botanical Garden established in the 19th century. As your trip comes to an end you'll realize that there are more things to do and see in this quaint city and you'll will find yourself dreaming of your next trip to this beautiful city, watching the passing of ships on the river

MAI's Cargo was -Digitalized by Hitit

Myanmar Airways International (MAI) has broadened its cooperation with Hitit and started receiving services from Hitit for its cargo business and operations. Hitit, one of the world's largest PSS technology providers, is working hard to bring the same level of success to air cargo. MAI, which since April 2021 has been carrying out all its scheduled flight operations with Crane software solutions now includes digitized cargo operations, initiated with Hitit.

Atilla Lise, Hitit's Chief Transportation Solutions Officer, stated that by freeing MAI from the manual element in cargo processes; Hitit brought speed and agility to the airline – enabling MAI to be competitive in terms of air cargo business soon: "Our cargo solution, which we started developing in Q4 2019, is now an important member of the Crane family. En-route to offering the most comprehensive and complete air cargo operation solution, we have addressed airlines' domestic and international cargo operational needs. Our solutions offer end-to-end technology that touch all operational stages from cargo acceptance to final delivery.

The pandemic has been a pivotal point, and airlines have now realized how crucial it is to ensure operational continuity by diversifying their business models. Hitit has been able to offer airlines two different opportunities. The first is to combine cargo operators' manual processes with technology; the second is to open the doors of a new operation for airlines that previously flew only passengers. In the post-pandemic process, we will continue to bring airlines together with the technology that the industry really needs."

Tanes Kumar, Chief Commercial Officer (CCO) said: "Myanmar Airways International (MAI) is delighted to expand our cooperation with Hitit with the launch of Crane.CGO solution for our cargo business, as we continue to focus on digital solutions which enable us to be ever more efficient and effective in the marketplace. Despite the challenges, we are pleased with the successful cutover and implementation of the solution within 6-months of its start date."

Tanes also added "Crane.CGO will be a crucial enabler for our cargo business, allowing us to accelerate our growth while improving our customer service by covering our cargo business functions extensively and aligning our end-to-end business processes. Furthermore, we have ambitious plans to continue to invest in our cargo business post-pandemic; hence, the rollout of this solution will allow us to remain nimble in this competitive area."

Turkish Cargo Selects cargo.one

cargo.one announced a global partnership that brings Turkish Cargo, the Turkish national carrier's cargo division, on board the leading marketplace for digital air cargo bookings. Flying to more countries than any other cargo airline, the combination of Turkish Cargo's capacities and cargo.one's seamless digital booking experience now offers freight forwarders worldwide a valuable new proposition. With 40 bookable airlines on board, cargo.one has now secured close to 50% of global air cargo capacity for instant booking on its platform.

Turkish Cargo is a major international operator, achieving exceptional growth across market segments, flight network and transported tonnage in recent years. In 2010, the carrier was ranked 33rd in the world, and has risen steadily to 14th in 2017, and now 5th globally in 2022. Investments in state-of-the-art SMARTIST, its Istanbul mega cargo hub, sustainability programmes and a comprehensive digitalization strategy has helped Turkish Cargo increase business volumes to 9.1 million tonne kilometers during 2021.

Within weeks, cargo.one customers worldwide can book capacities across Turkish Cargo's extensive network of more than 340 destinations, 100 of direct cargo - including important centers of commerce in North America, South America, Europe, and Asia. Already flying its fleet of 20 freighters to more international direct cargo destinations than any other airline, Turkish Cargo plans to increase this from 100 to 120 by 2025. Freight forwarders can now benefit from the best marketplace booking experience for Turkish Cargo capacities.

Turkish Cargo is achieving its impressive growth by prioritizing customer value and leveraging digital transformation to enhance its reliability and customer service. The partnership with cargo.one reflects an ongoing development of its sales capabilities in line with recent investments in its product range, including the introduction of TK URGENT. As a digital leader, cargo.one will support the airline's teams to further enhance the offer quality and customer experience for online bookings.

cargo.one is expanding its available capacity at a rapid pace thanks to velocity on both sides of the marketplace. During 2022, it has launched many additional global airlines and airline groups, adding significantly to capacity across all three of the most important air cargo markets: Europe, North America and Asia.

Air Cargo Shows Signs of Improvement in February

The International Air Transport Association (IATA) released data for February 2023 global air cargo markets showing that air cargo demand rose above pre-pandemic levels.

Global demand, measured in cargo tonne-kilometers (CTKs*), fell 7.5% compared to February 2022 (-8.3% for international operations). This was half the rate of annual decline seen in the previous two months (-14.9% and -15.3% respectively). February demand for air cargo was 2.9% higher than pre-pandemic levels (February 2019)—the first time it has surpassed pre-pandemic levels in eight months.

Capacity (measured in available cargo tonne-kilometers, ACTK) was up 8.6% compared to February 2022. The strong uptick in ACTKs reflects the addition of belly capacity as the passenger side of the business continues to recover. International belly-capacity grew by 57.0% in February year-over-year, reaching 75.1% of the 2019 (pre-pandemic) capacity.

