ISSN 2667-8624
VOLUME 2 - ISSUE 6 - YEAR 2020

AVIATION TURKEY

FINANCIAL REVIEW
RISK & RECOVERY IN THE AVIATION INDUSTRY

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AVIATION TURKEY

VOLUME 2 - YEAR 2020 - ISSUE 6
ISSN 2667-8624

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Basım Tarihi
Ağustos - Eylül 2020

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Future of Aviation: Zero-Emission Commercial Aircraft

At the United Nations Climate Conference in Copenhagen in 2009, all stakeholders of the aviation industry (airlines, manufacturers, airports and air navigation service providers) committed to a set of ambitious climate action goals for the improvement in fuel efficiency of 1.5 percent per year from 2009 to 2020, carbon-neutral growth by 2020 and a reduction in CO2 emissions to 50 percent of 2005 levels by 2050.

Accomplishing these targets means continued investment in new technology, sustainable fuels and operational improvements. A broad range of technological innovations is under development to improve aircraft fuel efficiency and reduce their CO2 emissions. The global focus on climate action has triggered a strongly increased intensity of research and technology (R&T) activities to improve energy efficiency and expand the use of renewable energies. More specifically, R&T in aviation has been inspired by the Industry's high-level goal to reduce the global CO2 footprint of air transport by 2050.

In accordance with this roadmap, Airbus has revealed three concepts for the world's first zero-emission commercial aircraft which could enter service by 2035. These concepts each represent a different approach to achieving zero-emission flight, exploring various technology pathways and aerodynamic configurations in order to support the Company's ambition of leading the way in the decarbonization of the entire aviation industry.

All of these concepts rely on hydrogen as a primary power source - an option which Airbus believes holds exceptional promise as a clean aviation fuel and is likely to be a solution for aerospace and many other industries to meet their climate-neutral targets. The three concepts - all codenamed "ZEROe" - for a first climate neutral zero-emission commercial aircraft includes turbofan, turboprop and blended-wing body designs.

The transition to hydrogen, as the primary power source for these concept planes will require decisive action from the entire aviation ecosystem. It is stated that together with the support from government and industrial partners it can rise up to this challenge to scale-up renewable energy and hydrogen for the sustainable future of the aviation industry.

In order to tackle these challenges, airports will require significant hydrogen transport and refueling infrastructure to meet the needs of day-to-day operations. Support from governments will be key to meet these ambitious objectives with increased funding for research & technology, digitalization and mechanisms that encourage the use of sustainable fuels and the renewal of aircraft fleets to allow airlines to retire older, less environmentally friendly aircraft earlier.

Recently ZeroAvia, the leading innovator in decarbonizing commercial aviation, has announced the maiden flight of the world's first hydrogen fuel cell powered flight of a commercial-grade aircraft. The flight took placed on 24th September at the company's R&D facility in Cranfield, England, with the Piper M-class six-seat plane

completing taxi, takeoff, a full pattern circuit and landing. ZeroAvia's achievement is the first step to realizing the transformational possibilities of moving from fossil fuels to zero-emission hydrogen as the primary energy source for commercial aviation.

On the other hand, a new LA-based fuel logistics startup, Universal Hydrogen, has embarked on a project to develop a retrofittable hydrogen powertrain for existing airliners, and will test it with a 40-seat Dash-8, that will become the world's largest hydrogen-fueled commercial aircraft.

Although discussions on hydrogen-fuel production and storage challenges will take significant time to work through in the days ahead, it is evident that Airbus and some researchers and startups have put much effort and investment into the future of hydrogen powered aircraft. We will see how the future unfolds as new technology pathways are explored. Undeniably hydrogen in aviation certainly offers many opportunities for the transformation of the aviation sector and we'll be here to keep you up to date as the industry evolves.

Enjoy the issue...

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Pandemic Hastens the End of Jumbo Jets

While some of the effects of the pandemic on the aviation industry are transient, some of its consequences will be completely permanent. Airlines, which used to gain favor by claiming a four-engine plane was better and stronger than a twin-engine plane, today are trying to figure out how to shift all planes in their fleets to twin-engine aircraft.

Four-engine aircraft, such as the Boeing 747, which has been in active service since the first human set foot on the Moon, the Airbus A380 which had been decided upon to be discontinued in 2021, and the Airbus A340 which has been operating in the airline's fleet for 27 years without being involved in a single fatal crash, have all reached the end of the road due to the pandemic.

The pandemic has thrust the aviation industry into the most turbulent times in its history and has led airlines to make radical future decisions. Airlines that had to ground all their planes for about 2 months had taken a series of future actions in fleet planning to survive the financial crisis they had experienced in the last months. In addition to options such as delaying the delivery schedule of orders placed to manufacturers, canceling some orders completely, returning leased aircraft in the fleet earlier than planned, the retiring of inefficient aircraft in the fleet has been one of the most frequently used methods to help reduce expenditures.

Post-pandemic estimates for the aviation industry suggest that 2019 figures could not be achieved before 2023. This shows that it is difficult to reach more than 500 passengers in both directions on many routes. For this reason, airlines rescheduled the retirement plans of Boeing 747, Airbus A340 and A380 planes, which have high operational and maintenance costs, and are inefficient, and accordingly directed the vast majority of them to aircraft graveyards for good.

Boeing to end 747 production!

When it was first introduced in the early 1970s, the Boeing 747 was like a miracle. The aircraft, which can carry up to 600 passengers and crew in its variants, is estimated to have flown more than 3.5 billion people around the world so far. Since its launch, Boeing has sold more than 1,500 747s. There are also 17 747 orders currently waiting to be produced.

Before the pandemic, Boeing had many questions on its mind about the future of the jumbo jet, even though the 747's order book still reflected a double-digit

Airbus A380

number. For nearly 5 years, the U.S. manufacturer itself was fueling speculation that the 747 production would end. Boeing finally announced in an official statement in July 2020 that the production of the 747 will end in 2022.

As of June 2020, according to Cirium fleets data, there were only 171 passenger versions of the 747 still in fleets worldwide, and only 27 of them were in use. The airlines (British Airways, Lufthansa, KLM, Qantas) have mostly this passenger version of the 747 in their fleets and as such they quickened the retirement processes of these aircraft, which are normally planned to last until the mid-2020s. In the aftermath of the pandemic, it is seems quite unlikely that we would travel with the 747.

Emirates may be the only chance for the A380!

Airbus dropped a bombshell with the announcement made on February 14, 2019 for the A380, the biggest failure of the European manufacturer in recent years. The news that the A380 production line will be shut down in 2021 was a like an awful Valentine's Day gift for A380 lovers. The declining demand of airlines for this aircraft was the major factor behind this decision. Even Emirates (the biggest customer of the aircraft) wished to cancel or shift its remaining orders to another model and this forced Airbus management to make this decision.

The pandemic almost legalized this decision that was made for Airbus 380. Airlines having A380s in their fleet have stored the A380s and started to schedule the removal of them from their fleet.

242 of the A380s, which had received only 251 orders until today, were delivered to their owners. 123 of these deliveries were made to Emirates. Of the remaining 9 orders, 8 will join the Emirates fleet and 1 will join the All Nippon Airways fleet.

The Emirates, which alone owns almost half of the entire A380 fleet worldwide, announced that it would teardown 46 of the aircraft to use for spare parts. Thus, it had to lay off thousands of cabin attendants. In short, Emirates' gamble for A380 failed. Billions of dollars were lost. Emirates plans to continue operations with the A380s until the mid-2030s.

Other important customers other than Emirates, such as Air France, Qatar Airways, British Airways, Qantas, Singapore Airlines, Lufthansa, Korean, Malaysian and Asiana have also decided not to fly with A380s after the pandemic.

For those who want to fly with an A380 after the pandemic, they most likely will make their way to Dubai. It will be possible to fly with an A380 on all Nippon Airways' Tokyo-Honolulu flights and China Southern Airline flights from China to some of Europe's major cities. You may have another chance to come across a charter flight operated with an A380 by HiFly, the world's only airline that has a second-hand A380.

The pandemic is the final nail in the Airbus A340's coffin!

For many, it is probable to attribute the gradual decline in A340 use in recent years even to the fact that a transatlantic flight takes at least an hour longer due to its slow speed. Increased operational and maintenance costs of A340s fleets had already started to become a burden.

The year 2008 took its place in history as the year in which A340 aircraft were used the most across the globe. With 206 thousand flights in 2008, A340 aircraft were conducting an average of 560 flights per day worldwide. In 2008, 43 operators across the world had the A340 in their fleet and this enabled their prominence and popularity in 2008. Lufthansa, the biggest operator of the A340, conducted 31,200 flights with A340 aircraft in 2010, while the number of flights fell to 14,500 in 2019. With the pandemic, A340s commenced their final and permanent descent. It is not difficult to foresee that giants such as Lufthansa, Iberia, Air Canada, Virgin Atlantic and Singapore Airlines will not conduct passenger operations with these aircraft in the aftermath of the pandemic. Many of A340 operators have already sent the aircraft in their fleet to aircraft graveyards.

Out with four-engine aircraft, in with new generation twin-engine aircraft

Demand for the 747, A380 and A340 have gradually dropped in recent years. With the destructive impact of the pandemic, 4-engine jumbo jets will be decidedly replaced by new technology, such as the new generation twin-engine aircraft.

The dominance of twin-engine alternatives in the market instead of four-engine jumbo jets will create positive effects for all stakeholders in the industry. Along with the substantial reduction in maintenance costs, another important aspect is that the size of areas necessary to maintain the planes will also be reduced. When we combine the perception of efficiency and the decrease of environmental concerns with the economic benefits it will bring, it is not difficult to predict that the process will lead to positive outcomes at every point of the chain. It's not hard to understand why 4-engine aircraft are going to be replaced by twin-engine aircraft; it is evident from the number of orders placed by airlines worldwide for new generation twin-engine aircraft.

Even though the demands of airlines determine the manufacturers' decision to continue or discontinue production for any model, airports are also amongst the main factors that determine the demands of airlines. Connection and capacity problems emerged and were underestimated especially at airports in Europe before the pandemic, but in fact it's a very significant factor in shortening of the lifespan of 4-engine aircraft.

A340-300 at the end of a runway

What benefits will new generation twin-engine aircraft provide?

Shifting to new generation twin-engine aircraft is likely to minimize many of the aviation industry's problems. Three basic conclusions can be drawn from the scenario of the removal of four-engine aircraft: with a smaller and more efficient aircraft, flight frequency can be increased, aircraft ground time can be minimized, and on account of all of these factors capacity can be increased and eventually income.

Capacity problems are a critical issue for airlines, which can result in considerable pressure after a while. There are various factors that create capacity crises for airlines, from geography to finance, from airport footprints to environmental concerns. Air traffic management and outdated slot allocation schedules also contribute to capacity crises. The increasing popularity of new generation twin-engine aircraft designs seems to be the most important solution for airlines to overcome capacity crisis challenges in the future.

Smaller and lighter aircraft make connections faster and easier between relatively small regional airports and large hubs. Thus, airlines can increase their mobility between airports and connect regional airports, which can be a vital source of income, to each other and to hubs more easily than ever before. The new generation twin-engine passenger aircraft contributes to this process positively, enabling airlines to use all the facilities they have in a much more efficient way.

How to achieve the performance of four-engines with twin engines

With the shift to twin-engine aircraft from 4-engines, each improvement step in which existing capacity is optimized brings along other advantages to the business world, passengers and airports. It also contributes to the efficiency of the infrastructure.

One of these advantages is the increase in runway utilization capacity. The wake turbulence formed by large aircraft will disappear, just a negligible effect will occur between landing and take-off. This will potentially result in many more aircraft being able to use the same runway during the same time period. Even this move will increase capacity at airports without the need for major infrastructural changes.

From the perspective of sustainability, the advantages to be provided are crystal clear. Thanks to the increased efficiency and fuel-saving features of twin-engine aircraft equipped with new generation technologies, it will be much more probable for the industry to reach its environmental targets and the zero-emission vision that is set to be reached in 2050.

Another important factor speeding up the transition to twin-engine aircraft are the changes in aviation regulations. With the ETOPS rule took effect in the 1980s, airlines were building their flight routes in a way to position an airport where they could land within a maximum 90 minutes in case of emergency. As engine technologies advanced, these regulations were eased and the range that twin-engine aircraft could fly was expanded. Thus, routes that were never considered before could be established.

Today, both the aviation industry and the world are more sensitive about fighting against climate change, so it

B747 Jumbo Cargo Carrier

Aerial view of Air France Airbus A380 and British Airways Boeing 747

was impossible for these aircraft not to become popular due to the shorter routes, allowing for less fuel consumption and more environmentally friendly flights.

Boeing 747 will continue for air freight

Very few industry branches are seeing as much rapid change and transformation as the aviation industry. The dynamics and rate of change in the aviation industry are constantly evolving through technological developments and fluctuating market conditions. There has been a reduction in the difference between the time various aircraft types are put into service and the time they are removed from service, an increased rate of consumption. The A340, for example, was put into service by Lufthansa in 1993, and today A340 operations will not go beyond the 2020s. However, the A380 reached the end of the road rather quickly after a journey that had only just begun in 2007.

New aircraft, long-haul flights, ultra-long-haul-flights, point-to-point flying are all part of the 10-year projections and possible roadmap of the aviation industry. It seems rather unlikely that the 747, A340 and A380 will play any significant part in future-plans.

The pandemic sounded the death knell for the four-engine passenger aircraft. Even from the simplest point of view, this idea is popular in the industry: Why do with four what you can do with two? Thus, things are both simpler and cheaper. Not to mention the positive environmental impact it creates!

To end with a pleasing development, we have the chance to see Boeing's iconic jumbo jet 747 in the sky for a while longer, because Boeing believes the 747 still has a future in the cargo business, even as the possibility of carrying passengers decreases.

Even though the transformation of the A380 from a passenger plane to a cargo configuration, the process of which has was initiated for the first time for an unnamed customer during the pandemic, the cargo version of the A380 is not expected to become widespread in the long run.

In summary, we, as passengers, are seriously losing our chances of traveling with 4-engine airplanes due to the pandemic. I hope you can experience flying in jumbo jets before they become another addition to Aircraft Boneyards worldwide, joining out of service aircraft, taking their place in the dusty pages of history

İSTANBUL SABİHA GÖKÇEN

ŞEHRİN HAVALİMANI SABİHA GÖKÇEN

#siziönemsiyoruz

Yaşadığımız bu yeni dönemde havalimanımızdan başlayacak tüm seyahatlerinizi daha sağlıklı yapmanız için, süreçlerimizi daha güvenli hale getirdik.

Çünkü sizi ve sevdiklerinizi önemsiyoruz.

Risk and Recovery in the Aviation Industry

Is Government support really a lifeline for airlines?

Dr. Batuğhan Karaer
Chairman of the Finance Association, Turkey

While the COVID-19 pandemic has hit the whole world extremely hard in many ways, we are seeing some movement in the financial figures as the wheels of many industries have started to turn once again... with the exception of aviation and tourism. In the second quarter of 2020, we witnessed an economic recession on an unprecedented scale, something we have not witnessed since World War II and now in the third quarter, we are seeing signals of revitalization in commercial activities even with the complicated data from macroeconomic indicators such as growth, industrial production, employment, etc. Despite the ongoing COVID-19 pandemic, the expectations for economic growth has increased.

Although many sectors have started to show signs of recovery, the ongoing ambiguity concerning the COVID-19 pandemic has been damaging to the aviation industry with every passing day. The failure to make adequate projections regarding the sector also hampers many plans involving investments, aircraft production and human resources training. No matter how soon the crisis is resolved, the damage already caused to the aviation industry will take many years to recover from.

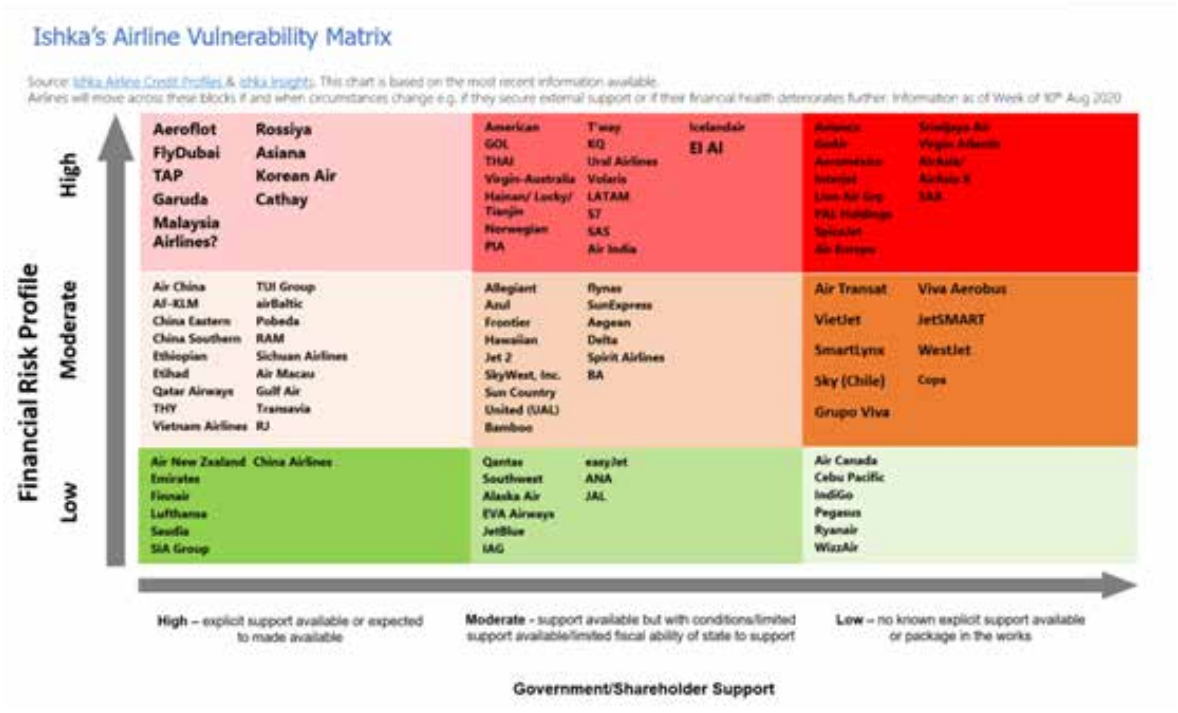
On the other hand, with China's relaunching of domestic flights and their support of the sector with the stabilization of the virus, Chinese domestic airline activity figures have started to match 2019 figures. There is a prevailing belief in the aviation industry and in financial markets that China's aviation sector will recover faster than other countries. This may put China's aviation industry in a better position than it was before the pandemic. We will see together whether the COVID-19 pandemic will create an advantage for China in the aviation industry and other sectors. The qualified workforce failing to find job opportunities in their own countries or regions may relocate to China and nearby countries in the region. As I also mentioned in my previous article, a capacity transfer may come up resulting from the transfer of unused aircraft to regions where flights are in demand and continue to take place. Additionally, there are also efforts to sign agreements for the relaunch of flights between certain countries in the Asia-Pacific region.

Surely, the lower seat occupancy rates and reduced number of destinations that has occurred during the pandemic will have a major impact. Airline companies with leased aircraft in their fleets are planning to return the planes to the owners. In this case, the lessors will have to include their

aircraft in the aviation parking and storage process, for at least 2 years. Within the scope of this implementation, with the cost depending on the type of airplanes, the aircraft will be parked at airports of countries with favorable weather conditions to better protect the aircraft. The lessors will have to bear the costs throughout this period that will last until future agreements are struck. Furthermore, scarcity of airplanes in the medium and long run will be inevitable, due to the slowdown in production depending on the decrease in aircraft orders. The increase both in the average age of existing fleets and the number of aging aircraft in the sector results in an increase in maintenance requirements and costs. Therefore, we anticipate that an increase will occur in the business volume of airline maintenance companies and hangars.

The airline industry should be evaluated in relation to airline companies as all the components of the industry are incorporated through these companies. The achievements of airline companies and the increase in their activities are unavoidably linked with the sub-sectors as well. Therefore, focusing on airline companies is the correct approach to project the future of the industry. As you may remember, in my article in the 4th issue of our magazine, I pointed out that the future of the aviation industry lies particularly in the resolution time of the crisis caused by the virus and the approach taken by states and financial realms in response to the industry's adversity. In my attempt to illustrate the levels and effects of such factors I referenced a vulnerability matrix. Furthermore, I stated that the box that contained the companies in the matrix should be in a better position, when we considered the debt levels of the companies. In other words, I indicated that this box should be regarded in a more unfavorable position than its current perceived position. Since I did not have the chance to examine the entire financial data of the airline companies, I did not mention where the airline companies were located on said vulnerability matrix.

In order to illustrate the vulnerability of the airline companies in the matrix, airline data analysis companies Ishka and OAG conducted a joint study in August 2020; the study was featured in Andrew Curran's article on the website www.simpleflying.com. The related matrix is given below.



source: https://simpleflying.com/which-airlines-are-best-positioned-to-survive-covid-19/

While reviewing the status of airline companies, the matrix also provides us with an opportunity to view said companies from a different angle. For instance, we are able to identify the most successful and unsuccessful airline companies within this matrix. On the bottom and right end of the matrix, Air Canada, Cebu Pacific, IndiGo, Pegasus, Ryanair and Wizzair stand out as successful airline companies that maintained their financial position without taking any support or funds from the government or fund holders. Other successful companies in the matrix are Qantas, Southwest Airlines, Alaska Air, EVA Airways, JetBlue, IAG, easyJet, ANA and Japan Airlines; these companies are being funded at the medium level. It would not be false to say that Air New Zealand, Emirates, Finnair, Lufthansa, Saudi Airlines, SIA Group and China Airlines - companies that have received stimulus packages from states and investors are the luckiest and most advantageous companies (except Lufthansa); however we do not clearly know if their positive status is based on their own achievements or due to state aid. Airline companies such as Aeroflot, FlyDubai, TAP, Garuda, Malaysia Airlines, Rossiya, Asiana, Korean Air and Cathay are in poor

condition comparatively speaking, despite backup from governments & fund holders and thus may be regarded as unsuccessful.

In the case of companies receiving state aid that fail to recover their poor financial status in the upcoming period, they may be nationalized or merged with public airline companies.

In this matrix, we see Turkish Airlines positioned in the group with moderate financial risk, which receives high state/fund holder support, Sunexpress placed in the low financial risk group receiving average state/fund holder support, and Pegasus Airlines, a company with a robust financial structure (with low financial risk) without any state/fund holder support.

When we consider the course of the COVID-19 crisis, we see that two alternatives stand before the industry. The first alternative, which has a low likelihood, is the sudden elimination of the crisis in the next six-month period; in the event that this alternative takes shape, the airline companies that have low financial risks according to the matrix study of Ishka and OAG and those that receive state or investor funds would embrace a more advantageous position and further increase their pre-COVID-19 market share. Powerful airline companies will have the opportunity to gain the routes and passengers of the weaker ones. No matter how painful it would be for them, the remaining airline companies would start to recover upon the stimulation of demand. However, restoration to their pre-pandemic state will invariably constitute a long process lasting well until 2024; that is if they adopt favorable strategies.

The second alternative concerning how the COVID-19 crisis plays out is a scenario where the struggle ends in the medium and long run; no matter how much we wish to avoid this, this scenario has a high probability. In this alternative we will witness the bankruptcy or hand-over of the airline companies with weak financial structures which do not have the support of the governments/ fund holders, or we will see mergers with other airline company will emerge throughout this process. On the other hand we will see companies not being able to effectively navigate the existing circumstances, subsequently downsizing by taking more radical steps to decrease the size of their fleet and eventually their staff.

The aviation industry's focus solely on the resolution of its own problems will not be sufficient in this rapidly changing world; a world that must be reinvented due to the crisis caused by the COVID-19 pandemic. Thus, by reviewing their long-term strategies, aviation companies need to approach the future through a broader vision and with a new perspective

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TURKISH AEROSPACE

Keeping Asset Values Safe with Well Organized Records

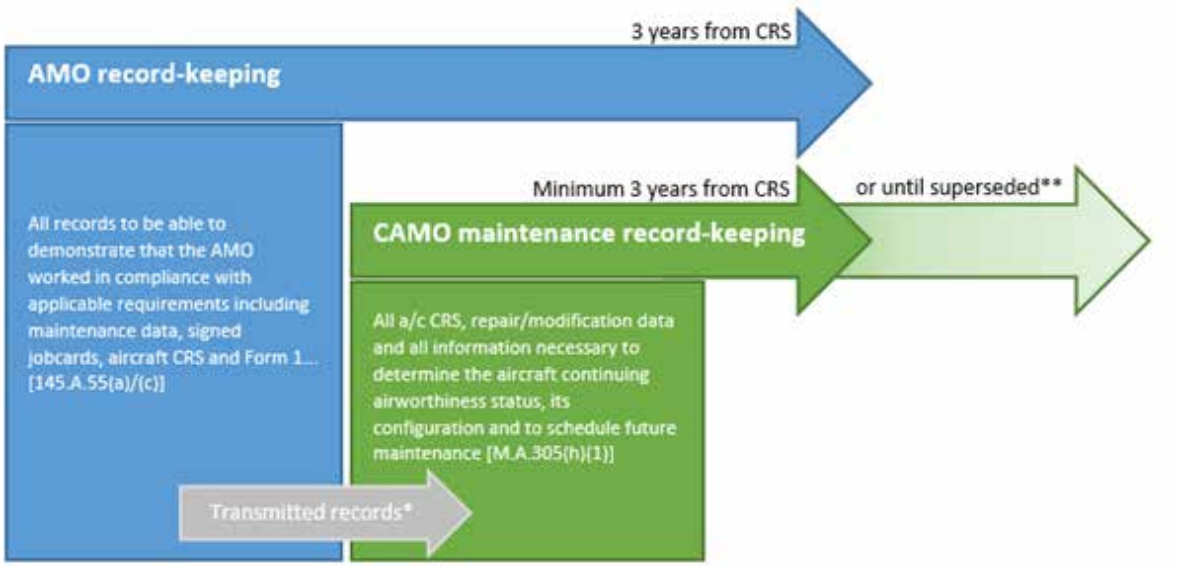
by Cengiz Armutlu
Industrial Engineer, DIN EN ISO/IEC 17024 certified Expert for A/C Valuations, Engineering and Maintenance

Around the globe almost the half of the world's fleets operate under lease so that operators can benefit from adding aircraft to their fleets for a desired period without taking the risk of aircraft ownership. However, these leasing transactions also cause some challenges for all involved parties due to Aircraft and Record Delivery-Re-delivery conditions. Therefore, both the lessor and lessee need to be extremely careful to save asset values and keep the transaction within the planned budget. To highlight these problem areas during aircraft transition periods from an engineering point of view, I have written a series of articles about Aircraft Transition Management. The article below is the first of the series and it is related to the issue of Records that are necessary during aircraft deliveries. With the second article I will concentrate on the major showstoppers of lease transitions and then with the third, I will try to highlight the importance of project management as it impacts the success of the delivery/redelivery of an aircraft.

We are all certainly going through difficult times now due to COVID-19. The Aviation Industry is one of the most affected sectors that has felt the full impact due to the lock down and travel restrictions. In addition to leisure travel, also business travel was almost not possible at all during the last months. As a result, the way to meet and make decisions, conduct training, reviews etc. was to transfer these types of activities to the virtual environment. Most companies have reacted very quickly by shifting all possible activities to the virtual environment to keep the business going. Meetings, Seminars, Conferences, which normally took place face to face, have been held on virtual platforms such as Zoom, MS Teams, Skype etc. Most of the Approved Training Organizations (ATOs) have also changed their systems to support distance learning either as live on-line sessions or as online web-based training to continue providing services to their customers. Even though most Aviation Authorities weren't inclined to conduct distance learning during the pre-COVID-19 era, they have pivoted quickly in support of these kinds of solutions and have been able to provide the necessary approvals after reviewing the training concepts which have allowed ATOs to continue their business during the lockdown period. In the last months we have seen that these precautionary transitions are working quite well, and I assume also after the COVID-19 pandemic most of these COVID-19 solutions will be a standard for the new normal. It means whenever possible, travel will be avoided and meetings, reviews, training will be performed virtually. I am quite sure that some companies will change their work operations to support remote work, with flexibility to allow at least a partial home office and on-site working arrangement, continuing the approach which many companies have adopted in the midst of the pandemic.

During these changes we have also seen the importance of digitalization of Aircraft Records is. An aircraft without its properly maintained technical records is valueless and cannot be operated or remarketed. When considering an aircraft as an asset, the asset value consists of approximately 70% based on Records and 30% the airframe, engine etc. This means that a lack of records causes a drastically drop in asset value and makes it hard to remarket or operate the aircraft. Therefore, from the point view of an aircraft owner, the back to birth availability and legibility of the records are a very important aspect to consider during the lease term, including lease in or lease return phases within the entire lifecycle of an asset.

The leasing companies need to know the status of their asset and this is where the records play a major role. Mostly during delivery, midterm, redelivery, or repossession periods the records need to be reviewed by professionals so that the leasing companies know what the gap is. To perform these reviews, leasing companies assign either their inhouse Inspectors, contracted agencies, or independent consultants. Nevertheless, due to travel restrictions, it has been very difficult to send qualified Record Inspectors to the locations where the Aircraft Records are archived. These difficulties resulted in the fact that aircraft leasing



*: Transmitted records are a subset of AMO maintenance records provided to the CAMO. Certain transmitted records do not need to be kept as a record by the CAMO such as EASA Form 1 for a component with no scheduled maintenance task selected and not subject to AD or modification/repair.

**: by new information equivalent in scope and detail

Record keeping and Transmitted Records from AMO to CAMO (Credit: EASA Website)

companies tried to find local people where possible or let the records be reviewed remotely if they were digitalized already. Record reviews are being increasingly conducted remotely, which saves travel and accommodation costs and reduces risks, due to the flexibility of assigning the job to a specialist.

If we examine the Record keeping requirements, we need to consider two aspects: keeping up Airworthiness (Regulatory Requirement) and maintaining and protecting asset value (Contractual Requirement).

The record keeping requirements of an aircraft and its components to demonstrate continuing airworthiness are described within the regulations of the FAA, EASA or local Aviation Authorities. These are mandatory requirements to keep an aircraft flying and carrying passengers and freight, which is the core business of an operator. Therefore, most of operators focus only on the Regulatory requirements since it is of paramount importance in order to legally operate the aircraft safely and verify that it is airworthy. However, these regulatory requirements differ from contractual (lease contracts) requirements, which in addition to continuing Airworthiness, they also consider the Asset value.

The authority requirements taking care of keeping the aircraft airworthy and within regulations clearly written which records and how long they need to be kept for demonstrating the airworthiness of an aircraft.

For example, as per EASA regulations Part M a CAMO (Continuing Airworthiness Management Organization) must retain the detailed maintenance records until they are superseded by new information, but not less than 3 years. It means that when a Maintenance task is repeatedly performed on the aircraft or its components and the previous completion was older than three years the previous scheduled Maintenance task completion Records can be eliminated.

Another example is the transmitted records from an AMO (Approved Maintenance Organization) to a CAMO (Continuing Airworthiness Management Organization). According to the EASA Rules a CAMO does not need to keep certain transmitted records from an AMO such as the EASA Form 1 for a component with no scheduled maintenance task selected and not subject to AD (Airworthiness Directive) or modification/repair.

Nevertheless, this is not sufficient for an asset

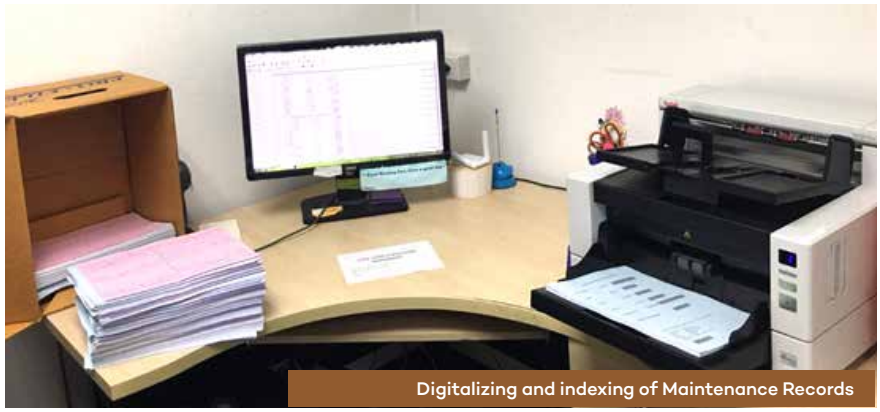
owner. The asset owner needs the full traceability of the records and therefore during the operation of a leased aircraft it is strongly recommended that all maintenance records are kept, all records that were produced during the time of operation.

A well organized and safe archive system is important for the Operator to satisfy the authority requirements during audits but also it is an important indicator for a lessor to see how professional the operator is. This will ease the process of lease return or Mid-Term inspections and saves a lot of unnecessary costs. Even though the authorities are not yet stipulating the digitalization of aircraft maintenance records, it is highly recommended to have secure access of the records anytime and from anywhere. This will allow the Operator to archive the originals in a remote archive and save costs due to the lower property rentals compared to the nearby airports. The professionally digitalized records with OCR (Optical Character Recognition) and necessary attribution and document classification makes the search for any document much easier without any dependence on location. These digital Records can be uploaded to a cloud-based server so that all the required records can be found easily with a document management program without any need to physically locate hard copies in dusty archive boxes. With this possibility the parties during a lease transaction can investigate the records independently and raise concerns which need to be corrected and communicate through the document management system to close outstanding issues to satisfy the parties.

A well-organized Aircraft Records Archive

Another important aspect is to prepare a proper delivery record folder structure so called “delivery bible”. In the past, many operators and lessors had their own delivery folder structure and understanding about the records and record conditions to be delivered during a lease transaction. These differences made the work complex, since each time the working parties needed to fight with different structures which caused unnecessary discussions about the preparation or provision of the records. Time was also often wasted searching for a document in the wrong section, coupled with misunderstanding of some terminologies etc.

Since the 1980s aircraft operating leases have grown significantly from about 5% to almost half of all aircraft worldwide. The higher amount of leased aircraft causes more resource effort involved in transferring the aircraft and the records from the lessor to the operator and vice versa. This has caused a unique challenge for



Digitalizing and indexing of Maintenance Records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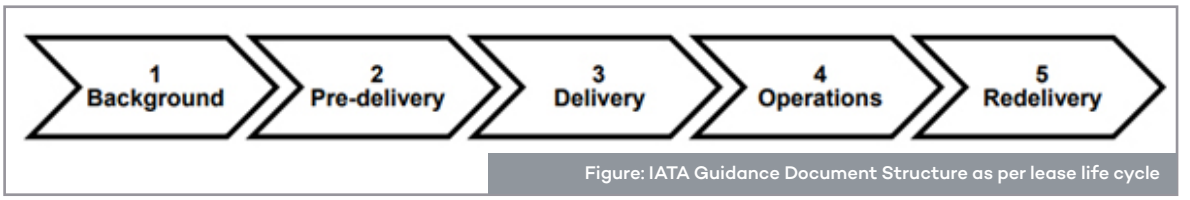

Figure: IATA Guidance Document Structure as per lease life cycle

airlines in addition to their normal Operation. These 'back-office' operational challenges are a result of different perspectives and expectations of lessor and lessees. The complexity and tight schedules of the Lease transactions often catch the operators unprepared and therefore it is important for operators to understand what difficulties must be overcome and how to avoid time consuming and costly pitfalls. Since there are no uniform rules or guidelines existing for engaging aircraft leases, the International Air Transport Association (IATA) has taken the initiative and provided the Document "Guidance Material and best practices for Aircraft Leases" in February 2014 for IATA Airline members and other interested parties. Since then this Guideline has been improved and the IATA published the 4th Edition of Guidance Material and Best Practices for Aircraft Leases on May 2017. This Guideline helps all lease involved parties especially the engineers, technical Representatives from leasing companies, to understand lease related issues during the aircraft lease life cycle. It describes important subjects from a broad practical perspective, considering technical, regulatory, legal, and commercial aspects. Sections 1 to 5 describe lease life cycle related issues and knowhow in chronological order as seen in the figure below. The IATA recommends a process of continual review to ensure lease compliance throughout the leasing life cycle.

The Annexes of the Document provide all parties with very helpful Information/Checklists/ Templates that ensure a common understanding during an aircraft lease transaction. The most important Annex which is related to the subject of this article is Annex 2 where the typical Delivery/ Redelivery Records Folder Structure is given. Every lease agreement and the delivery/redelivery requirement will be different, and as a result the list of documentation will be different, but these differences can be adjusted by adding or removing items to or from the given structure.

Preparing the records as per this structure and considering the guidance material will ease the process of the records review and helps to reduce the time required to check the Delivery/Redelivery Records and save time and costs.

Finally, I would like to highlight that in addition to knowhow and understanding and aircraft lease issues, the most important thing by far is to make sure you have a well-prepared action plan supported by good project management practices to be successful during lease transactions.