Several factors in the operating environment should be noted: The global new export orders component of the manufacturing PMI, a leading indicator of cargo demand, continued to increase in February. China's PMI level surpassed the critical 50-mark indicating that demand for manufactured goods from the world's largest export economy is growing. Global goods trade decreased by 1.5% in January; this was a slower rate of decline than the previous month of -3.3%. The Consumer Price Index for G7 countries decreased from 6.7% in January to 6.4% in February. Inflation in producer (input) prices reduced by 2.2 percentage points to 9.6% in December (last available data).

"The story of air cargo in February is one of slowing declines. Year-on-year demand fell by 7.5%. That's half the rate of decline experienced in January. This shifting of gears was sufficient to boost the overall industry into positive territory (+2.9%) compared to pre-pandemic levels. An optimistic eye could see the start of an improvement trend that leads to market stabilization and a return to more normal demand patterns after dramatic ups-and-downs in recent years," said Willie Walsh, IATA's Director General.

February Regional Performance

Asia-Pacific airlines saw their air cargo volumes decrease by 6.0% in February 2023 compared to the same month in 2022. This was a significant improvement in performance compared to January (-19.0%). Airlines in the region benefitted from China's reopening, which saw restrictions lifted and economic activities resumed. Available capacity in the region increased by 19.9% compared to February 2022 as more and more belly capacity came online from the passenger side of the business.

North American carriers posted a 3.2% decrease

in cargo volumes in February 2023 compared to the same month in 2022. This was a solid improvement in performance compared to January (-8.7%). Notably, the region saw a significant increase in international demand in February which boosted its market share in international cargo traffic to beyond pre-pandemic levels (21.7% in Feb 2023 versus 18.2% in Feb 2019). Capacity increased 2.8% compared to February 2022.

European carriers saw the weakest performance of all regions with a 15.3% decrease in cargo volumes in February 2023 compared to the same month in 2022. This was an improvement in performance compared to January (-20.4%). Airlines in the region continue to be most affected by the war in Ukraine. Capacity decreased 1.5% in February 2023 compared to February 2022.

Middle Eastern carriers experienced an 8.1% year-on-year decrease in cargo volumes in February 2023. This was a slight improvement to the previous month (-11.8%). Capacity increased 9.3% compared to February 2022.

Latin American carriers reported a 2.7% decrease in cargo volumes in February 2023 compared to February 2022. This was a drop in performance compared to January which saw a 4.6% increase. Capacity in February was up 27.6% compared to the same month in 2022.

African airlines saw cargo volumes decrease by 3.4% in February 2023 compared to February 2022. This was an improvement in performance compared to the previous month (-9.5%). Notably, the Africa to Asia route area experienced significant cargo demand growth in February, up 39.5% year-on-year. Capacity was 4.7% above February 2022 levels.

Challenge Airlines Say Merhaba, Istanbul!

Challenge Group starts the new year as it means to go on, with an historic, inaugural Challenge Airlines flight out of Istanbul, Türkiye on 25 January 2023. The freighter will carry a mix of Türkiye's main export products: garments, fabrics, and automotive parts, all from key international customers.

This event signifies the start of Challenge Airlines' first scheduled operations out of Istanbul Airport, linking Türkiye to Liège in Belgium, and from there to destinations across Europe, as well as to the U.S. and Far East.

From the end of this month onwards, Challenge Airlines will operate two Boeing 747F flights per week – on Days 3 and 7 - totalling a joint capacity uplift offer of 240 tons.

"As the world's 29th largest exporter with one in two of its exports heading to Europe, Türkiye is a significant contributor to global trade, and Challenge Group, with our established Liège hub at heart of Europe, is a perfect business fit" says Or Zak, Commercial Vice President of Challenge Group. "Some 3 million metric tons are handled at Turkish airports each year. Istanbul, in particular, is deservedly making its way up the international Cargo airports ranking ladder, and has long been of strategic interest to us. The airport is a fitting pioneer for our planned Group expansion on the east side of the globe. Merhaba, Istanbul, and here's to a long and successful service!".

And since the World Cargo Symposium will also be taking place in Istanbul, on 25-27 April this year, attendees can pencil a reminder in their diaries to meet Challenge Group. The teams look forward to answering any questions you may have and discussing potential network requirements in person. Challenge Group is always open to growing and exploring new markets to enhance the value proposition offered to its customer.

Air France-KLM Orders Four A350Fs to Modernise the Fleet of Martinair

The Air France-KLM Group has placed a firm order for four A350Fs, the brand new Airbus widebody freighter, to be operated by Martinair Holland N.V., a Dutch cargo airline headquartered and based in Amsterdam Schiphol airport, and part of KLM Group. The A350F's will allow the airline to retire its existing older generation freighters and replace them with a clean sheet cargo aircraft that offers a big step towards more sustainable cargo operations.

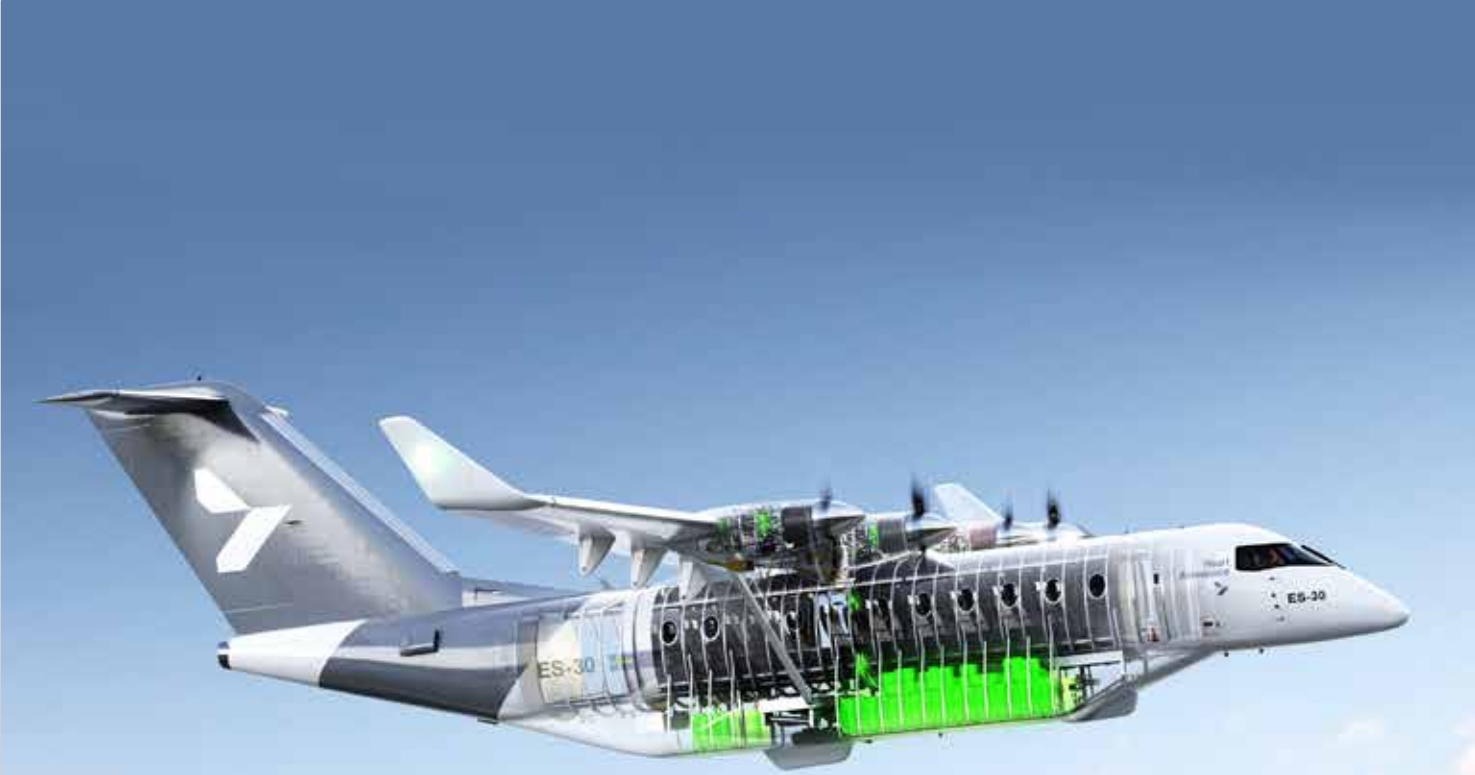
he A350F is based on the world's most modern long range leader, the A350. The aircraft will feature the largest main deck cargo door and a fuselage length optimised for cargo operations. Over 70% of the airframe is made of advanced materials resulting in a minimum 30 tonnes lighter take-off weight, which together with efficient Rolls-Royce engines generate an advantage of at least 20% lower fuel burn and CO2 emission over its current closest competitor. Delivery to Martinair will be in time to comply with the latest ICAO CO2 emissions standards that will come into effect by the end of 2027. With a 109 tonnes payload capability (+3t payload / 11% more volume than its competition), the A350F serves all cargo markets (Express, general cargo, special cargo...).

Dronamics Raises $40 Million in Pre-Series A Funding

Dronamics, the world's first cargo drone airline with license to operate in Europe, announced that it has raised a total of $40 million in pre-Series A funding from venture capital funds and angel investors from 12 countries as the company approaches its upcoming Series A round.

This amount includes funds received from Founders Factory, Speedinvest, SeedBlink, Eleven Capital, and most recently the Strategic Development Fund (SDF), the investment arm of the Tawazun Council, Abu Dhabi, United Arab Emirates.

SDF venture capital division's investment in Dronamics funding is a step in the creation of a UAE-based joint venture that will expand Dronamics capacity and support the future establishment of Dronamics' operations in the UAE as one of the main hubs for the Middle East and North Africa region. SDF shall, through the establishment of a manufacturing and operations JV, become a main partner in the UAE-based joint venture with additional significant investment.



BAE Systems and Heart Aerospace to Collaborate on Battery for Electric Airplane

Lightweight and groundbreaking battery for commercial electric airplane will enable efficient regional air travel.