Never forget "If you fail to plan, you are planning to fail! (Benjamin Franklin)"

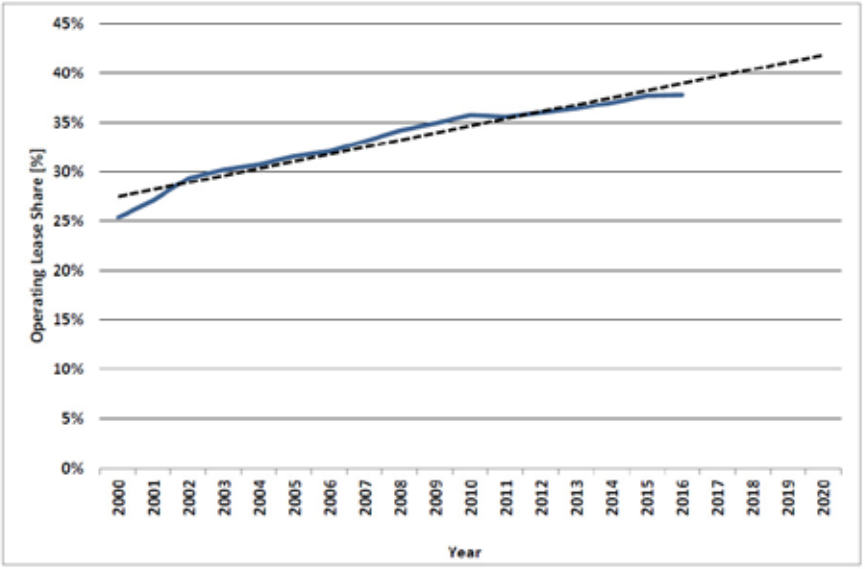

Figure 2. Share of Worldwide Fleet under an Operating Lease (Ascend, 2017)

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Fatigue Studies in Aviation in Light of the 1988 Aloha Airlines Incident

State-of-the-art solutions engineered for aircraft manufacturing and assembly are listed among the top engineering advancements. Today aircraft manufacturing must be focused on future-oriented structure assembly and automation, one can perhaps say this field of expertise is a harmony of art and science when considering the fluid mechanics involved in commercial aircraft during cruise flight, with average conditions being -55OC, 1/5 PAtm, and under variable precipitation. It is noteworthy to mention here that the speed of these aircraft is about 800 km/h, and with a relatively lower oxygen ratio, strong wind shears are another other phenomena which aircraft must bear while providing a smooth and comfortable journey for passengers. Since the aircraft operating environment is severe as highlighted, any failure in any of the parts and/or components significantly jeopardizes safety. This failure may originate from a fatigue fracture or a systematic phenomenon.

There are some iconic accidents in aviation history that occurred due to structural failure which resulted from aircraft fatigue damage. For example, the incident with flight 243 that occurred on April 28, 1988 with a Boeing 737-200 type aircraft, that took off from the city of Hilo, Hawaiian Islands, to the city of Honolulu. While the aircraft was climbing to cruising altitude, an explosive decompression was experienced. According to the National Transportation Safety Board (NTSB) report, approximately 18 feet of the cabin skin, structure aft of the cabin entrance door, and above the passenger floor-line separated from the aircraft as shown in **Figure 1**.

Due to the sudden pressure change caused by the explosive decompression, one flight attendant was swept overboard, and 7 passengers and 1 flight attendant suffered serious injuries. The crack originated by fatigue failure on the fuselage lap joints was the core reason for the accident (NTSB, 1988). It is important to mention here that controlling the structurally decomposed and fragmented aircraft could have only been achieved by highly skilled heroic pilots. The passengers were lucky because heroic and highly skilled pilots were in the cockpit that day. Otherwise, the scenario could have been much worse because 89 passengers were on board.

Although the 1988 Aloha Airlines incident is the most well-known failure-oriented accident, long before a De Havilland Comet had crashed into the sea due to cabin joint part failure, on January 10, 1954 (Withey, 2019).

On April 17, 2018 Southwest Airlines flight 1380, a Boeing 737-700 experienced a failure of the left CFM International CFM-56-7B engine and the loss of an engine inlet and cowling during its climb about 30 minutes into the flight. Fragments from the engine inlet and cowling struck the wing, fuselage and a window resulting in rapid depressurization. The

Figure 1. The 1988 Aloha Airlines Incident Occurred due to Lap-Joint of Fuselage Fatigue Failure

flight crew conducted an emergency descent and diverted into Philadelphia International Airport (KPHL), Philadelphia, Pennsylvania. Of the 144 passengers and five crewmembers onboard, one passenger received fatal injuries and eight passengers received minor injuries. The plane landed safely. The NTSB stated that a fan blade had broken off, apparently because of metal fatigue (NTSB, 2019).

These accidents and many others prompted many studies in the field of fatigue failure. These studies have led the way to a much better understanding of fatigue science with the benefit of fracture mechanics to evaluate the life of airborne components and structures.

Hence, so far, many investigations have been conducted to explore fatigue fracture and to reveal wear prediction of aircraft parts and components. Scientists and researchers have conducted many laboratory studies, inspections, and field surveys in order to take a preventive approach against aircraft accidents involving fatigue fracture (Campbell & Lahey, 1984). Especially some investigations have focused on the riveted lap-joints as this was the core reason of the 1988 Aloha

Figure 2. Fatigue Failure Under Repetitive Forces Demonstrated with Newton's Cradle

Airlines accident and other fatigue failure-oriented accidents (Newman & Ramakrishnan, 2016). The common conclusion of these studies has emphasized that generally fatigue fractures originate from repeated exposure to forces and vibrations.

In time, studies on fatigue failure have shown that there is a natural correlation between fatigue and vibration. While classic significant theorems imply implicitly that material under cyclic loading behaves stable after only one or two loading cycles, the experimental investigations show that stable cycles can be reached only after several loading cycles and sometimes only asymptotically. Eventually, fatigue failure is the result of the progressive and localized structural damage that occurs when a material is subjected to repetitive or fluctuating cyclic loading as it is depicted as Newton's Cradle in **Figure 2**.

The culmination of this occurs when fatigue nucleation channels the fracture and hence cracks. It is relevant to note here that the cracks propagate under either high level or low-level loading.

If we look at the history of various failure fatigue studies, we can see that the fatigue phenomenon was first recognized in 1937 by a civil servant Wilhelm Albert during tests that he performed for conveyor chains. He released the results of the tests in Clausthal/Germany. The conclusions of his studies indicated that failure was originating from repetitive loading (Schültz, 1996). The term of "fatigue" was first used in print in 1854 (Pook, 2007). Fatigue can be described as a failure process propagated by the effect of linear and cyclic repeated loadings. At a certain stress level below the monotonic yield strength of the material, a failure can be nucleated (Schijve, 1988).

To illustrate this concept in a simplified case, the obtained force can be determined using Newton's formula (F =ma) by summing all the accelerations imparted to the air. Dependently, every object in the aircraft experiences a force equal to the object's weight times the aircraft load factor. This situation creates additional stresses throughout the aircraft, which must be determined. It is noteworthy that, the weight of the wing structure will produce torsional loads on the wing in addition to the aerodynamic torsional loads. Besides four basic forces (Lift, weight, thrust, drag) the stress forces and loadings acting on the aircraft are depicted in **Figure 3**.

A tangential acceleration force is generated throughout the aircraft by a rotational acceleration such as caused by a gust, a sudden elevator deflection, or by the nose-wheel impact. Inertial loads due to rotation must also be considered. For example, the tip tanks of a fighter aircraft rolling at a high rate will experience an extreme outward centrifugal force. This centrifugal force produces an outward load factor equal to the distance from the aircraft e.g.

times the square of the rotation rate, divided by "g". As it was stated in the beginning of this paper, aircraft operate

under extremely difficult conditions. It should be also highlighted that the loads produced by vibration and flutter are acceleration forces of a special nature (Raymer, 1992). Obviously, random vibration levels for steady-state flight conditions and various flight maneuvers differ due to external and internal impacts. The stress load varies depending on the flight stage, payload, command characteristics of the cockpit crew, configuration, and environmental effects such as meteorological conditions.

So far it has been stated that repeated loads and random vibrations may likely be the core of fracture failure. It should also be underlined that vibrations vary in accordance with different flight phases as mentioned above. In order to illustrate flight stages, we can review a plain flight profile which can be divided into some stages such as ground operations before take-off, take-off roll, departure, climb, cruise, descent, approach, landing roll, ground operations after landing as it is shown in **Figure 4**.

Every flight stage has its own characteristics and also has its own unique stresses load as it is demonstrated in **Figure 5**.

These loads also vary structurally. For example, a change in the vibration due to a pitch input indicates

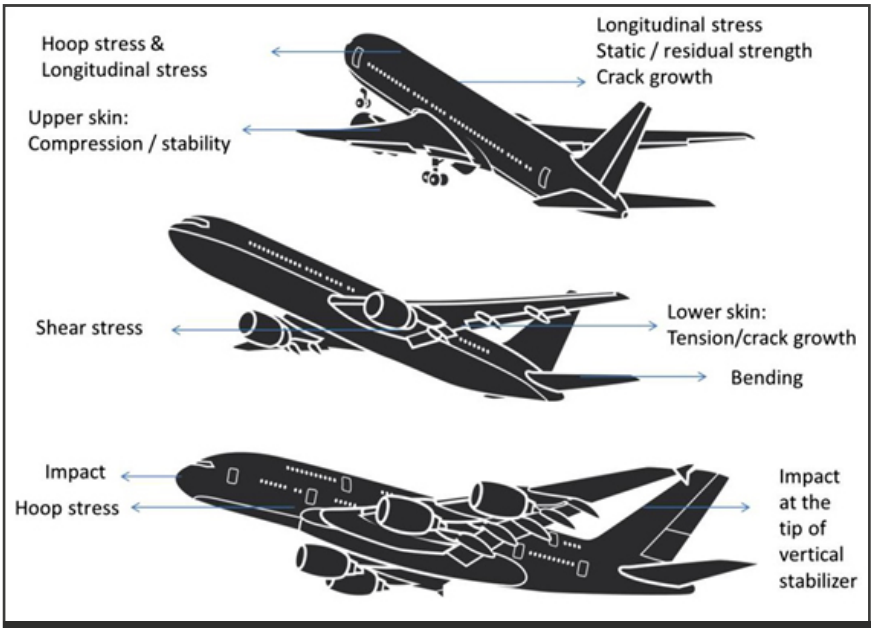

Figure 3. Stress Forces of an Aircraft (Wanhill, 2014)

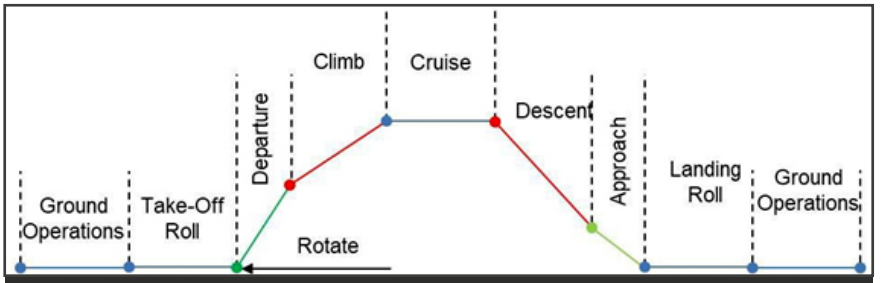

Figure 4. The Phases of a Flight (Dorfling, 2007)

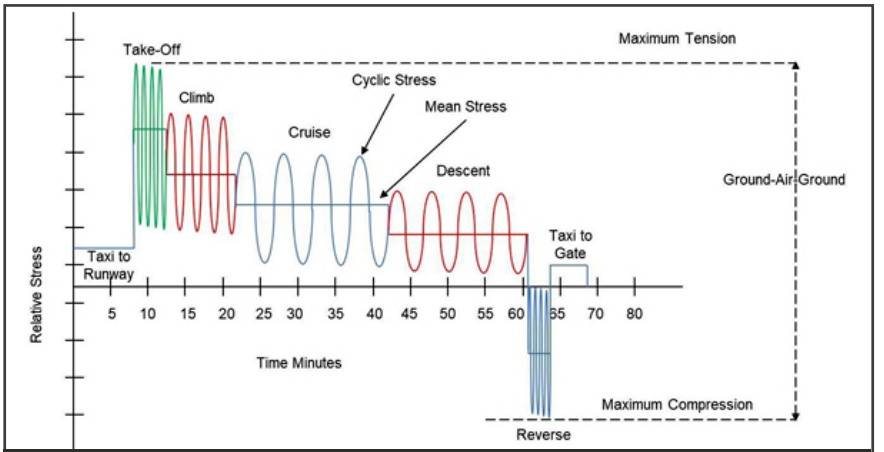

Figure 5. Representation of the Vibratory Stress Cycles for Each Flight Stage (Adapted from FAA) (FAA, 2001)

that the elevator is the most likely source of vibration. A change in the vibration due to a yaw input indicates that the rudder is the most likely source of vibration. And finally, a change in the vibration due to a roll input primarily indicates that the vibration is coming from the ailerons. In **Figure 6**, the vibration percentage

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of moveable control surfaces is shown on the Airbus A-320. In general, the moveable parts are attached to the fuselage with hinges. In general, the aircraft manufacturers also create checklists such as the Vibration Reporting Sheet (VRS) (Airbus, 2017).

The many studies regarding the correlations between rigidity and fatigue damage change in composite structures have concluded that the change in the rigidity of the composite structures helps provide critical information about their structural status (Verma Rahul, 2019). This critical information can be used for the early determination of fatigue nucleation. It is noteworthy to mention that Prognostics Health Management (PHM) and Structural Health Monitoring (SHM) systems provide better prospects for early warning of potential cracks. It is important to evaluate the performance under an expected condition to reduce unexpected failures and to plan maintenance activities so that they do not disrupt operations (Nuwan Munasinghe, 2019).

With the development of additive manufacturing technologies, many scientists are conducting research on fatigue-sensor-embedded aircraft structural parts. In general, these sensors are strain-gauge type. Before additive manufacturing technologies, those strain-gauges were manufactured separately, and they were conglutinated on the fuselage in the maintenance shops or manufacturing lines. The conventional strain-gauge technology has limitations including surface preparation and special adhesives that can delaminate under the aforementioned vibration conditions.

Figure 6. The Main Sources of Vibration on the A320 Family Aircraft (Airbus, 2017).

Figure 7 illustrates the steps from the fatigue-failure sensor-embedded structural part to the end-evaluator of a trend monitoring the system architecture

For sure, in the future with the help of additively manufactured smart structural parts, the fatigue failure data will be transferred from their in-situ origins. As shown in **Figure 7**, this data will be used proactively to ensure aviation safety. The information will be evaluated in real-time for the determination of remaining life, time-to-failure, and probability of failure as well

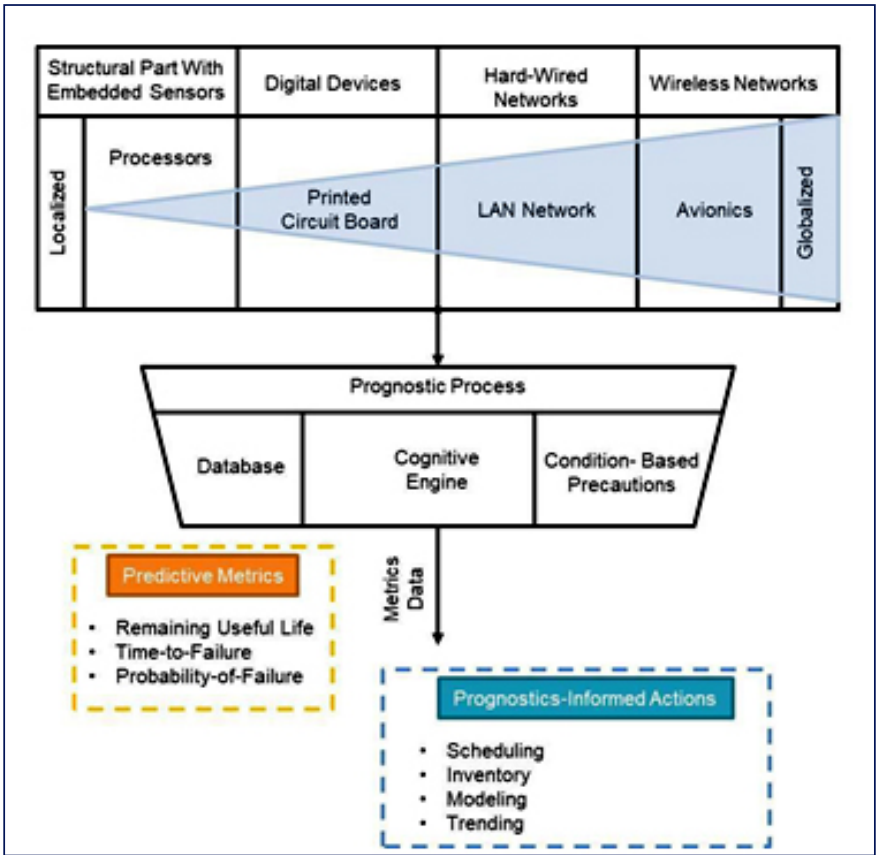

Figure 7. The Illustration of a Typical SHM Architecture (Vohnout, Kenneth, & James, 2019)

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Performance of Airports in Turkey During the Normalization Process

by Muhammed Yılmaz

Due to the pandemic, on March 28th all international flights from Turkey were cancelled and on April 4th all domestic flights were completely suspended. Scheduled flights could not be conducted for nearly 2 months, and during this period airports hosted only a designated number of evacuation flights and cargo flights. With the implementation of a process called controlled normalization, domestic flights in our country were launched on June 1st and on June 11th international flights started again gradually.

Turkish Airlines conducted its first international flight to Düsseldorf from Istanbul Airport and its first domestic flight to Ankara Esenboğa Airport. Pegasus Airlines, on the other hand, realized its first domestic flight to Izmir and its first international flight to Cologne. The first international flight from Istanbul Sabiha Gökçen Airport was carried out by Anadolujet Airlines with a flight to London.

At this stage, the number of Turkish Airlines' destinations increased to 222 on the flight schedule for September, and according to its flight plans for September, Pegasus Airlines is available to fly to 63 destinations in 42 countries.

As the whole world pursues its fight against the Coronavirus pandemic with considerable determination, many ambiguities remain for those wishing to travel. Presently, as per the decisions adopted by the governments in line with the course of the pandemic, there are no exact guidelines or processes for traveling around the world. Even members of the European Union impose different sets of rules and implementations for visitors. Therefore, particularly the number of international flight passengers is far below the expected level. The market for domestic flights has shown a slight improvement across the world.

Performance of our airports June 2019 & June 2020

The best source from which to analyze patterns of passenger air travel in Turkey during the controlled normalization process is the monthly aircraft, passenger and air freight statistics of the General Directorate of State Airports Authority.