BAE Systems, a leading aerospace and defense company, and Heart Aerospace, a Swedish electric airplane maker, announced a collaboration to define the battery system for Heart's ES-30 regional electric airplane.

The battery will be the first-of-its-kind to be integrated into an electric conventional takeoff and landing (eCTOL) regional aircraft, allowing it to efficiently operate with zero emissions and low noise.

"Our industry-leading solution builds on decades of expertise delivering technologies and systems needed to progress sustainable transportation," said Ehtisham Siddiqui, vice president and general manager of Controls and Avionics Solutions at BAE Systems. "We are delighted to collaborate with Heart Aerospace on the innovative battery system for its electric airplane."

The program will leverage more than 25 years of BAE Systems' expertise in electrifying large, heavy-duty industrial vehicles. Today, the company has over 15,000 power and propulsion systems operating in service across the globe. Work on the program will be conducted at the company's state-of-the-art facility in Endicott, New York.

"BAE Systems' extensive experience in developing batteries for heavy-duty ground applications, and their experience in developing safety critical control systems for aerospace, make them an ideal partner in this important next step for the ES-30 and for the aviation industry," said Sofia Graflund, chief operating officer at Heart Aerospace. "We look forward to decarbonizing air travel together."

The ES-30 airplane will be powered by four electric motors, and has an all-electric range of 200 kilometers, an extended reserve hybrid range of 400 kilometers with 30 passengers and ability to fly up to 800 kilometers with 25 passengers.

The ES-30 will also have a cost-effective and scalable upgrade path as future battery technology matures. The battery upgrade roadmap allows for increased usable energy at the same weight, resulting in longer flight durations and expanded route options.

Heart Aerospace has a total of 230 orders and 100 options for the ES-30, along with letter of intent for an additional 108 airplanes.

GE and EcoGreen Energy to Build Solar Project In Türkiye

GE announces that it has been selected by Ecogreen Energy to deliver its FLEXINVERTER Solar Power Station technology for the 130 MWp, 100 MWac Nigde Bor Solar power plant to be built in Nigde, Türkiye. The scope of work includes design, engineering, procurement, and commissioning of the Solar Power Station.

The Nigde Bor solar power plant is part of YEKA- GES4 launched in 2022 by the Ministry of Energy. It will enable the energy transition in the country and beyond, by helping Türkiye continue the expansion of renewable energy resources and commission 10 GW of solar capacity between 2017-27, according to IEA. Türkiye's solar energy capacity is projected to reach 52.9 gigawatts with an increase of approximately 500% by 2035.

This project adds up to the 1.3 GW of solar projects GE is delivering in Türkiye.

Prakash Chandra, Renewable Hybrids CEO, GE, said: "The potential for solar energy in Türkiye is a reality. We are thrilled to be partnering with Ecogreen Energy on the projects and look forward to more opportunities to increase the penetration of renewable energy in Türkiye and beyond."

GE will partner with Ecogreen in the supply and services contract of an extended scope of equipment beyond inverter stations and commissioning services. Inogen will execute the local works to fulfill the EPC scope. GE and Inogen will work together again after having completed 1.3 GW of YEKA and Hybrids projects in Türkiye.

Inogen managing partner Professor Ali Murat Soydan mentioned "We are very happy and proud to partner with GE and support the company with local capability in Türkiye".

The FLEXINVERTER* Solar Power Station is an integrated containerized solution that combines a solar inverter, medium voltage power transformer, and an optional MV Ring Main Unit, all integrated in a standard 20-feet ISO high cube container. The technology is a smart solution that helps deliver a reliable, cost-effective, plug & play, factory-integrated power conversion platform for utility scale solar and storage applications. It helps reduce capital and operation costs and ensure a more reliable plant performance.

The FLEXINVERTER is a key component of GE's Renewable Hybrids FLEX portfolio, designed to solve customer needs through multiple applications to enable dispatchable, green MWhs. It also includes the FLEXRESERVOIR and the FLEXIQ technologies. The FLEXRESERVOIR is a systems integrated battery energy storage and power electronics solution for multiple configurations and market applications. FLEXIQ is a digital platform that provides design, operation, and fleet management solutions to enable grid compliance and maximize lifetime customer value.

Horizon Aircraft Successfully Completes Wind Tunnel Transition Flight Testing

Horizon Aircraft announced that it has successfully completed initial transition flight testing of its "Cavorite X5" 50% scale eVTOL prototype in the world class ACE Climatic Wind Tunnel.

Brandon Robinson, CEO of Horizon Aircraft said: "Aircraft performance exceeded our expectation. We explored forward speeds of up to almost 100 km/h, measuring aerodynamic forces, control authority, and mechanical system function with the wings open at varying fan speeds. We were particularly happy with pitch and roll stability and control throughout the entire transition envelope, as well as the embedded fan performance. Having real-world test results match our detailed predictions was further endorsement of our world class engineering. We can now use these results to refine our CFD modeling and further de-risk the outdoor transition flight test program that is beginning soon."