Flights were relaunched in June after a suspension of two months and during this month domestic passenger traffic via airports in Turkey reached 2,403,971 where the number of international flight passengers was just 366,448. Throughout the month, including the direct transit passengers, the total passenger traffic has reached 2.750.992.

To interpret these figures, we should take a closer look at the figures of June 2019. During that period, domestic passenger traffic at airports in Turkey was 9,080,111 and international passenger traffic was 11,504,383. Including direct transit passengers, the total passenger traffic was 20,606,926. According to these figures, there was a decrease of 75% in the number of domestic passengers in June, and a 97% decrease in the number of international passengers, compared to the same period of the previous year. In other words, it is possible to say that airline travel tendencies of passengers have not been high during the process of controlled normalization.

In June 2020, the number of aircraft arrival/departure at airports in Turkey was 38,550 via domestic lines and 8,210 via international lines. Services were provided to a total of 55,814 aircraft, overflights included.

On the other hand, in June 2019, the number of aircraft arrival/departure at our airports was 73,487 via domestic flights and 73,476 via international lines. The total number of aircraft traffic reached 188,153 in that period. The sharp fall in aircraft traffic compared to the previous year clearly reveals the decline in the number of passengers. It is possible to observe through these figures the inability to launch flights to many countries in June and the gradual increase of frequency in domestic flights.

Air freight traffic (cargo, airmail and luggage) at our airports reached a total of 115,173 tons in June 2020; 25,925 tons carried on domestic lines and 89,248 tons on international lines. In 2019 during the same period, the total weight of air freight carried was 257,106 tons, consisting of 70,131 tons carried on domestic flights and 186,975 tons on international flights. There has been a significant decrease in air freight which coincides with the decrease in passengers due to the pandemic. Although airline companies have tried to survive by conducting more air freight operations, some even reconfiguring many of their planes to carry a maximum amount of freight, overall air freight weight figures have still dropped by 55% due to the impact of reduced commercial flights on overall air freight operations.

	Turkey Total		İstanbul Airport		Sabiha Gökçen Airport		Ankara Esenboğa Airport		Antalya Airport	
	Domestic	International	Domestic	International	Domestic	International	Domestic	International	Domestic	International
2019 June	9.080.111	11.504.383	1.653.878	4.330.361	1.879.103	1.191.147	968.685	208.054	624.148	4.131.085
2020 June	2.403.971	246.448	455.528	149.134	451.725	60.733	164.457	22.868	113.225	25.754
Rate of Change (%)	73,5	97,0	72,5	96,6	76,0	94,9	83,0	89,0	81,9	99,4
2019 July	9.122.161	12.897.411	1.519.052	4.681.166	1.977.680	1.363.690	968.353	253.323	670.750	4.748.340
2020 July	4.608.184	1.614.484	805.184	594.831	968.049	257.571	311.049	65.318	257.046	360.294
Rate of Change (%)	49,5	87,5	47,0	87,3	51,1	81,1	67,9	74,2	61,7	92,4
2019 August	9.115.332	14.115.749	1.507.952	5.256.869	1.988.353	1.441.271	952.307	282.377	661.478	4.932.588
2020 August	5.758.283	3.810.011	864.751	1.084.018	1.376.564	436.598	392.386	80.326	353.861	1.403.377
Rate of Change (%)	36,8	73,0	44,0	79,4	30,8	69,7	58,8	71,6	46,5	71,5

Controlled normalization failed to prevent the sharp decline

In June, when the controlled normalization process started, total arrival-departure flight traffic via the Istanbul Airport reached 7,068; 4,100 on domestic lines and 2,968 on international lines. Total passenger traffic reached 604,662; 455,528 on domestic lines and 149,134 on international lines.

Referencing Istanbul Airport's June 2019 performance, total arrival-departure flight traffic was 38,001 composed of 10,675 arrivals/departures on domestic lines and 27,326 arrivals/departures on international lines. The passenger traffic on domestic lines was 1,653,878 and 4,330,367 on international lines, which equates to a grand total of 5,984,245 passengers that passed through the airport in 2019. The jaw-dropping difference between the figures from June 2019 and June 2020, a decline of almost 90% at Turkey's greatest center of aviation, clearly illustrates the devastating effects of the pandemic on the sector.

1,879,103 domestic flight passengers and 1,191,147 international flight passengers were hosted in June 2019 at Istanbul Sabiha Gökçen Airport. Whereas in June 2020, the airport hosted 451,725 domestic flight passengers and merely 60,733 international flight passengers. The massive difference between the numbers of passengers at this airport, which typically has Turkey's highest number of domestic flight passengers and is considered to be the heart of Pegasus Airlines, clearly reveals signs of the sector's vulnerability.

Sabiha Gökçen Airport

June 2020 performance of the Ankara Esenboğa Airport was quite low as well. In June 2019, the airport hosted 968,685 domestic flight passengers and 208,054 international flight passengers. Upon the launch of controlled normalization in June 2020, Esenboğa Airport served 164,457 domestic flight passengers and 22,868 international flight passengers. Again, the June 2019 and June 2020 numbers demonstrate that Ankara, the capital of Turkey, lost 83% of its domestic flight passengers and around 90% of its international flight passengers.

Turkey's most popular and significant summer destination Antalya hosted a total of 624,148 domestic flight passengers and a record-breaking number of 4,131,085

COVID-19 Social Distancing Measures, Sabiha Gökçen Airport

international flight passengers in June 2019. The figures we come across for June 2020 are without doubt quite different. 113,225 domestic flight passengers and only 25,754 international line passengers flew to Antalya Airport during June 2020. Hence, Antalya saw one of the most dramatic declines.

Performance of our airports July 2019 & July 2020

The COVID-19 pandemic caused an abrupt slowdown in the global aviation sector, yet in July the domestic market regained dynamism. The physical conditions of airports across the globe were rearranged according to social distancing measures and stringent disinfection processes continued uninterruptedly as part of the COVID-19 Free Airport project, and in this way in July the number of passengers travelling by plane and passing through our airports reached 6 million 224 thousand.

Throughout the month, the number of domestic flight passengers was 4,608,184 and international flight passengers reached 1,614,484 at airports across Turkey. Accordingly, the total traffic of passengers including direct transit passengers was 6 million 224 thousand 921 in July 2020.

Istanbul Airport

In July 2019, the traffic of domestic flight passengers via Turkey's airports came in at 9,122,161 and international flight passenger traffic was 12,897,411. Therefore, the number of domestic flight passengers decreased by nearly 50% and the number of international flight passengers dropped by 90%, compared to the same period of the previous year.

The number of arriving/departing aircraft at our airports in July 2020 was 61,002 on domestic flights and 19,166 on international flights. The total aircraft traffic, including overflights, was 92,192. However, in July 2019, 79,311 aircraft traffic was comprised of domestic flights and 83,547 were international flights, adding up to 207,518 in total aircraft traffic.

The decrease in air freight displayed a slight recovery in July 2020. During July, a total of 196,621 tons of air freight traffic composed of 50,719 tons on domestic flights and 145,902 tons on international were realized. While in July 2019, air freight traffic had reached 279,632 tons, consisting of 76,452 tons on domestic and 203,180 tons on international flights.

In July 2020, the number of domestic flight passengers came in at 805,184 and the total


COVID-19 Social Distancing Measures, İstanbul Airport

Antalya International Airport

number of international flight passengers was 594,831 at the Istanbul Airport. During the month of July, a total of 1,400,015 passengers used the airport. In July 2019, the number of domestic flight passengers was 1,519,052 and the total of international flight passengers was 4,681,166. The airport served a total of 6,200,218 passengers throughout the month of July,2019.

At Istanbul Sabiha Gökçen Airport, 1,977,680 passengers were hosted on domestic lines and 1,363,690 passengers on international lines in July 2019. However, in July 2020, domestic lines hosted 968,049 passengers and international lines merely 257,571 passengers. Despite the major fall in the figures compared to the statistics of the previous year, it can be seen that in July 2020 the number of passengers at Sabiha Gökçen Airport doubled in domestic lines and quadrupled in international lines compared to just a month prior, June 2020.

Having hosted 968,353 domestic flight passengers and 253,323 international flight passengers in July 2019, Ankara Esenboğa Airport served a total of 311,049 domestic flight passengers and 65,318 international flight passengers in July 2020. Compared to June 2020, the number of domestic flight passengers at Esenboğa Airport doubled while the number of international flight passengers tripled.

In July 2019, Antalya Airport hosted 670,750 domestic flight passengers and 4,748,340 international flight passengers. In July 2020, 257,046 domestic flight passengers and 360,294 international flight passengers flew to Antalya Airport. Similar to other airports,

COVID-19 Social Distancing Measures, Antalya International Airport

managing to double its average domestic flight passengers in July and June, Antalya Airport increased its number of international flight passengers by approximately 15 times compared to the previous month upon the relaunch of the charter flights in June, particularly from Russia. This increase has been way over the increases in passenger numbers at all other airports in Turkey. Despite all these achievements, the airport failed to reach the passenger figures of the previous year.

Performance of Our Airports in August 2019 and August 2020

The mobility that started at the airports in our country in July also continued in August. As part of the COVID-19 Free Airport project, the number of domestic passengers was 5,758,283 and the number of international passengers was 3,810,011 in August 2020 at airports where physical conditions were rearranged according to social distancing measures and where the disinfection processes had continued uninterruptedly. Thus, the total passenger traffic, including direct transit passengers, was recorded as 9,573,876 throughout the month.

In August 2019, domestic passenger traffic at airports across all of

Turkey was 9,115,332, international passenger traffic was 14,115,749, and the total passenger traffic was recorded as 23,262,843, including direct transit passengers. Despite the recovery trend, it is evident that the number of passengers is far from the figures of the same period of the previous year. Considering the figures of this year and August 2019, the number of domestic passengers at our airports has decreased by around 40% and the number of international passengers nearly by 75%.

The number of arriving/departing aircraft at our airports in August 2020 was 69,389 on domestic flights and 32,041 on international flights. The total aircraft traffic, including overflights, was 115,913.

In August 2020, the number of arriving/departing aircraft at our airports was 76,699 on domestic flights and 86,019 on international flights. Throughout the month, the total aircraft traffic, including overflights, was 207,239.

The recovery trend in air freight continued in August. In August 2020, the total air freight volume was 240,246 tons, with 65,274 tons on domestic lines and 174,972 tons on international lines.

Antalya Airport

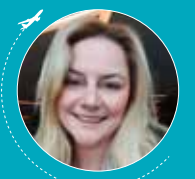
The air freight performance in August 2019 was 354,078 tons in total, with 92,033 tons on domestic lines and 262,045 tons on international lines.

In August 2020, the number of total passengers at the Istanbul Airport was 1,928,769; 844.751 of which were domestic flight passengers and 1,084,018 were international flight passengers. In August 2019, the number of domestic flight passengers was 1,507,952 and the number of international flight passengers was 5,256,869. The airport served a total of 6,764,821 passengers throughout the month.

At Istanbul Sabiha Gökçen Airport, 1,988,353 passengers were hosted on domestic lines and 1,441,271 passengers in international lines in August 2019. However, in August 2020, domestic lines hosted 1,376,564 passengers and international lines merely 436,598 passengers. The increase, compared to July 2020 figures, in the number of international passengers at Sabiha Gökçen Airport, which is far below compared to the same period of the previous year, is also noteworthy.

Having hosted 952,307 domestic flight passengers and 282,377 international flight passengers in August 2019, Ankara Esenboğa Airport served 392,386 domestic flight passengers and 80,326 international flight passengers in August 2020. Compared to June, there was a slight increase in the number of domestic and international flight passengers at Esenboğa Airport.

In August 2019, Antalya Airport hosted 661,478 domestic flight passengers and 4,932,588 international flight passengers. In August 2020, 353,861 domestic flight passengers and 1,403,377 international flight passengers flew to Antalya Airport. The number of domestic passengers continued to increase in August, but the significant increase was seen in the number of international passengers at Antalya Airport. The number of international passengers hosted throughout August was 40 thousand, which is just less than the total number of international passengers hosted in the first 7 months of 2020. In other words, within just the month of August, the number of international passengers has doubled the total from the first 7 months of this year. However, these figures, in any case, are far below the number of passengers we are used to seeing at Antalya Airport, especially during the summer season



by Şebnem Akalın

Crew Uniforms Designed with Innovative New Antibacterial & Antiviral Textiles by Keyvan Aviation

During the Pandemic, protecting the health of critical staff such as healthcare workers or pilots & cabin attendants has been a top priority for decision makers. The real solution is obtaining quality professional protective gear for these higher risk jobs. But how well do certain materials protect and what products are out there now? Many innovative companies are working hard to eliminate the invisible enemy, and to help protect our real heroes from the virus. In this exclusive interview, we talk with Mr. Mehmet Keyvan CEO of Keyvan Aviation about the antibacterial & antiviral flight crew uniform developed and manufactured by Keyvan Aviation.

Enjoy it...

Şebnem Akalın: Mr. Keyvan, thank you for the interview. Can you tell us about yourself and your background in the aviation industry?

Mehmet Keyvan: Thank you very much for this opportunity to be in your magazine. I am an avionic engineer. I started my career in aviation 20 years ago. Focusing on cabin interior design and modification projects, during these years I did a lot of projects for business jets and commercial airliners. While doing consultancy service for the owners of these aircrafts and high-net-worth individuals, I became interested in fashion in aviation, so I decided to start a new company focusing on aero fashion to provide the aviation industry with fashionable uniforms and unique designs for

business jets. There is no fashion company providing uniforms for cabin crews and most of the airlines are looking for well-known fashion freelance designers for their uniforms. We therefore decided to establish an aero fashion department comprising an inhouse design team with a strong supply system to create a professional, fashionable and elegant look for the crew as well as taking care of their comfort, safety and efficiency.

Şebnem Akalın: Keyvan Aviation has produced the first antibacterial and antiviral flight crew uniform in the world. Can you please share details about the properties of this uniform and other products developed by your company?

Mehmet Keyvan: The first idea of the company was to offer fashion for the aviation industry but due to Covid 19, we tried to respond quickly and prepare ourselves to support the airlines industry with a new product. While we were searching to find the best solution for our product, we discovered that the virus and bacteria easily spreads through the surfaces of textiles. Preventing this would help minimize the risk of infection. Since flight and ground crews deal with lots of people during their duty, having a design to cover their body and to also be comfortable offers them a convenient environment to perform their duty. The key benefit of this product is to help airlines manage their cost and care for sustainability. We considered all of these factors and it led us to design full body cover antibacterial and antiviral uniforms which use more natural fabric and offer breathability, comfort and skin friendly features. Wearing the antibacterial and antiviral uniforms protects you from carrying the virus and the bacteria, so when you are in a public transport airport area or inside airplanes, the risk of carrying virus and bacteria decreases 99.99%.

All features are tested by related standards in accredited laboratories in Turkey and internationally.

We also offer a COVID-free label for clients wanting to inform the passengers that they already upgraded their uniform to a higher level.

Mehmet Keyvan

Şebnem Akalın: Have any airlines started using these uniforms? If not yet, will we see these uniforms in use in the near future?

Mehmet Keyvan: Since we have just launched the product, we are still in the proposal stage with airlines but hopefully we will see uniforms in use in the air in the very near future. The Covid 19 situation is causing airlines around the world financial difficulties and as this product is less about luxury and mainly about keeping people safe, and we are discussing with our customers how to support them in these difficult days. I am glad to say that there is good potential in this market, and we intend to make Turkey a leader for this requirement. We have also received very positive responses from aviation professionals around the world. It has made us very happy and we are proud of our team.

Şebnem Akalın: Your company develops uniforms, specifically Crew uniforms. Is there a possibility that Ground Handling operations will also be able to use your products?

Mehmet Keyvan: Yes, our product is designed for airports and airline users and it is possible to use it in these sections. Our design team is available to review the requirements and prepare specialized designs based on requirements.

Şebnem Akalın: Can you tell us more about your future plans?

Mehmet Keyvan: Keyvan Aviation is the first to introduce such uniforms in the industry. From idea generation to creation of the product, Keyvan Aviation's products are 100% Turkish made. Our main goal is to be the market leader in aero fashion products and support worldwide aviation customers with our 100% Turkish made products. We hope that after this crisis airlines will start operating normally again and we can support them with more fashionable looks to enable them to welcome their passengers on board with distinctive style. This will be a strong message for Turkey which is historically and traditionally strong in the textile and fashion industries.

Şebnem Akalın: Thank you for your time and the interview Mr. Keyvan. Is there anything else that you would like to add in closing for Aviation Turkey readers?

Mehmet Keyvan: We are all passing through very difficult times for the aviation industry. We need to support each other as members of this worldwide community and try to rebuild passenger trust. Then, we will see an increase in flights and the airlines will grow. Keyvan Aviation strives to play its role in the industry and supports airlines and airports with its products. We all hope to see good days ahead for the aviation industry soon

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BUILD CONNECTIONS. DO BUSINESS. MAKE FRIENDS.

737 MAX Preps to Fly Again with New Name!

by Muhammed Yılmaz

Upon the completion of the examination on the safety of 737 MAX aircraft, the U.S. Federal Aviation Administration (FAA) announced that there were no obstacles to conduct the flight tests and Boeing authorities took relevant action accordingly.

Boeing 737 MAX aircraft were involved in two fatal accidents that killed 346 people within five months, and the entire fleet has been grounded across the world since March 2019. The flight tests that constitute the most critical step of the certification process required to get the aircraft reunited with the skies again were conducted in Seattle in the last days of June.

Throughout the 3 days of flight tests, the pilots tested flight maneuvers and emergency procedures required for testing whether the modifications on the automatic flight control system fulfilled the standards of FAA certification. In order to test the software update on the MCAS system that had caused both accidents, the pilots, during the flight tests, observed the nose-down behaviors of the airplane depending on the angles of attack.

In its original design, the MCAS was built in a way to pull the nose of the airplane down when the sensors transmit data on high degrees of attack angles, without requiring any intervention of the pilots, for the prevention of aerodynamic stall. In the revised version of the software, the system enables a single nose-down trim and leaves the control to the pilots.

When will the 737 MAX be back in the skies?

Successful flight tests alone do not signal that the 737 MAX airplanes will be up in the skies again. A new process has been launched for the detailed analysis of the data collected during the flight tests and the modifications on the aircraft. The safety experts of the FAA will be approving the airworthiness of the 737 MAX after making sure that the aircraft are fulfilling the certification standards.

During this process, FAA officials will be reviewing the minimum requirements for the training of the pilots and examine the final design documents of the Boeing in evaluation of the aircraft's compliance with all FAA regulations.

The certificate of airworthiness that reveals all required corrective measures in detail for the operators will be issued for the return of the aircraft to commercial service. Boeing is estimated to have lost over US$ 20 billion due to the 737 MAX crisis.

Boeing stocks rising along with the flight tests

The very idea of 737 MAX flying again has caused excitement in the aviation industry. Boeing stocks rose 14% on the New York Stock Exchange on the day of the first flight test (29 June 2020). The stocks of Spirit

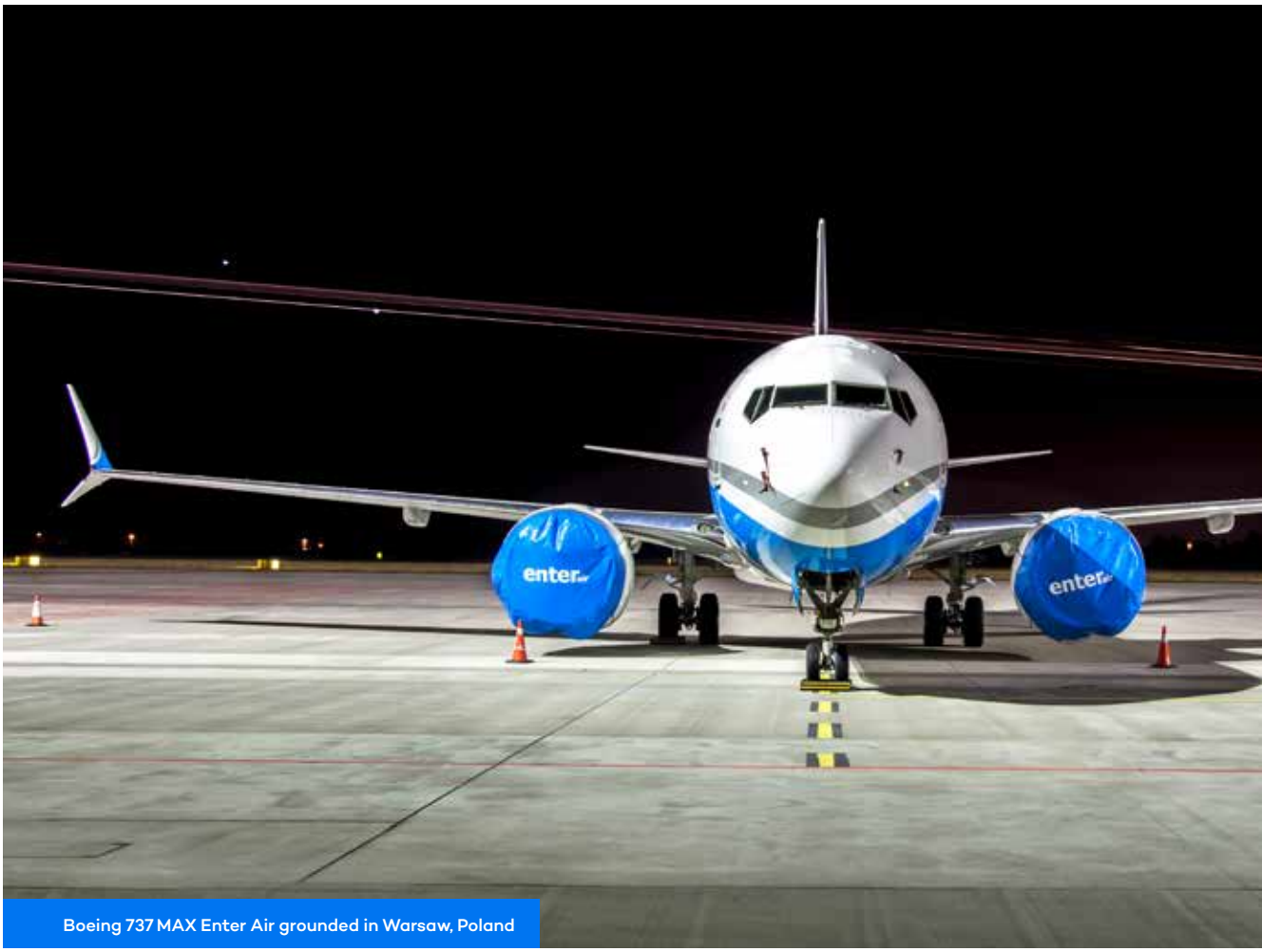
Boeing and the Federal Aviation Administration (FAA) have completed a series of certification flight tests on the Boeing 737 Max at the beginning of July.

AeroSystems, one of the most prominent suppliers of 737 MAX manufacturing many components of the aircraft, the airframes in particular, rose by 17%. Another supplier, Triumph Group's stocks rose by 18% as well. On the same day, the stock value of the most significant customer of 737 MAX aircraft, Southwest Airlines, also increased by 10%.

FAA administrator to fly with the 737 MAX

The Administrator of the Federal Aviation Administration (FAA) Stephen M. Dickson is quite cautious about the re-certification of the Boeing 737 MAX. The fact that the aircraft could be re-certified upon a comprehensive and rigorous review process is persistently underlined. The execution of flight tests, fulfilling the training needs of pilots, and revision of all final design documents have been emphasized repeatedly for the re-certification of 737 MAX. Dickson gave his word to operate the airplane in person and stated that first, he must be persuaded to fly the aircraft before lifting the ban. Besides, the pilots will have completed a new training process before the relaunch of the plane.

Stating that all approval processes regarding the 737 MAX were being controlled



Boeing 737 MAX Enter Air grounded in Warsaw, Poland

entirely by the FAA and that this authority has not been transferred to Boeing, Dickson declared that the FAA has been entitled to grant the airworthiness certificates for all new 737 MAX aircraft manufactured since the grounding of the aircraft.

Every country to decide on its own

Even though the FAA's execution of the flight tests for re-certifying the aircraft has been regarded as a step towards the relaunch of the aircraft into operation, the U.S. authority previously commented that "every country will be making its own decision" on putting the 737 MAX aircraft into service again. Within this scope, Canada's national authority in charge of monitoring air transportation policies and programs, Transport Canada, took action to run its own flight tests on the Boeing 737 MAX.

The tests conducted at Boeing's facilities in Washington State have been a part of the Canadian authority's "independent review" on suggestions on the modifications in line with the main framework designed by the FAA which is to be accomplished by Boeing.

This step taken by the Canadian authority has been followed by the European Aviation Safety Agency (EASA). The European authority started to run its independent tests on the modifications of the Boeing 737 MAX in Vancouver, Canada, on September 7th,2020.

Upon the completion of the EASA's tests, the officials of the EASA and the authorities in Canada and Brazil will gather and work on the required changes in pilot training for the renewed 737 MAX. Recommendations will be shared with Boeing by the Joint Operations Evaluation Board. This is expected to be conducted with the utilization of simulation applications with the participation of pilots from all related countries.

In addition to the revision of the modifications and the updates to the 737 MAX's flight safety software, after the revision of pilot training protocols, the FAA is expected to call for the relaunch of the aircraft into service, unless there are new concerns about flight safety.

Despite Boeing's previous statement announcing the continuation of deliveries in the last quarter of this year, 737 MAX aircraft are not expected to be put into commercial service before 2021.

Many order cancellations!

Despite the execution of the flight tests that are a massive step for the relaunch of the aircraft, the U.S. manufacturer Boeing was hit with a new wave of 737 MAX order cancellations.

As of the week of flight tests run by the FAA, Norway's low-cost airline Norwegian canceled its order for 92 Boeing 737 MAX aircraft with the list price of US$ 5.5 billion and announced that it will be filing a claim for compensation against Boeing for financial damages that occurred during the period where the 737 MAX aircraft were grounded. Not 24 hours after the news, Singapore based chartering company BOC Aviation announced cancellation of their order for 30 737 MAX aircraft adding that it was going to postpone some of the planned deliveries as well. Within the next few days, another chartering company Avolon declared that it canceled the order placed for 27 737 MAX aircraft. Avolon had canceled the order placed for 75 737 MAX during the first quarter of 2020.

The management of flyDubai, which is the second-biggest customer of 737 MAX and Civil Aviation authorities of the UAE are discussing the relaunch of Boeing 737 MAX to service and whether or not they should operate with these aircraft.

First order placed for 737 MAX after 9 months

As U.S. manufacturer company Boeing has been going through difficult times due to cancellations on bulk orders for the 737 MAX, Poland's greatest charter airline Enter Air made an interesting decision and ordered 2 Boeing 737 MAX aircraft. The entire fleet of this airline is composed of 737 aircraft, and Enter Air once again proved its loyalty to the Boeing 737 group with its recent two orders, providing relief for Boeing. These two new orders are important as they are the first orders placed for the 737 MAX since November 2019.

The 737 MAX won the title of the quickest sold aircraft and the most sold aircraft throughout Boeing's history on account of over 500 orders received in a brief amount of time and the total amount of the orders placed for the aircraft as of the end of July 2020 appears to be slightly over 4,000. Customers canceled over 400 orders placed for the 737 MAX in the first seven months of 2020. In that period, the total number of canceled orders of 737 MAX and orders that were shifted to other models reached 864.

Will Boeing rename the 737 MAX?

Boeing management used the name 737-8 for the aircraft while declaring the new orders received from Poland after nine months without a single order. In this way, they publicly announced that they would not be using the name 737 MAX as the aircraft returns to the skies and that they would implement a name change for the aircraft as expected.

As it can be recalled, the idea of changing the name of the aircraft before the relaunch was initially brought up by U.S. President Donald Trump, and was backed by prominent figures in the sector, including Tim Clark - the experienced boss of Emirates. The representatives of the industry and airline owners, agreeing on the difficulty of convincing passengers to fly again with these airplanes, believed in the necessity of developing a new branding strategy in order to overcome this problem. Indeed, campaigns of passenger persuasion will begin only after rendering the aircraft entirely safe for operation

“Business Cockpit Interviews”

by Enes Kocatopçu

My name is Enes Kocatopçu and this year I graduated from Eskişehir Technical University, from the Department Aviation Management. During my university education, my aim was to learn and improve myself by accessing knowledge and by questioning, and also to mutually benefit from sharing what I learned with my social and professional environment. During my time at the university I volunteered for various scientific research teams and student clubs. Gaining knowledge is a precious journey, and I recently had the opportunity to have a conversation with an industry executive in the first edition of “Business Cockpit” Interviews, which gave me a glimpse into the field of aviation. I learned some new information and valuable insights about the future of aviation, which I am pleased to share.

Before I share the interview, let me provide background on how this interview series came to be. During my last year at university I met Mr. Can Erel, who is known for his military and civil aviation activities, but especially for his efforts and dedication to training and mentoring aviators of the future as an aeronautical engineer. We held meetings to participate in the @ Team project, which was planned and implemented at the beginning of the COVID-19 outbreak. A few weeks later, I learned that Mr. Erel was planning remote business conversations with aviation decision-makers under the title "Business Cockpit". He intended to prepare this project with a task group consisting of young aviators preparing to take part in the industry, and I became a volunteer candidate. After the necessary evaluations, I was very happy when I learned that I had been selected as the first member of that task group, as a fresh graduate from Department of Aviation Management and the Vice President of the School's Civil Aviation Club.

During our frequent meetings with Mr.Erel, he highlighted that air cargo, business jets, air ambulances, and general / sports aviation are areas that have serious development potential in the aviation industry, significantly affected by the COVID-19 pandemic. . I know that Can Erel was a member of the team to create the idea and strategize of my aviation school. During our meetings he has stated that the concept of the "Global Economy" and that its impact area would change with the effects of the COVID-19 pandemic. He said "Design and Production" oriented changes would occur in aviation as in every field, that the volume of business jets would grow more than expected. He wished to supply and put business jets into service with mobile EMS kits and start operating them in our country if he had enough capital. He then shared his idea “Business Cockpit Interviews”. We wanted our first interview to be on the subject of business jets and to associate it with China, which has the most significant development potential on a global scale, and it is one of the most ambitious regions in the field of "Design and Manufacturing."

I was given full support in this activity from my esteemed mentors; Mr. Hakan Çağlayan, Körfez Aviation Manager for business, and Dr. Ferhan Kuyucak Şengür, Professor, Department of Aviation Management of Eskisehir Technical University.

When we contacted Gulfstream Aircraft China General Manager Mr. Bin Zhang and with his positive response to the questions, we had prepared, the scope of our first e-interview finalized. I focused on this theme in my research afterwards. Our research showed that there are a total of 13 Gulfstream business jets in Turkey

consisting of 1 G450 and 3 G550s used by operators in general aviation, and 1 G-IV, 1 G150, 4 G450s, 2 G550s, and 1 G650 in the air taxi field used by seven operators. We conducted a detailed review Gulfstream Aircraft company and its products in this field. The company has been developing its product range, placing particular importance on technological superiority.

I had the pleasure of conducting an e-interview with Mr.Scott Neal, the Vice President of the company responsible for global sales, after the mid-term review silence of Gulfstream, a subsidiary of General Dynamics. The anticipated developments in the field of business jets attracted my attention also in this interview. I would like to thank Mr. Zhang, the company's corporate communications managers, and of course Mr. Neal and my mentors who made this interview possible. We wish you pleasant reading!

"Gulfstream Aircraft 2020"

with Scott Neal, Senior Vice President, Worldwide Sales, Gulfstream

Enes Kocatopçu (EK): Before the pandemic, how would you evaluate the business jet industry? What were the global trends in the business jet industry at that time?

Scott Neal (SN): Gulfstream entered the pandemic with an innovative product line, strong business and a great deal of interest in our products around the world, all of which have helped us weather the crisis. We are in a strong position thanks to our geographically diverse distribution of products, our unmatched customer service and outstanding support.

As far as trends, business-jet customers around the world are showing increased interest in the ultralong-range, large-cabin aircraft Gulfstream offers – the G500, G600, G650, G650ER and G700. This portfolio provides a compelling mix of range capabilities at high speeds, so customers can choose an aircraft that best fits their mission requirements.

We also see continued interest in our super-midsize G280 for customers who need a nimble aircraft for shorter trips and one that can access hard-to-reach airports and does so with the performance features of a large-cabin aircraft.

EK: How has COVID-19 affected the Business Jet Industry? How would you evaluate this effect on operators and private ownership?

SN: The COVID-19 crisis and its impact on travel really make the case for business aviation. Business-jet operators and passengers have much more control over schedules and routes as well as health and safety when traveling on a private jet.

EK: What has changed in the customer experience during COVID-19? In terms of customer experience, what changes do you expect in the business jet industry post-COVID-19?

SN: Customers have become increasingly interested in features of the cabin environment that enhance health and wellness. Gulfstream leads the industry in providing a healthy cabin experience with 100% fresh, never recirculated air, low cabin altitudes, whisper-quiet noise levels and an abundance of natural light thanks to Gulfstream's large, panoramic windows.

Gulfstream has recently added even more enhancements to the signature Gulfstream Cabin Experience with an air ionization system. Gulfstream's plasma ionization system, which operates whenever the aircraft environmental control system is active, works by emitting positive and negative oxygen ions that actively seek out and inactivate harmful molecules in the air and on surfaces.

The plasma system is available as a retrofit on the Gulfstream G650 and G650ER, G550, G450 and GV models, with

© Gulfstream Aircraft

Gulfstream G500

additional installation options pending foreign certification. International certifications are currently in development.

EK: Does Gulfstream plan to expand its service network (maintenance center) geographically?

SN: Over the past few years, Gulfstream Customer Support has been expanding significantly around the world, and we have recently seen a number of new service center openings. In July, our new service center in Farnborough, England, opened, following U.S.-based expansions in Savannah, Georgia; Van Nuys, California; and Appleton, Wisconsin.

These new expansions allow us to enhance service opportunities for our customers and construct even bigger hangars to accommodate the large-cabin Gulfstream aircraft that are in high demand around the world. The new facility at Gulfstream Farnborough, for example, can accommodate up to 13 G650, G650ER or G700 aircraft, once the G700 enters service.

EK: What do you think the most important difference is between you and your competitors?

SN: Gulfstream is a financially strong company, thanks to the backing of our parent company, General Dynamics.

With General Dynamics' support, Gulfstream has consistently invested in research and development that has allowed us to bring new technologies to the industry. The G500, G600 and G700 are the latest results of that research and development and feature the Symmetry Flight Deck, the most technologically advanced flight deck in the industry, with the only electronically linked

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Gulfstream_G280_Groun

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Gulfstream_G650ER_Ground

Gulfstream G700 Flight Deck ITF

Gulfstream_G500_G600_Production

active control sidesticks, most extensive use of touchscreen technology and the most robust data concentration network. These are all great safety differentiators for pilots and passengers.

EK: Is there a new Gulfstream aircraft model project in the near or far future?

SN: Our focus is to continue to deliver our outstanding products around the world, increasing deliveries of the G500 and G600 and continuing to progress the flight-test program of the new industry flagship G700.

EK: What would you say about the business jet industry in Turkey?

SN: Gulfstream has seen good interest from potential and existing customers in Turkey and is optimistic about the growth of the business-jet industry in the region. The market has responded well to Gulfstream's large-cabin, long- and ultralong-range aircraft offerings.

EK: Do you have any advice for the business jet industry in Turkey?

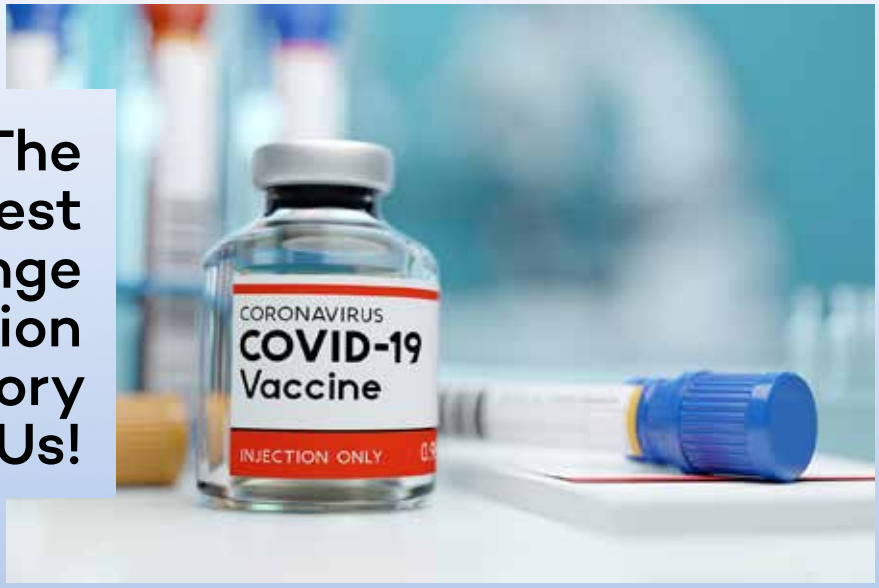
SN: As the world emerges from the COVID-19 pandemic, we expect the business-jet industry to see interest in flying privately increase. It's important to continue to innovate and ensure a solid support system and access for operators in the years to come

Biography of Scott Neal

Scott Neal has been senior vice president of Worldwide Sales since 2011. Before that, he was a top Gulfstream sales executive in the Eastern and Central United States sales regions.