Horizon's innovative and patented hybrid 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 unique aircraft can also operate in Short Takeoff and Landing (STOL) or Conventional Takeoff and Landing (CTOL) modes. The full-scale aircraft will be powered by a hybrid electric architecture that can recharge the battery array in-flight while providing additional system redundancy and flexibility.

Horizon Aircraft will move to outdoor transition flight testing shortly as they continue the detailed design of their full-scale aircraft, anticipating final assembly for flight testing in 2025.

IBS Software Acquires Accenture Freight and Logistics Software (AFLS) to Bolster Air Cargo Capabilities and Extend into Ocean Freight & Logistics

The acquisition will help expand IBS Software's footprint in the global freight supply chain, accelerating digital transformation and innovation

IBS Software, a leading SaaS solutions provider to the travel industry globally, has announced the completion of a transaction to acquire Accenture Freight and Logistics Software (AFLS). AFLS provides technology platforms to help airline and ocean transportation companies manage their freight operations and grow through digital transformation and innovation.

The acquisition will strengthen IBS Software's leadership as a technology provider to the air freight industry by bringing together complementary solutions and a shared vision for innovating and transforming the air cargo businesses. Boosting the freight business is an increasingly critical priority for airlines and the AFLS acquisition consolidates latest innovations to accelerate growth, especially AFLS' cloud-based collaboration platforms which deliver advancements in airline partnerships – a major focus area for carriers.

The acquisition is also a strategic step in recognizing IBS Software's vision to establish itself as an end-to-end player in the global freight supply chain. AFLS has a strong heritage in ocean freight innovation with a suite of new generation platforms that enable ocean carriers to automate critical business functions and make data-led decisions for commercial operations. Further, the transaction helps IBS Software to deploy its cargo and logistics management expertise in the ocean transportation sector.

With increasing industry focus on the digitalization of the ocean supply chain to improve efficiencies, expansion into ocean cargo presents a significant growth opportunity for IBS Software. The acquisition will also allow IBS Software to tap into a highly capable talent pool of experts in logistics and supply chain management that can drive innovation and deliver value to the industry.

To support this expansion, IBS Software will open a new development center in Chennai, its fourth in India, for travel, transportation and logistics. The center will accelerate the company's mission to transform how travel companies operate in a digital world by delivering next-generation products to accelerate growth, drive efficiency, and create differentiated customer experiences.

"The acquisition of AFLS is a strategically important milestone for our cargo and logistics business to broaden its global footprint, with ocean transportation being a natural adjacent industry in which to expand our expertise," said V K Mathews, Executive Chairman of IBS Software. "It is a synergistic opportunity to bring our decades of experience and expertise to the ocean cargo business, as well as strengthen our own capabilities to provide greater value to the air cargo customers."

"Cargo and logistics are vital to the global economy. It's an area ripe for growth and hungry for transformation. Recent moves by logistics businesses to enter air cargo as they seek to influence the supply chain at every level are evidence of the growing disruption in the sector. AFLS will be pivotal in our wider mission to transform the global supply chain through digital innovation," said Anand Krishnan, CEO, IBS Software.

Air Freight Grows in Munich

Munich Airport plays an important role as a reliable part of the infrastructure and a key component of global supply chains. Recently, Qatar Airways doubles cargo capacity. With the increase of its cargo service between Munich and Doha from two to four weekly flights, Qatar Airways is doubling its capacity. All flights are operated on behalf of the logistics company DB Schenker. One of the new rotations continues from Munich to Chicago Rockford and via Munich back to Doha. Markus Heinelt, Director Traffic Development Cargo at Munich Airport: "We welcome the expansion of our long-standing customer Qatar Airways. It once again demonstrates the growing importance of Munich as a cargo hub."

Qatar Airways launched cargo connection to Munich as of 2022 Qatar Airways is operating regular flights to and from Munich with a cargo version of its Boeing 777. The routing started in Bangalore, India, and leads via Qatar's capital

Doha to Munich and then on to Chicago. On the return flight, in exactly the opposite rotation, the freighter reaches Munich every Tuesday. Qatar Airways operates this service on behalf of the international logistics provider DB Schenker.

Gulf Air Extends its Partnership with Unilode for Another 10-year Term

Gulf Air, the national carrier of the Kingdom of Bahrain and the World's Most Improved Airline 2022, and Unilode Aviation Solutions, the market leader in outsourced unit load device (ULD) management, repair and digital services, announce the renewal of their longstanding ULD management partnership for another 10-year term.

Gulf Air awarded the management of its ULD fleet to Unilode in 2011. Since then, Unilode has supported Gulf Air's significant fleet growth and route network extension with global ULD supply, management, maintenance and digital services as well as accessories management, led by a dedicated local customer success management team and supported by the global Operations Control Centre. The renewed agreement will see Unilode continue to supply pallets, and lighter weight and more durable AKE containers from its ULD pool to Gulf Air for increased synergies and sustainability benefits. Unilode will also provide speciality containers, which will be dedicated for Gulf Air's exclusive use.

Gulf Air Chief Executive Officer, Captain Waleed Al Alawi, commented: "In the past 10 years of our close cooperation, Unilode has demonstrated excellent customer-centric attitude and met all our expectations, therefore we are delighted to continue working together with our valued partner. Gulf Air is committed to being an industry leader and embracing innovative technologies, and Unilode's digital ULD fleet enables our airline to enhance the services offered to our passengers and customers. For the success of our airline, it is important to collaborate with strategic partners who share our values and vision, and we are pleased to be able to continue our strong relationship with Unilode's team and ULD solutions for another 10 years."

Unilode Chief Executive Officer, Mr. Ross Marino, said: "Gulf Air is one of Unilode's most loyal ULD management customers, and we are pleased with the extension of our partnership until 2032. Gulf Air is well-known in the industry for its focus on customers and its continuous improvement, and we are proud that Unilode has been able to contribute to its growth and success. We have strengthened our presence in the region with additional customer success management staff to be able to continue providing the best possible service to our valued partner. Gulf Air's ambitious growth plans are very exciting, and we look forward to continuing our close and successful partnership for many years to come."

Rolls-Royce PLC Announces New Leadership for the META Region

Rolls-Royce PLC has appointed John Kelly to the role of President – Middle East, Türkiye and Africa (META), with immediate effect. Previously Kelly spent six years as Senior Vice President, Europe, Middle East and Africa, for the firm's Civil Aerospace business. Kelly started his career with Rolls-Royce in 2001, joining as a graduate trainee in the Defence business, where he rose to become a senior manager before joining Civil Aerospace.

In his new role, Kelly will assume group-wide leadership and representation across the META region for engagement with senior stakeholders in government and industry.

Görkem Kırış Gümüşel, Rolls- Royce's Country Director for Türkiye and Central Asia, will be reporting to John moving forward. Rolls-Royce employs over 300 specialists in the Middle East, including those engaged in engineering and technical roles supporting commercial aviation, industrial and defence customers. It has had a substantial presence in the region for more than 50 years.

John Kelly said: "My vision is to ensure Rolls-Royce builds on the solid foundations it has established across the META region and for each of our business units. While we are renowned for excellence in civil aerospace, we will leverage opportunities for all the Rolls-Royce businesses, providing solutions for the region's major infrastructure projects and industrial customers. Our technology can play a fundamental role in enabling the transition to a low carbon global economy."

With bold ambitions for the future, Kelly is committed to growing partnerships across META which reflect Rolls-Royce's core engineering and technological innovations. As the region looks towards COP28, set for Dubai later this year, these are anticipated to increasingly focus on sustainable aviation, decarbonisation solutions and the energy transition, all of which are embodied in Rolls-Royce's net zero commitments.

Etihad Cargo Expands European Capacity

Etihad Cargo, the cargo and logistics arm of Etihad Airways, will offer increased capacity to the European market via two new gateways with the introduction of two new routes from its Abu Dhabi hub to Copenhagen in Denmark and Düsseldorf in Germany. The carrier will also introduce additional services to Frankfurt.

The carrier currently operates seven passenger and four freighter flights per week to Frankfurt. From 1 May 2023, Etihad Cargo will increase weekly flights from eleven to 15 with the introduction of four new services.

From 1 October 2023, Etihad Cargo will provide cargo capacity out of Denmark with the introduction of four weekly flights. The reinstatement of three weekly flights to Düsseldorf, in combination with the airline's widebody passenger and freighter flights to Frankfurt and Munich, will offer additional cargo capacity out of Germany. The flights will be operated via state-of-the-art Boeing 787 Dreamliner aircraft.

VoltAero Selects Safran's ENGINeUS™ 100 Electric Motor to Equip the Cassio 330 Electric-Hybrid Aircraft Prototype

VoltAero's prototype Cassio 330 will utilize Safran Electrical & Power's ENGINeUSTM 100 smart electric motor in the aircraft's parallel electric-hybrid propulsion system.

The ENGINeUSTM 100 will have a maximum rating of well above 150 kW at takeoff and is to be integrated along with a 150-kW thermal engine in VoltAero's proprietary hybrid propulsion unit on the Cassio 330. Features of the ENGINeUSTM 100 include an integrated motor controller and an optimized air-cooling system for thermal management.

Under terms of the agreement, Safran Electrical & Power will deliver an ENGINeUSTM 100 motor before year-end for ground-based endurance testing of the electric-hybrid propulsion system. The supply of a flight qualified ENGINeUSTM 100 will follow in 2023, enabling the startup of flight testing with the Cassio 330 prototype. Certification of the electric motor is scheduled for mid-2023.

VoltAero will produce Cassio airplanes in three versions, each sharing a high degree of modularity and commonality. First to be certified is the Cassio 330, with a capacity of four/five seats and powered by the 330-kW electric-hybrid propulsion system. The follow-on six-seat Cassio 480 will have a combined electric-hybrid propulsion power of 480 kilowatts, while the Cassio 600 is sized at a 10/12-seat capacity with electric-hybrid propulsion power of 600 kilowatts.

The electric-hybrid propulsion system will be installed in the Cassio's aft fuselage, driving a pusher propeller. VoltAero's design for the Cassio aircraft family is based on a sleek, aerodynamically optimized fuselage, a forward canard, and an aft-set wing with twin booms that support a high-set horizontal tail.