In his earlier years at Gulfstream, Neal served in the pre-owned aircraft sales and sales engineering groups. Prior to joining Gulfstream, Neal held positions of increasing responsibility at Raytheon Corporate Jets and British Aerospace Inc.

The Biggest Challenge in Aviation History Awaits Us!



by Muhammed Yılmaz

The entire world is watching as numerous projects strive to develop vaccines against the new type COVID-19 virus. According to the World Health Organization, about 250 different vaccine development programs are currently underway around the world. However, finding a vaccine as well as distributing it worldwide will be a major operational undertaking.

According to a calculation made with the assumption that a single vaccine dose is sufficient for each person, it has been revealed that in order to ensure the worldwide distribution of vaccines for the world's population of 7.8 billion, it would be necessary to achieve 8,000 Boeing 747-400F equivalent (cargo aircraft) of flight capacity. Such figure would of course show upsurge, if people need more than one dose of vaccine.

If cold chain transportation is required for the vaccines (temperature between 2 to 8 degrees Celsius), some of the existing aircraft would be out of scope. If the vaccines must be transported in frozen form, the number of aircraft capable of performing this historic task would be far fewer. Considering that the vaccine will be produced in a few developed countries and distributed around the world, it is obvious that this should be planned as a high precision military operation.

The International Air Transport Association (IATA) announced that they are in contact with airlines, airports, healthcare institutions and pharmaceutical companies on this issue. The IATA says the aviation industry faces the biggest transportation challenge ever, and that governments must plan the "mission of the century" now to ensure that the vaccine reaches every destination in the world.

Air cargo will play a significant role in the supply of vaccines to regions such as South America, Africa and Southeast Asia where road transport is relatively difficult. Almost all cargo normally carried to such emerging markets was being transported in cargo compartments of passenger aircraft. However, in most of these regions,

passenger operations were halted due to a decrease in demand and travel bans placed to prevent the spread of the virus. This situation can make the distribution process far more complex.

Experts think that it is "impossible" to distribute vaccines on the African continent especially considering its size in surface area alone, and compound that with the inadequacy of the transportation infrastructure in the region and the complexity of border crossings as well as capacity problems.

It is thought that vaccine delivery planning should be treated sensitively and that local distribution processes in the hinterland will require cold storage sites where vaccines can be stored to prevent damage. This will improve both the timeliness of the vaccine reaching people as well as reduce the overall cost.

Action already taken by airlines and airports!

Fraport, which operates airports in many parts of the world, especially Frankfurt, announced that they have started to work on the processes of vaccine distribution. Air France-KLM Group is also reviewing its flight network in Africa and assessing vaccine supply potential.

Turkish Airlines Cargo Carrier

Air cargo companies taking advantage of the pandemic can significantly increase their profitability, considering their involvement in vaccine distribution operations. For this reason many airlines see a role they can play in vaccine distribution and it will be great opportunity for their recovery.

Air Cargo Sector in Turkey also to benefit!

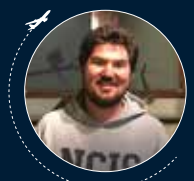
Turkish Cargo, the thriving sub-brand of Turkish Airlines, provides services in the field of air cargo and has made significant progress in recent years. The company, conducting cargo flights to 88 destinations with 23 aircraft in its fleet, has increased the volume of cargo it carries more than 11 times in the last 15 years. Turkish Airlines increased its share in the global market from 2.35% in 2013 to 4.10% in 2019 with the rapid rise in cargo transportation, and achieved US$ 1.72 billion in cargo revenue in 2019. It ranks 4th in Europe and 7th in the world according to the volume of cargo sold.

Last May, Turkish Cargo became the first air cargo brand to have all three "CEIV Pharma, CEIV Fresh, CEIV Live Animal" certificates granted by the IATA CEIV (Center of Excellence for Independent Validators). With CEIV certificates, Turkish Cargo carries out the transportation of pharmaceuticals / health products, live animals and perishable products in accordance with international and industry standards. The fact that Turkish Cargo holds CEIV certificates, which are valid for three years, symbolizes the company's perfectionist approach in special cargo operations and it seems to qualify Turkish Cargo to be one of the few airlines that will meet the requirements in the vaccine distribution process, thus increasing its revenues significantly.

Except for Turkish Cargo, other air cargo companies in Turkey such as, MNG, ACT, ULS Airlines are having their moment with the pandemic. Air cargo companies in Turkey are likely to increase their market share during the worldwide vaccine distribution once an approved vaccine is created.

The vaccine distribution operation seems to be a great opportunity for Istanbul as well, one of the most important hubs in the world. There is a firm belief and expectation that cargo traffic both at Ataturk Airport and Istanbul Airport will increase during this process

The Effects of Bio-Inspiration on Structural Design



Göksel Keskin
Junior Researcher, Department of Biological Physics, Eötvös Lorand University / Glider Pilot

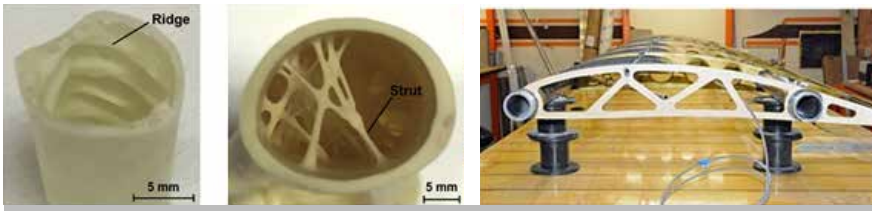


Figure-1 Bird Wing Bone Structures and Wing Manufacturing of the STOL Ultralight.

In the development of aircraft, the evaluation of different materials in manufacturing is a particularly important aspect. Such applications play an important role in weight reduction, material strength as well as aerodynamic gain. Researchers have been conducting projects on bio-inspired materials by studying a variety of different creatures not only birds. Especially plants, arthropods and fish are just as important as birds in this type of research.

In birds, bones need to be strong and stiff to lean forces during take-off, flight, and landing, with a minimum of weight. Flying birds and mammals have a lightweight skeleton system to provide less weight force, making flight easier. By comparison, birds weigh 1/3 the weight of a mammal of the same size. These birds do not have marrow filled long bones (e.g. humerus, ulna, radius). Therefore, reinforcing structures (struts and ridges) are found within bird wing bones to provide resistance. These kinds of applications can be seen in fuselage and rib construction in historical planes, ultralights and short take-off and landing (STOL) planes. This method reduces wing weight by up to 30% in the wing design of an ultralight type of aircraft.

Solid particle erosion causes millions of dollars of damage each year to helicopter rotors, rocket motor nozzles, turbine blades, pipes and other mechanical parts. It's tough to be a machine in the desert: particles of dirt and sand work their way into moving parts. The desert scorpion (Androctonus australis) live their entire lives subjected to blowing sand, yet they never appear to be eroded. Researchers studied the bumps and grooves on the scorpions' backs, scanning the creatures with a 3-D laser device and developing a computer program that modelled the flow of sand-laden air over the scorpions. Computer simulations are used to develop actual patterned surfaces to test which patterns perform best. At the same time, the erosion tests were conducted in the simple erosion wind tunnel for groove surface bionic samples at various impact conditions. Their results showed that a series of small grooves at a 30-degree angle to the flowing gas or liquid give steel surfaces the best protection from erosion. Furthermore, an application exploring the use of bionic blades on a centrifugal fan was conducted. The blades with optimum parameters could effectively improve anti-erosion property by 29%.

Figure-2 Point Clouds of Scorpion Back

Many flora and fauna flourish due to their low drag and antifouling properties, with commonly studied examples including shark skin and lotus leaves. The skin of fast swimming sharks is both low drag and antifouling; and lotus leaves are antifouling via self-cleaning. Sharks remain clean due to their microstructured riblets,

flexion of dermal denticles, and a mucous layer. Lower drag is necessary for shark survival as it allows sharks to swim faster in order to catch prey. Increased fluid flow velocity on the skin reduces microorganism settlement time and promotes antifouling, along with riblet spacing smaller than microorganisms. Conversely, lotus leaf surfaces are comprised of hierarchical micro papillae with a waxy nanostructure that repel water droplets and provide self-cleaning by removing unwanted contaminants. These findings have been applied on airplane fuselages, windows and wings to provide better aerodynamic performance.

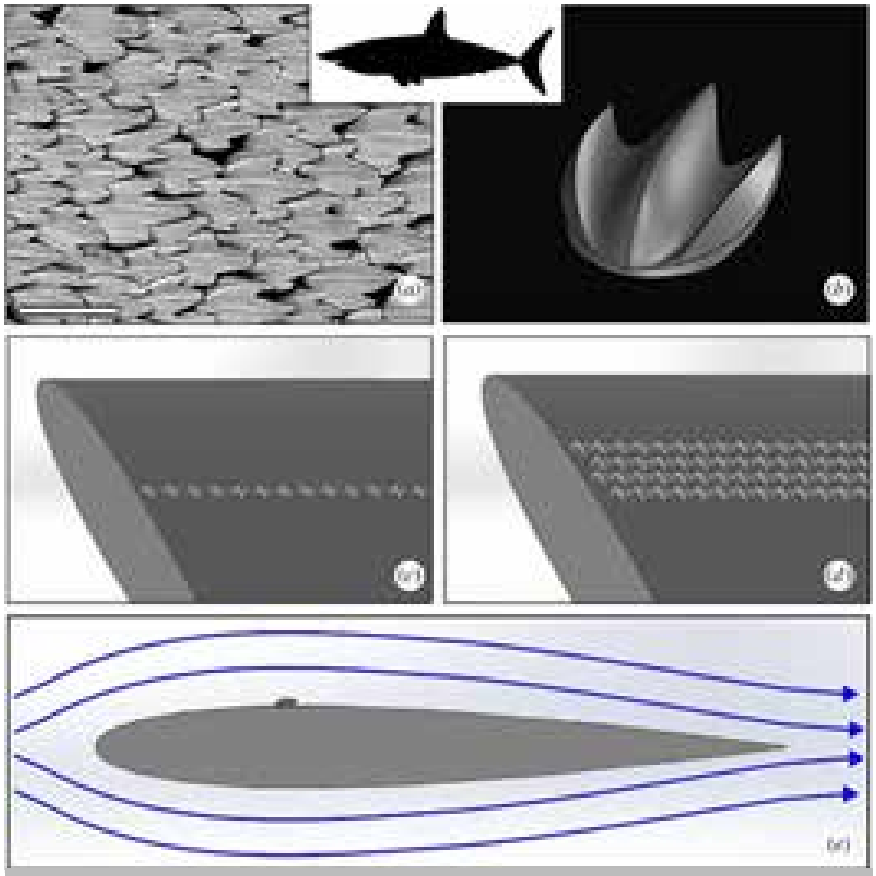


Figure-3 Application of a teeth like structure of the shark skin on wing surface (August et al. 2008).

To create the most durable and lightweight design possible, researchers sought inspiration from nature. Bionics, which involves examining natural mechanics to see how they could be mimicked in technological devices, has been crucial in the production of the 3D printed component. The jet partition was created with custom algorithms, which generated a design that mimics cellular structure and bone growth. Airbus has also been exploring weight-saving aircraft structures based on the construction of super-strong water lilies, and torsion springs based on fish jaws. Airbus revealed designs for a totally revamped 3D printed partition, which are used in Airbus A320 aircraft. The "bionic" partition, 45% (30kg) lighter than its traditionally manufactured ancestors, has now been 3D printed for testing, with the contributing companies offering further insights into the design process behind the giant 3D printed component.

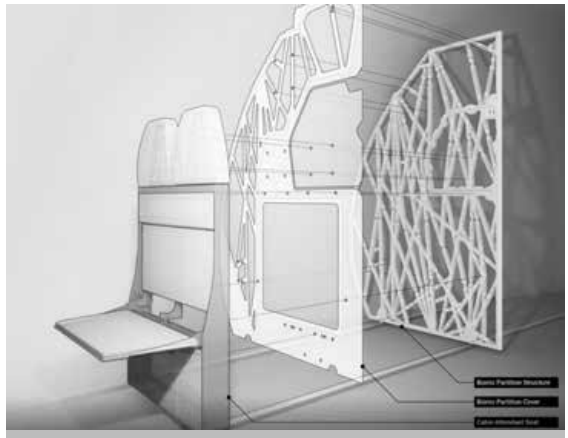


Figure-4 Concept design of fuselage frames that mimic cellular structure and bone growth

Birds have undergone almost 7 different adaptations like having a beak instead of teeth, one ovarium instead of two, one sweat gland etc. only for weight reduction in the evolutionary process. Such adaptations for weight reduction have become significant in aviation thanks to technological developments. With both biomimetic studies and developments in materials, we will see much lighter and more performance aircraft in the future

by Saffet Uyanık

Success of SpaceX's Demo-2 Mission

The Future of Commercial Space

On May 30, NASA astronauts Robert Behnken and Douglas Hurley made history when they were launched from American soil in a commercially built and operated American spacecraft on its way to the International Space Station (ISS). SpaceX's Falcon 9 carrying the Crew Dragon "Endeavour" spacecraft lifted off from Launch Complex 39A (LC-39A) at Kennedy Space Center in Florida on NASA's second demonstration (Demo-2) mission marking the first time a crewed orbital spaceflight launched from the United States since the final Space Shuttle mission (STS-135).

Known as NASA's SpaceX Demo-2, the mission (branded as "Launch America" by NASA TV) is an end-to-end test flight to validate the SpaceX crew transportation system, including launch, in-orbit, docking, and landing operations. The goal of the Demo-2 was to complete the validation of crewed spaceflight operations using SpaceX hardware and receive human-rating certification for the spacecraft, including astronaut testing of Crew Dragon capabilities on orbit. Astronauts Hurley and Behnken safely reached orbit and docked with the International Space Station on May 31 and worked alongside the crew of Expedition 63. During their 62 days aboard the ISS, both astronauts contributed more than 100 hours supporting the orbiting laboratory's investigations, participated in public engagement events, conducted four spacewalks with fellow American astronaut Chris Cassidy to install new batteries in the station's power grid and upgrade other station hardware. Crew Dragon Endeavour autonomously undocked from the station on August 1, 2020, and splashed down off the coast of Pensacola, Florida, on August 2, 2020, returning the astronauts to Earth, in the first water landing by astronauts since 1975. These activities

are a part of NASA's Commercial Crew Program to launch astronauts on American rockets and spacecraft from American soil the International Space Station for the first time since 2011. With this test flight, SpaceX returned human spaceflight to the United States, ending NASA's dependency on Russia's space agency Roscosmos' Soyuz capsules to deliver its astronauts to the ISS.

Aside from eliminating NASA's dependence on Russia to send astronauts into orbit, another significant reason for the SpaceX launch was the cost. Over the past two decades, 85 flights have transported 239 astronauts to the International Space Station (ISS) on either a NASA Space Shuttle or a Roscosmos State Corporation for Space Activities (Roscosmos) Soyuz vehicle. However, following the Space Shuttle program's retirement in 2011, NASA no longer had a spacecraft system capable of sending humans to space, and the Soyuz has served as the sole means of transporting astronauts to and from the ISS. Thus, NASA has launched its astronauts to the International Space Station on Russian spacecraft from the Baikonur Cosmodrome in Kazakhstan for the last nine years. According to the NASA Office of Inspector General (OIG)

report (November 14, 2019), as of July 2019, NASA had purchased 70 Soyuz seats worth $3.9 billion in total ($27.7 million in the first half of 2011, $43.4 million in the second half of 2011, $86 million in 2020) to ferry astronauts to and from the ISS. As an alternative, NASA contracted with private companies such as SpaceX for the Commercial Crew Program, which is expected to cost less than Soyuz.

Commercial Crew Program (CCP)

Since the Mercury program in the early 1960s, NASA has used an almost identical operating model to achieve human spaceflight, including the Apollo rockets, Space Shuttle Program, and the American portions of the International Space Station. In the post-Shuttle era, NASA moved from its traditional approach of working with private aerospace companies to build launch vehicles that the government would own and fully control to a commercial program. Thus, in 2010, NASA's Commercial Crew Program (CCP) was formed to facilitate the development of a commercial crew space transportation capability to achieve safe, reliable, and cost-effective access to and from the International Space Station and Low-Earth Orbit (LEO). With the new system, NASA pays private companies a fixed price to develop crew transportation options and provide crew transportation flights to the ISS as a service.

The Commercial Crew Program (CCP) is a human spaceflight program operated by NASA, in association with American aerospace manufacturers Boeing and SpaceX. The program conducts rotations between the International Space Station expeditions, transporting crews to and from the International Space Station (ISS) aboard Boeing Starliner and SpaceX Crew Dragon capsules, in the first crewed orbital spaceflights operated by private companies. The program succeeds NASA's involvement in the Soyuz program, upon which it was dependent on transporting its astronauts to the ISS following the retirement of the Space Shuttle program in 2011. The program's history goes back to the establishment of the Vision for Space Exploration (VSE), which was announced by President George W. Bush in 2004 as a response to the Space Shuttle Columbia disaster and as a way to regain public enthusiasm for space exploration. The VSE sought to implement a sustained and affordable human and robotic program to explore the Solar System and beyond, extend human presence across the Solar System, and return to the Moon by 2020, in preparation for human exploration of Mars and other destinations. Following the NASA Authorization Act of 2005, the Constellation program was established, which envisioned crew rotation flights to the International Space Station (ISS) and lunar exploration goals. However, in 2009, the program's funding and resources were deemed insufficient to execute its goals without significant delays to its schedule, and NASA started considering alternatives to the program. The Constellation program was officially canceled in 2010, with NASA collaborating with commercial partners for ISS crew rotation and other crewed activities in low Earth orbit following the Space Shuttle's retirement in 2011.

Development of the Commercial Crew Program began in 2011 through a rescope of the Commercial Crew Development (CCDev) program. By investing in multiple American companies that are designing and developing transportation capabilities to and from low-Earth orbit and the International Space Station, NASA aims to establish safe, reliable, and cost-effective access to space. To achieve its goals, NASA used Space Act Agreements to partner with domestic companies capable of contributing to the development of a U.S. human spaceflight capability. Throughout the process, NASA awarded more than $8.2 billion in Space Act Agreements (SAAs) and contracts under two Commercial Crew Development (CCDev) phases, the Commercial Crew Integrated Capability (CCiCap) initiative, Certification Products Contract (CPC), and Commercial Crew Transportation Capability (CCtCap). As NASA retired the space shuttle, the private industry's ability to take on the task of providing routine access to space was of vital importance. Before NASA would begin using a commercially developed system to transport its astronauts to and from the Space Station, the system must be certified as meeting NASA's safety requirements throughout an entire mission cycle. NASA's Commercial Crew Development Round 1 (CCDev1) began in 2010 using American Recovery and Reinvestment Act (ARRA) funds.