VoltAero already has gained significant experience with ENGINeUSTM motors, having logged more than 10,000 km. since 2019 during flights with its Cassio 1 testbed aircraft – which incorporates two ENGINeUSTM 45 versions (rated at 45 kW of continuous power) installed on the wings.

"The ENGINeUSTM 100 agreement signed today extends our excellent partnership with VoltAero that began in 2019, and it reinforces our common vision for carbon-free aviation," stated Bruno Bellanger, Safran Electrical & Power's Executive Vice President and General Manager for Power division. "This is another success for our ENGINeUSTM range of engines, ideally positioned in the general aviation market for electric aircraft, and it represents a further step towards zero-emission airplanes."

Safran Electrical & Power's ENGINeUSTM product line includes a wide range of electric motors with power ratings up to 500 kW.

Blankets Made from Recycled Plastic

Emirates has recycled more than 500,000 kilograms of plastic and glass over the course of 2022, by collecting discarded bottles onboard for repurposing. 500,000 kilograms is almost the same weight as a fully loaded Emirates flagship A380 aircraft.

Onboard every flight that lands in Dubai, Emirates Cabin Crew work hard to quickly separate glass and plastic bottles, before they are sent to a recycling plant in Dubai.

The glass and plastic recycling initiative onboard was suggested by environmentally conscious Emirates Cabin Crew in 2019, as part of regular webinars and events where they are given a platform to share feedback and encouraged to share innovative ideas to key departments. The proposal was well-received and implemented within weeks.

Emirates has several other initiatives which focus on repurposing plastic or using sustainable materials where possible; For the last 6 years, Emirates has offered cosy sustainable blankets made from recycled plastic bottles to Economy passengers on long haul flights. The soft and warm blankets are made from 28 recycled plastic bottles. The bottles are shredded into plastic chips before being turned into yarn, creating a fleece material. The fine thread is then woven into soft blankets. Over the 6 years since the initiative was introduced, Emirates blankets have prevented more than 95 million plastic bottles from going to landfill. As the largest sustainable blanket programme on board in the airline industry, the manufacturing process of using recycled polyethylene terephthalate (rPET) also reduces energy emissions by around 70%.

Consuming responsibly is a key environmental focus area for Emirates, who have embedded an environmental requirement in the supplier code of conduct and consider the entire lifecycle of products from the design stage.

For example, wooden tea and coffee stirrers, paper straws and inflight retail bags are made using wood and paper from responsibly managed forests. For Emirates' youngest customers, the airline's complimentary toy bags, baby amenity kits and plush toys are also made from recycled plastic bottles and other sustainable materials. Belt bags, duffle bags and backpacks are designed with specific age groups in mind and are constructed from a yarn that is made from 100% recycled plastic bottles. Each Emirates kids' backpack is made from 5.5 recycled plastic bottles and each duffle bag is made from 7. The production of the Emirates children's bags has saved 8 million plastic bottles from landfill. The swing tags are made from recycled card, and even the outer cases that the products are shipped in are made from recycled card that can be recycled again.

Emirates' Premium Economy and Economy Class range of amenity kits are complimentary for customers on long-haul flights, and feature designs that represent the four essential elements of nature – fire, water, earth, and air. The pouches are reusable and made from washable kraft paper with bespoke art printed in non-toxic soy-based ink. The contents include a selection of durable travel essentials made from environmentally friendly materials. The toothbrush is made from a combination of wheat straw and plastic, and the socks and eyeshades are made from recycled plastic, in this case, rPET (recycled polyethylene terephthalate). The packaging used for the dental kit, socks and eyeshades is made from 90 per cent rice paper.

RECYCLING ON BOARD

Emirates has recycled more than 500,000 kilograms of plastic and glass over the course of a year, by collecting discarded bottles onboard for repurposing.

500,000 kilograms is almost the same weight as a fully loaded Emirates flagship A380 aircraft!

All our recyclable waste is taken to specialist facilities in Dubai, where it is given a second lease of life as new glass bottles, textiles, binding strips, and more.

Turkish Airlines Technic will Provide Maintenance Services to Emirates Fleet

Turkish Airlines Technic Inc. and Emirates, the United Arab Emirates-based airline company with the world's largest Boeing 777 fleet, has signed an aircraft maintenance contract.

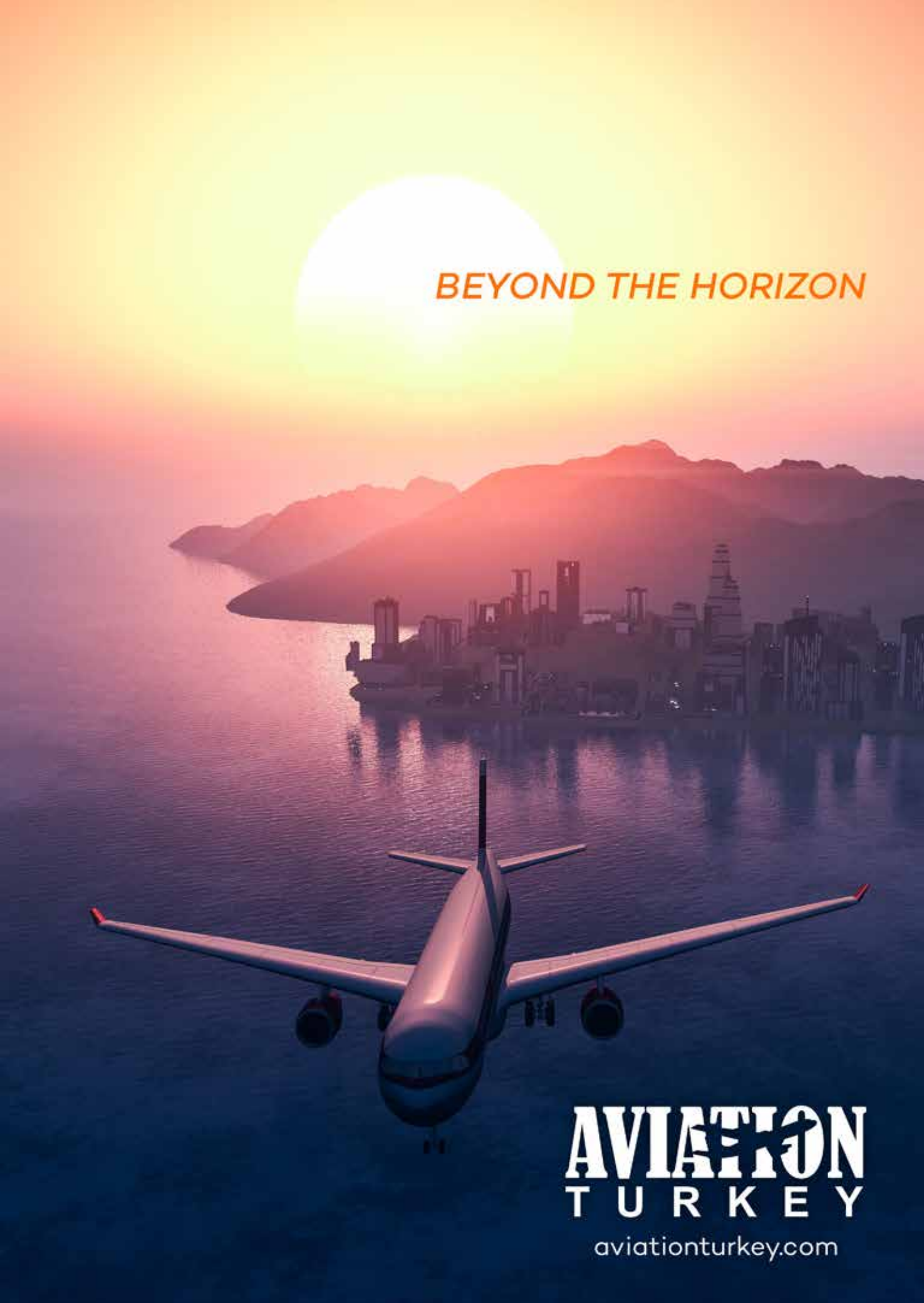
With the signed agreement, Turkish Technic will provide base maintenance services to 5 Boeing 777 aircraft in Emirates' fleet. As of April 1, the maintenance of the first aircraft under the agreement will begin at the Atatürk Airport Facilities of Turkish Airlines Technic Inc., while the maintenance operations of the other aircraft will be carried out in the coming months.

Mikail Akbulut, General Manager of Turkish Airlines Teknik A.Ş. "The fact that Emirates Airlines has entrusted the base maintenance operations of its Boeing 777 aircraft to us is a testament to Emirates' confidence in our company. We have become one of the most important service providers in the aircraft and component maintenance-repair industry with the high quality and reliable service concept we offer for our customers. While working in line with this vision, we set bigger goals and add new collaborations to our success. We believe that our agreement with Emirates is the beginning of a long-term partnership." said.

Corendon Airlines Entrusts AFI KLM E&M With Six Additional CFM56-7B Engines

Corendon Airlines and AFI KLM E&M announced the signing of a new contract. AFI KLM E&M, a long-time partner of Corendon Airlines, will be in charge of shop visits for six additional CFM56-7B engines. Two of the engines are in service with Corendon's Turkish fleet, while the other four are owned by its Maltese subsidiary Corendon Airlines Europe. The services will be performed at AFI KLM E&M's engine shop in Amsterdam over the next several months.

AFI KLM E&M is one of the world's leading providers of maintenance services for CFM56-7B engines, serving numerous airlines and operators worldwide. Yildiray Karaer, co-founder and CEO of Corendon Airlines, said: "Beyond the technical quality of the offer, we appreciate the frank and direct relationship offered by AFI KLM E&M. Their experts are always very clear upstream about what is and is not possible - a transparency that is essential for us to make our operations reliable." Ton Dortmans, Executive Vice President KLM E&M, added: "It is an honor for us to retain the trust of Corendon. Our teams know this customer well, and were eager to respond to this new demand with an offer exactly adapted to their needs and those of their new aircraft."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