Crew Dragon, SpaceX's Next-Generation Spacecraft

SpaceX's Crew Dragon is an autonomous spacecraft designed to deliver crew and critical cargo to orbiting destinations. Crew Dragon launches atop a Falcon 9 rocket from Launch Complex 39A at NASA's Kennedy Space Center in Florida. As part of NASA's Commercial Resupply Services contract with SpaceX, the company developed its Dragon spacecraft to carry cargo to space, but it was designed with people in mind from the beginning.

Crew Dragon Design and Development

Crew Dragon was developed in collaboration with NASA's Commercial Crew Program. In 2014, NASA awarded Commercial Crew Transportation Capability (CCtCap) contracts to Boeing and SpaceX to each safely and cost-effectively transport astronauts to the International Space Station from the United States. Crew Dragon can carry up to seven passengers but will carry up to four astronauts for NASA missions, and is designed for water landings. Crew Dragon's displays will provide real-time information on the state of the spacecraft's capabilities—anything from the spacecraft's position in space, to possible destinations, to the environment on board. Crew Dragon is a fully autonomous spacecraft that can be monitored and controlled by onboard astronauts and SpaceX mission control in Hawthorne, California.

Dragon comprises two main elements: the capsule, which is designed to carry crew and critical, pressurized cargo, and the trunk, which is an unpressurized service module. The capsule is subdivided into the pressurized section, the service section, and the nose cone, which is opened once on orbit and stowed prior to re-entry. Near the base of the capsule, but outside the pressurized structure, are the Draco thrusters, which allow for orbital maneuvering. Additional Draco thrusters are housed under the nose cone, along with Dragon's Guidance Navigation and Control (GNC) sensors. Dragon's trunk provides the mating interface for the capsule to Falcon 9 on its ascent to space. On orbit, half of the trunk contains a solar array, which powers Dragon, and the other half includes a radiator, which rejects heat. Both the radiator and solar array are mounted to the exterior of the trunk, which remains attached to Dragon until shortly before re-entry when the trunk is jettisoned. Crew Dragon was designed with three windows so passengers can take in views of Earth, the Moon, and the wider solar system right from their seats. Crew Dragon has an Environmental Control and Life Support System (ECLSS) that provides a comfortable and safe environment for crew members. During their trip, astronauts on board can set the spacecraft's interior temperature to between 65 and 80-degrees Fahrenheit (18-27°C). Crew Dragon features an advanced abort system with eight SuperDraco engines and a series of parachutes that can be activated instantaneously from the moment they are armed on the launch pad all the way through orbital insertion.

During the CCDev1 phase, NASA awarded a total of $50 million to five companies to stimulate efforts within the private sector to aid in developing and demonstrating safe, reliable, and cost-effective crew transportation and capabilities. The second round of Commercial Crew Development (CCDev2) kicked off in April of 2011 when NASA awarded nearly $270 million to four companies to further develop and demonstrate safe, reliable, and cost-effective transportation capabilities. Winners of CCDev2 were Blue Origin (US$ 22 million), Boeing (US$ 92.3 million), SpaceX (US$ 75 million), and Sierra Nevada (US$ 80 million). NASA later funded an additional US$ 20.6 million to Boeing and US$ 25.6 million to Sierra Nevada Corporation by exercising optional, pre-negotiated milestones, which were part of their original Space Act Agreements, to accelerate development. In 2012, the agency extended its CCDev2 agreement with Blue Origin in an unfunded capacity. Through the agreement, the agency continued to support developing the company's Space Vehicle and related systems. CCiCap continued the development of three fully integrated systems in August 2012.

The Space Act Agreements called for industry partners to develop crew transportation capabilities and to perform tests to verify, validate, and mature integrated designs. NASA later funded an additional US$ 20 million to Boeing, US$ 20 million to SpaceX, and US$15 million to Sierra Nevada Corporation by exercising optional, pre-negotiated milestones, which were part of their original Space Act Agreements, to accelerate development. On December 10, 2012, NASA announced the next step to launch American astronauts from U.S. soil. NASA selected three companies and awarded a total of nearly $30 million under the CPC contracts. Throughout CPC, the first phase of a two-phase contract, companies worked with NASA to achieve safe, crewed missions to the space station. It included data that will aid in developing engineering standards, tests, and analyses of crew transportation system designs. During the CPC phase, these American companies' advances also aimed to launch American astronauts to the International Space Station from the United States, ending the NASA's dependency on Roscosmos' Soyuz program to deliver its astronauts to the ISS. The second phase of the certification contract, CCtCap, aimed to commercially built and operated integrated crew transportation systems. Two Federal Acquisition Regulation (FAR-based), fixed-price contracts were awarded in September 2014 following an open competition. Through its certification efforts, NASA's goal was to ensure the selected commercial transportation systems meet the agency's safety and performance requirements for transporting NASA crew to the International Space Station. NASA awarded a total of $6.8 billion under CCtCap contracts (Boeing - $4.2 billion, SpaceX - $2.6 billion).

Crew Dragon, SpaceX's Next-Generation Spacecraft

Falcon 9 is a two-stage rocket designed and manufactured by SpaceX for the reliable and safe transport of satellites and the Dragon spacecraft into orbit. Falcon 9 is the first orbital-class rocket capable of reflight.

Falcon 9 made history in 2012 when it delivered Dragon into the correct orbit for rendezvous with the International Space Station, making SpaceX the first commercial company to visit the station. Since then, Falcon 9 has made numerous trips to space, delivering satellites to orbit as well as delivering and returning cargo from the space station for NASA. Falcon 9, along with the Dragon spacecraft, was designed from the outset to deliver humans into space, and under an agreement with NASA, SpaceX is actively working toward this goal.

Falcon 9's first stage incorporates nine Merlin engines and aluminum-lithium alloy tanks containing liquid oxygen and rocket-grade kerosene (RP-1) propellant. After ignition, a hold before-release system ensures that all engines are verified for full-thrust performance before the rocket is released for flight. Then, with thrust greater than five 747s at full power, the Merlin engines launch the rocket to space. Unlike airplanes, a rocket's thrust actually increases with altitude; Falcon 9 generates more than 1.7 million pounds of thrust at sea level but produces over 1.8 million pounds of thrust in the vacuum of space. The first-stage engines are gradually throttled near the end of the first-stage flight to limit launch vehicle acceleration as the rocket's mass decreases with the burning of fuel.

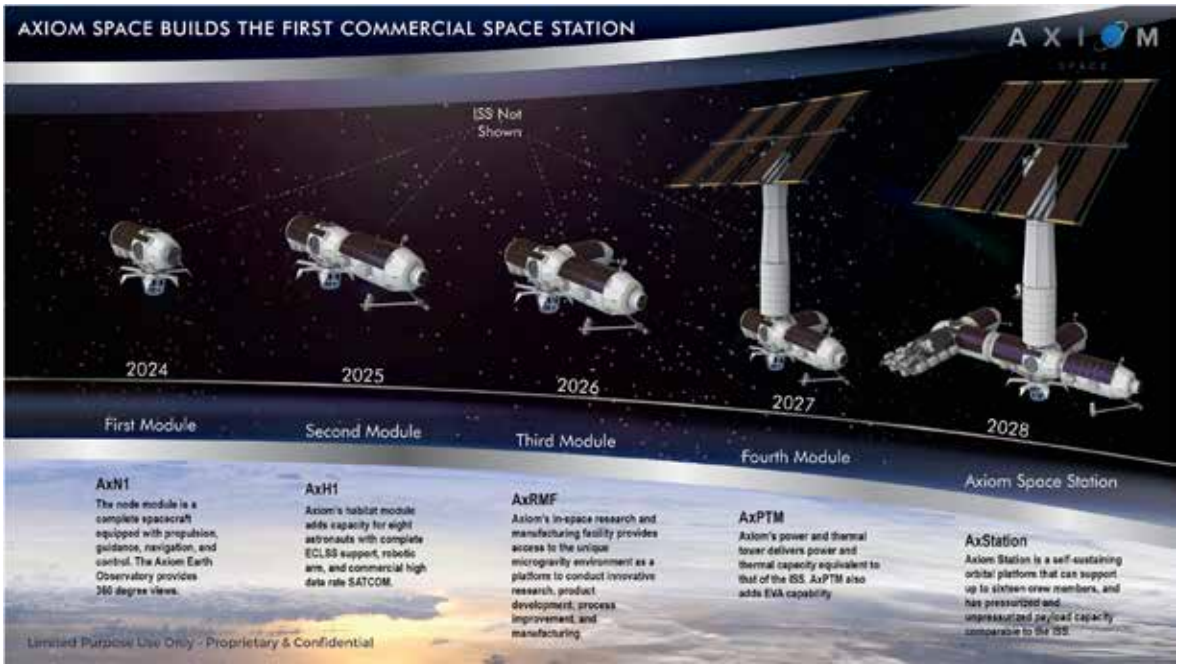
The interstage is a composite structure that connects the first and second stages and holds the release and separation system. Falcon 9 uses an all-pneumatic stage separation system (a highly reliable separation that can be tested on the ground) for low shock, unlike pyrotechnic systems used on most launch vehicles. Falcon 9 is equipped with an Autonomous Flight Termination System to be used in the unlikely event that the rocket drifts off course or becomes unresponsive. Carbon fiber landing legs and hypersonic grid fins, all stowed during ascent, are two of the critical elements essential to ensure safe and successful landing of the Falcon 9 first stage.

Technical Overview:

- *Height: 70 meters or 229.6 feet*
- *Mass: 549,054 kilograms or 1,207,920 pounds*
- *Payload to Low Earth Orbit: 22,800 kilograms or 50,265 pounds*
- *Diameter: 3.7 meters or 12 feet*

The Era of Accessible Private Spaceflight

Given Commercial Crew's apparent success, NASA is also hoping to use this model for private spaceflights as well. In February 2020, Space Adventures, Inc., a Virginia-based space tourism company founded in 1998 by the American entrepreneur and aerospace engineer Eric C. Anderson, signed a deal with SpaceX, announcing its plans to fly private citizens into orbit on the Crew Dragon. Under the agreement, Space Adventures will use the SpaceX Falcon 9 rocket to fly up to four passengers to Earth orbit on a standalone mission aboard a Crew Dragon spacecraft in late 2021 or 2022. The mission would not dock with the space station but would instead fly into an orbit that could reach an altitude two-to-three times higher than the International Space Station. Space Adventures offers various programs such as Orbital spaceflight missions to the International Space Station, Circumlunar missions around the Moon, zero gravity flights, cosmonaut training programs, spaceflight qualification programs, and reservations on future suborbital spacecraft. To date, Space Adventures has arranged eight orbital trips to the International Space Station for seven wealthy customers, businessman Dennis Tito in 2001, South



African entrepreneur Mark Shuttleworth in 2002, American entrepreneurs Greg Olsen in 2005, Anousheh Ansari in 2006, Microsoft co-founder Charles Simonyi (twice) in 2007 and 2009, computer game developer Richard Garriott in 2008, and lastly Cirque du Soleil founder Guy Laliberte in 2009.

SpaceX's Crew Dragon is also expected to be used to shuttle tourists to and from Axiom Space's planned space station. SpaceX has signed a contract with Houston-based space startup, Axiom Space, to ferry four astronauts, including a commander professionally trained by Axiom alongside three private astronauts to and from the International Space Station. The mission, set to launch as soon as the second half of 2021, will allow the crew to live aboard the ISS and experience at least eight days of microgravity and views of Earth that can only be fully appreciated in the large, venerable station. The crew will be selected and trained by Axiom, with SpaceX providing the taxi service. Axiom Space, Inc. is an American privately funded aerospace manufacturer and orbital spaceflight services company headquartered in Houston, Texas. Founded in 2016 by the previous program manager for the International Space Station from 2005-2015, Michael T. Suffredini, the company plans commercial missions in late 2021 to the International Space Station (ISS) and aims to own and operate the world's first commercial space station. The company's leadership team is composed mainly of former NASA employees. As NASA shifts human spaceflight aspirations beyond low Earth orbit, Axiom's goal is to create the commercial infrastructure necessary to push humanity forward in space. The company outlines broad commercial activities, including human spaceflight for national and private astronauts, in-space research and manufacturing, and space exploration support. In 2020, NASA awarded Axiom a $140 million contract on 28 February 2020, to provide at least one habitable commercial module to be attached to the ISS as the agency continues to open the station for commercial use. The module will connect to the space station's Node 2 forward port to demonstrate its ability to provide products and services and begin the transition to a sustainable low-Earth orbit economy in which NASA is one of many customers. Next, NASA and Axiom will begin negotiations on the terms and price of a firm-fixed-price contract with a five-year base performance period and a two-year option.

Developing commercial destinations in low-Earth orbit is one of five elements of NASA's plan to open the International Space Station to new commercial and marketing opportunities. NASA's five-point plan addresses both the supply-side and demand-side for a new economy, enabling the use of government resources for commercial activities, creating the opportunity for private astronaut missions to the space station, enabling commercial destinations in

low-Earth orbit, identifying and pursuing activities that foster new and emerging markets, and quantifying NASA's long-term demand for activities in low-Earth orbit. Through these combined efforts, NASA aims to meet its long-term needs in low-Earth orbit well beyond the International Space Station's life. The agency's ultimate goal in low-Earth orbit is to partner with industry to achieve a strong ecosystem in which NASA is one of many customers purchasing services and capabilities at a lower cost. More than 50 companies are already conducting commercial research and development on the space station via the International Space Station U.S. National Laboratory. NASA has also worked with ten different companies to install more than 14 commercial facilities on the station that support research and development projects for NASA and the ISS National Lab. This effort is intended to broaden the scope of commercial activity on the space station beyond the ISS National Lab mandate, which is limited to research and development. NASA aims to enable commercial manufacturing and production and allow both NASA and private astronauts to conduct new commercial activities aboard the orbiting laboratory. Additionally, NASA plans to allow private astronaut missions of up to 30 days on the International Space Station. Considering the market demand, the agency intends to accommodate up to two short-duration private astronaut missions per year to the International Space Station. These missions will be privately funded, dedicated commercial spaceflights that will use a U.S. spacecraft developed under NASA's Commercial Crew Program.

From a broader perspective, the industry implications of commercial space travel remain various and promising. Demand for space travel among those that can afford it may rise significantly as barriers to entry decline. Moreover, the development of new spacecraft will encourage growth within the manufacturing sector because of the vast supply chains in spacecraft manufacturing. For the space economy to take off, countries will also need to put regulations in place that ensure safety and reliability in many areas, including vehicle safety and debris mitigation. In the future of space tourism, the commercial space travel industry has unbounded potential. However, whether SpaceX or anybody else can offer orbital flight for humans at a price that can actually yield a profit, SpaceX's crew launch brings humanity closer towards the viability of accessible commercial space travel.

Launch Complex 39A

Launch Complex 39A (LC-39A) was initially built for the Apollo/Saturn V rockets that launched American astronauts on their historic journeys to the Moon and back. Since the late 1960s, Pads A and B at Kennedy Space Center's Launch Complex 39 have served as backdrops for America's most significant human spaceflight endeavors—Apollo, Skylab, Apollo-Soyuz, and the space shuttle.

In 2014, Space Exploration Services, or SpaceX, signed a property agreement with NASA for use and operation of LC-39A for 20 years, part of Kennedy Space Center's transition to a multiuser spaceport. SpaceX modified LC-39A to adapt it to the needs of the company's Falcon 9 and Falcon Heavy rockets. SpaceX constructed a Horizontal Integration Facility near the pad's perimeter where rockets are processed for launch prior to rollout to the pad for liftoff. The Transporter Erector (TE) is used to move the Crew Dragon spacecraft to the top of the Falcon 9 rocket on the launchpad. Standing 212 feet high—more than 20 stories—the TE moves launch-ready rockets and spacecraft from the processing hangar at the base of the pad up to the pad surface and into a vertical position over the flame trench. The TE is a much larger and stronger version of the erector the company uses at Space Launch Complex 40 and is used to process and launch Falcon Heavy rockets.

The first SpaceX launch from LC-39A was SpaceX's 10th Commercial Resupply Services mission to the International Space Station, known as CRS-10. The launch on Falcon 9 took place on February 19, 2017 and carried supplies and research to the space station. Since then, CRS-11 and CRS-12 have also launched from LC-39A. SpaceX will use LC-39A for its Crew Dragon missions to the International Space Station.

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ALPTEKNİK AVIATION

The Future of Learning in Aviation: Are the IATA's Predictions for 2035 Already Visible?

by Gökhan Demirdöken, Researcher & English Language Instructor

The aviation industry has always been surrounded by the latest developments in technology and there is far more yet to come. The Industry Affair Committee of the International Air Transport Association (IATA) recently published a report on the future of the aviation industry. The report presents interesting foresights regarding various changes that technology is expected to bring to the industry in less than two decades. The list includes areas of cybersecurity, expanding human potential, robotics and automation, 3D printing and manufacturing techniques, alternative fuels and energy sources, new aircraft designs, alternative modes of rapid transit, and geospatial technology. However, the report also mentions two more changes: Internet of things and virtual and augmented reality.

Training is one of the most important and critical areas for any aviation professional and it plays a non-negligible role in ensuring safety in the aviation industry. Today artificial intelligence and virtual reality have already begun to revolutionize the approach to training through new innovative methods and means, even prior to the predictions of the IATA for 2035. Training programs designed for cabin crews, flight crews, and air traffic controllers are among areas that most frequently use this new training technology. Apart from familiarizing themselves with the theoretical aspects of their profession, these aviation professionals engage in simulations which provide the most realistic reanimation of possible scenarios that could be encountered during on the job operations. While cabin crews are trained for any irregularity in the cabin, the flight crews are prepared for abnormal flight procedures and the air traffic controllers are confronted with various specific situations that they need to successfully negotiate and deal with. Technology-integrated training is also available for ground crew as well. Ground handling personnel now have an opportunity to simulate and experience a full range of ground operations with the help of virtual reality, and this is a functional complement to theoretical knowledge. Consequently, technology has been an indispensable part of training for pilots, air traffic controllers, flight attendants, airplane technicians, and ground handling personnel.

The sky's the limit was once a perfect idiom for a slogan of any airline but today this slogan needs to be "slightly" modified along the lines of Technology's the limit. The reason for this is that now technology is embedded in civil aviation more than ever and technology is the right tool to go beyond the current limits in civil aviation in terms of ensuring safety. We are no longer limited to what we already know, rather we now have the opportunity to integrate artificial intelligence into our learning environments which allows students to apply their knowledge hands-on in a safe controlled simulated VR environment before actually taking a seat for a real-life flight operation. During any flight safety is not something that can be taken for granted in aviation, mostly because of the human factor, so flight training simulators seem to be the safest way to learn the basics of flying and, of course, getting familiar with a specific aircraft type in a less costly way. Any mistake an air cadet could make throughout the simulation needs only but a restart of the scenario which could have resulted in a fatal accident in real life. In that sense, technology takes pilots beyond the limits of the sky for educational purposes and it is certain its role will become more crucial for aviators in the future.

On the other hand, there are some other important components which make the wheel spin 24/7 in aviation. Flight attendants, for instance, are the ones who do their best to make our flying experience more comfortable. Furthermore, they are the heroes in unexpected circumstances including hijackings, giving birth in the air, unruly passengers, medical emergencies, ditching (emergency water landing), and so on. Although only a small portion of all flight attendants are faced with these situations in real-life, they all need to be well-trained and prepared for such scenarios beforehand. At this point, the required training can be provided with the help of virtual reality solutions. Currently many airlines make use of various VR software including those that provide familiarization with cabin, aircraft, and galley, pre-flight preparations, pre-boarding checks, evacuation, fire, crowd control, suspicious items, cabin security, and ditching. The experiences of prospective flight attendants with such VR-integrated software also has proven the effectiveness of this type of training when compared to traditional training.

Air traffic controllers are important figures enabling safe flight operations, and they are the ones who always keep an eye on us. Yet, their workload is extremely high and hence their job is ranked among the five most stressful professions. Due to the nature of their profession, air traffic controllers need to be prepared for worst-case scenarios at all times. However, safety cannot be ensured without proper training before they take control of an airspace. So, air traffic control simulations offer great opportunities for prospective air traffic controllers to simulate sample cases which are difficult to replicate in real life and which can quickly turn into a fatal case if not handled properly. Such conditions may include unusual weather conditions, high intensity air traffic, varying runway configurations, runway incursions, parallel runway operations, and so on. Getting to know the must-dos in such scenarios and demonstrating the necessary skills required to handle them can now be practiced with ease.

In a nutshell, the ways technology has contributed to the training needs of various components of the aviation industry are impressive. Technology, in this sense, does not only give aviation professionals the flexibility to get the proper training regardless of space and time but it also makes the replication of critical scenarios possible for learners. Still, there is much to uncover in terms of technology integration into one more learning environment for the aviation industry: learning Aviation English.

The outbreak of Covid-19 pandemic has had a devastating impact on the aviation industry. The capacity of seats offered has already decreased by 45% in 2020 and is expected to be around -40% in the first quarter of 2021; the number of passengers flown has drastically decreased by 257m in 2020 and is expected to further decrease by 312m in the first quarter of 2021; and finally airline revenue losses have been recorded to be around $345bn in 2020 according to the latest (as of month) financial report published by the ICAO. When approached from a different perspective, the effects of Covid-19 are not limited to these statistics. Unfortunately, many aviation professionals including pilots and flight attendants have been laid off in the last eight months. Worse than that, the future of the aviation industry is still blurry. Two things are crucial: First of all, the preparedness of pilots and flight attendants for a possible increase in flight operations if the necessary preventive measures can

Trainee pilot in a flight simulator

Graphic of airplane interface with digital radar

be taken, and secondly the issue of meeting the demand that will be placed on more pilots and flight attendants when flight operations return normal. To ensure the "fitness" of cabin and flight crews for such optimistic predictions for the aviation industry, training will play a key role. No matter when the Covid-19 pandemic will come to an end, once thing is for sure, nothing will remain the same and some transformations are underway in terms of learning environments for aviation professionals.

One change has already been seen clearly in education after the lockdown in various parts of the world. Although preparations for alternative learning environments such as distance education and flipped learning were already taking place before the Covid-19 pandemic outburst, this year it became a necessity for institutions worldwide to pivot quickly to this remote approach and as a result the year 2020 has us well positioned for a worldwide implementation of such changes. However, what we have seen so far is just the tip of the iceberg. A better understanding of how technology can be further integrated into Aviation English learning/teaching practices needs to be developed to be able to meet the training demands of prospective aviators in the safest way possible. To do so, two evolving aspects of education need to be discussed in detail: The 21st century learner profile and the latest opportunities that technology offers.

21st century learners are referred to as those having competencies such as digital literacy, collaboration, critical thinking, and problem-solving. These are pretty much the must-haves for any prospective aviator as well. In this sense, any pilot training should be based on helping cadet pilots attain such competencies and to hone their English language proficiency. The focus of the rest of this article is on the latter. The ever-increasing number of new technologies and their integration into Aviation English teaching environments have made it possible for various groups of learners including pilots, flight attendants, air traffic controllers, airplane technicians, and ground handling personnel to develop their Aviation English proficiency comfortably.

What learners used to see in conventional classrooms such as blackboard and projectors have been replaced by interactive smart boards and VR software offering learners a more hands-on experience towards attaining the outcomes of any language course. When the ICAO first implemented the new regulations for testing English Language Proficiency, the rating scale included six areas of competency, namely pronunciation, structure, vocabulary, fluency, comprehension, and interactions. The nature of communication by means of the English language requires all aviators to first utilize receptive skills (reading and listening) and then productive skills (speaking and writing). The rationale behind improving the overall quality of aviators' English language proficiency is to minimize the safety issues originating from communication problems. All flight operations undoubtedly require two foremost important skills: listening and speaking. As a result, the focus of Aviation English courses has shifted towards designing the

curricula to meet these types of learner needs.

Now, the number of distance education opportunities for learners of Aviation English has been clearly increased by course designers and language schools. No matter where you live, where you are, participation is now just one-click away, providing access to a variety of distance education learning environments. There are advantages to such changes. First of all, the lack of a native speaker had previously been one of the greatest concerns for learners for a long time. However, as English is now the lingua franca and similarly Aviation English is the lingua franca in aviation, there is no longer a need for a native-speaking Aviation English instructor. Now learners can now choose from many courses offered around the world without any extra cost for a native speaker. The nature of communication during international flight operations also requires the receptive skill to comprehend the air traffic controllers' messages and the number of those who are non-native-speaking ATCOs outnumbers the native-speaking ATCOs. In addition, distance education opportunities also give learners the chance to communicate with learners in the target language for the completion of any task. Existing software such as Microsoft Teams, Zoom, Adobe Connect, and Google Meet all offer great opportunities for international learners to collaborate. They can either work on a task simultaneously or have a videoconference for the revision of the content; they can enjoy authentic material related to aviation and develop their pronunciation for mutual intelligibility during flight operations. The forced changes in the approach to education imposed by the Covid-19 pandemic have, to a great extent, paved the way for distance education and it has been the impetus for the release of new distance education software with numerous features to learn Aviation English.

However, future changes in teaching and/or learning Aviation English is not limited to distance education software. Apart from playing a major role in complementing theoretical knowledge, virtual reality will most definitely be the game changer in the future. For example, in a virtual shared cockpit, the pilot-in-command can develop his/her communication skill by simultaneously interacting with a co-pilot. Also, the interaction between flight crew and ATCOs can be further practiced in such virtual environments when artificial intelligence technologies are integrated into them. When compared to conventional classrooms where pilots used to listen to the recorded audio and fill-in the blanks to complete the missing information in a sample activity, the evolving technologies can now take such training further ahead and provide learners with real-life experiences by enabling them to interact with hands-on situations.

It is important here to point out that one of the most significant struggles for cadet pilots or ATCOs is the lack of content knowledge. For instance, the ICAO mandates a standard use of aviation phraseology to avert the possibility of air traffic accidents, but it is not that easy for beginners to learn the phraseology all at once. So, what most of the training centers used to offer in to learn the standard phraseology was just limited to a coursebook and an airport diagram to practice it. However, the industry needed much more than that for safer airspaces with proficient pilots and ATCOs. At this point, technology really is saving the future of aviation with advances that are improving the overall training experience for aviation professionals. With the integration of speech recognition applications and other tools to practice Aviation English phraseology, it is always possible to improve your mental lexicon and your pronunciation regardless of time and place. Today, there are more than 250 applications for speech recognition and the number of applications to practice any set of vocabulary are even more numerous. For these reasons, we can no longer imagine a classroom setting with outdated learning technologies, and we won't imagine a physical classroom setting but rather it is expected to include various Web 2.0 tools, virtual reality integration, artificial intelligence, and so on.Another significant change can be observed in the assessment process of prospective pilots and air traffic controllers. The most satisfying event for a pilot is most probably the experience of soloing which is traditionally followed by drenching him/her with water. Soloing is the indication that the student can fly without an instructor. From an educational perspective, it is a final assessment by the instructor to approve the competencies of a student to operate an airplane on their own. This often requires a series of training flights which are costly. Many flight schools or aviation academies now are equipped with flight simulators to make prospective pilots familiar with the flight operations and procedures, and to reduce the cost of training. Even the Federal Aviation Administration acknowledges the crucial role of flight simulators and categorizes them as full flight simulators (FFS), flight training devices (FTD), and aviation training devices (ATD). Although the time spent on simulators cannot be counted as flight time, it is most likely that developments in technology will pave the way for such implementations in the near future. More importantly, a further step that we can anticipate in aviation training is the integration of more developed simulators or other

International military-technical forum ARMY-2018. Visitors experienced an aviation simulator.

technological devices into the assessment process of cadet pilots.

Finally, the future of the aviation industry will be shaped by technology to a great extent as emerging technologies become inevitable components of evaluating the English language proficiency of future aviators. The initial reports presented to the ICAO after the first announcement of the upcoming language proficiency requirements for pilots and air traffic controllers shared the concerns of member states regarding the worldwide implementation of new regulations. Two things were crucial: First, it was not possible to reach so many pilots and air traffic controllers. Second, there was nowhere to accommodate these people for training and/or assessment purposes. Eventually, the ICAO Assembly adopted Resolution A38-8 stating that "any Member State which finds it impracticable to comply in all respects with any international standard or procedure is obliged to give immediate notification to the ICAO". Hence, putting a new implementation into practice had become quite difficult for the ICAO and they could do nothing to help member states other than give each member state the flexibility to make preparations for the new implementation. However, the ICAO council was not aware of the opportunities that the latest technological developments could offer as a solution to all of these problems which necessitated a commonly shared practice for all parties that are included in the aviation industry.

Fortunately, the past is the best teacher and the industry still has more to learn from it. Amid the fatal consequences of the Covid-19 pandemic, what the ICAO should seriously take into consideration is alternative ways of assessing the English language proficiency of test takers via online platforms. There are online assessment tools already available and they are being used in many areas of education. So, why not integrate them into ICAO English language proficiency tests? For instance, the Turkey Airline Pilots' Association (TALPA) is one of the accredited institutions in Turkey by the Directorate General of Civil Aviation to assess the language proficiency of pilots. Although these assessment tests last approximately half an hour, they still require the test takers to be physically present in the test center which can be easily replaced by online assessments, and this would give the test takers the opportunity to participate online. Also, the test consists of three parts: one-to-one interaction, audio comprehension, and vocabulary, structure and pronunciation. These tasks can be easily adapted to online assessment environments and in doing so both the test centers and test takers can reap the benefits of technology to the fullest extent.

All in all, "the only thing that is constant is change" as Heraclitus stated. In a world where we are surrounded by all kinds of technology, change will always be a part of our lives and those who can keep pace with this constant change will flourish rather than just simply survive. What awaits us in the future in terms of new learning opportunities is only dictated by the limits of technology. Conventional methods are rapidly being replaced by innovative technological tools that will inevitably dominate almost all areas of our lives. This is an ideal time for all stakeholders in education, especially those working in the aviation industry, to start proactively integrating more technology into their Aviation English teaching/learning environments. What we have witnessed so far is just a precursor to a more dynamic and engaging future in aviation training if we take full advantage of modern technology in developing and learning platforms and resources. As an industry we had better be prepared for it now, let's not be doomed to fail, let's look towards the future as we equip future aviators with the necessary skills for safety and success

Bir Avcı Tayyaresi Yapmaya Karar Verdim

Gazeteci Abidin Daver 1938 yazında Beşiktaş'taki tayyare atölyesini ziyarete gider. Röportaj esnasında Nuri Demirağ yeni bir projeden bahseder:

> *...Bir avcı tayyaresi yapmaya karar verdim. Bunun prototipi üzerinde çalışıyoruz. Avrupa ve Amerika'dan lisanslar alıp tayyare yapmak istemiyorum. Çünkü bu kopyacılıktan ibaret bir iştir. Ben, yeni ve milli bir Türk tayyareciliği yaratmak istiyorum... Şimdi resimleri üzerinde çalıştığımız bu avcı tayyaresi bugün Avrupa ve Amerika'daki en seri avcı tayyarelerinin baş döndürücü süratini haiz ilk Türk tipi avcı uçağı olacaktır...*

Peki, neydi Demirağ'ın bahsettiği bu Türk tipi avcı uçağı? 1938'de çizimleri ve prototipi üzerinde çalışılan bu uçaktan neden bugüne kadar hiç bahsedilmedi ve bu uçak neden üretilmedi?

ISBN 978-605-312-388-0

Theodore von Karman's Visit to Turkey in 1955 and Reflections by Local Press - Part 1

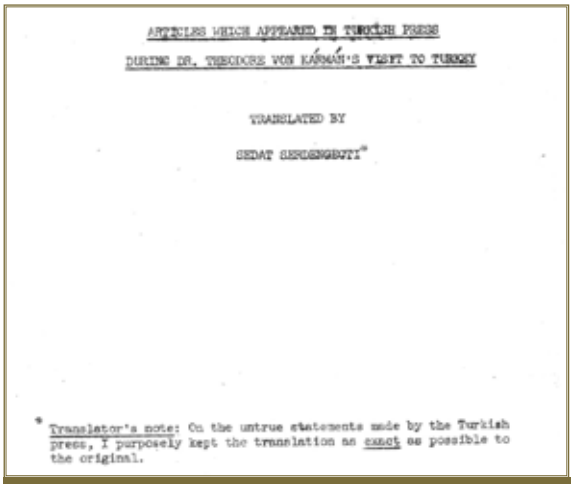
by Dr. Emir Öngüner
Freelance Researcher in Aviation History

The Cold War period did not only witness unique diplomatic strategies. Among various political steps the achievements in aviation and aerospace technology should also be considered as important milestones between the east and west blocks. NATO countries established such a committee to specify the conditions and control the associated scientific research. Within this scope, Theodore von Karman as the Chairman of Aeronautical Research and Development of NATO organized a visit to Turkey on 9.-14. January 1955 to discuss related topics with local authorities.[1]

Von Karman's personal collections at the CALTECH ARCHIVES (the archives of the California Institute of Technology) provides us with some useful information about his official meetings in Ankara and Istanbul. The files TVK 156.11 and TVK 156.12 entitled "Articles Which Appeared In Turkish Press During Dr. Theodore von Karman's Visit to Turkey" contain some copies of Turkish newspapers and English translation by Sedat Serdengeçti, who was a Turkish Ph.D. researcher in mathematics during that period at CalTech.

As a guest of the Turkish government von Karman arrived in Ankara on the 9th of January with his staff, met with officials and discussed national defense issues related to Turkey. Later he gave a guest lecture at Istanbul Technical University, where he received an honorary doctorate degree, and held discussions with Turkish scientists about the progress in aerospace research. In one of the interviews he even claimed that in previous centuries the Turks used to invent rocket technology. The significant questions of the reporters were on the disasters of jet fighters and the scientific collaboration of NATO countries. He also visited the new wind tunnel facility in Ankara, which was apparently under construction at that time, and insisted to include it into actual research activities as soon as possible. In this article we look back in time, scrolling back to introduce an interesting historical event of an aviation pioneer based on official records in chronological order.[2]

Zafer, 09.01.1955



ARTICLES WHICH APPEARED IN TURKISH PRESS
DURING DR. THEODORE VON KARMAN'S VISIT TO TURKEY

TRANSLATED BY

SEDAT SERDENGEÇTİ*

* Translator's note: On the untrue statements made by the Turkish press, I purposely kept the translation as exact as possible to the original.

Cover page of the file which contains the related newspaper articles during von Karman's visit to Turkey

Esteemed Scientist Theodore von Karman is in Ankara Today

Professor Theodore von Karman, the chairman of the Advisory Group for Aeronautical Research and Development of the United States Air Joint Chiefs of Staff and Chairman of Aeronautical Research and Development of NATO, will get in touch with scientists in our city.

Released by Ministry of National Defense:

As a guest of Ministry of National Defense, Professor Theodore von Karman, Chairman of the Advisory Group for Aeronautical Research and Development of the United States Air Joint Chiefs of Staff and Chairman of the Aeronautical Research and Development of NATO, will arrive at Ankara on January 9, 1955 (today) at 3:30 p.m. by a private plane. His staff includes General Gregory, the United States Military Attaché to Paris, General Adrier and General Molinier, French Air Force Joint Chiefs of Staff, Mr. Paul Dane, engineer of US. Air Force and Dr. Frank

[1] *His second visit was in 1960 to Istanbul to participate in the 10th AGARD Conference on 3.-8. October. The archive files at CalTech contain related newspapers as well.*

[2] *Some minor changes are applied into the text by author. Additionally a personal camera record of Istanbul's historical parts by von Karman can also be found in his personal collection (TVK 161.1); starting at 8:20: https://www.youtube.com/watch?v=ivly-55tzU4, last access: 16.08.2020*

Wattendorf, General Secretary to Aeronautical Research Group of NATO.

After meeting Turkish officials in Ankara, Dr. von Karman and his staff will visit Istanbul and Prof. von Karman will deliver a lecture at Technical University on "Today's Scientific Developments in Aeronautics". Dr. von Karman is a worldwide known celebrity and has devoted his life to his research and inventions in aeronautics.

Theodore von Karman (written by Engr. Col. Fuad Uluğ)

Theodore von Karman who took the first breath of our earth's atmosphere in Budapest in the spring of 1881, whom I met three years ago at a meeting, said the following as if he is passing out a sweet secret: "I was very little. Our house was located across Gül Baba, I always remember those days when I played in those beautiful gardens as the sweetest memories of my life".

Today we are also very happy and pleased to see this great scientist in our country.

There is no doubt that his tremendous improvement in aeronautics in a very short time is due to his past and present scientific research. Today without doubt he deserves the largest portion of the credit if the jet planes are breaking through

Değerli İlim adamı

Th. VON KARMAN Bugün Ankara'da

Aynı zamanda Amerika Hava Erkânı Harbiye-i Umumiye Riyaseti İlmî İstişare Kurulu ve Nato Havacılık araştırma ve Geliştirme Başkanı olan von Karman şehrimizde temaslarda bulunacak

M.M.V. Temsil Bürosundan bildirilmiştir: Amerika Birleşik Devletleri Hava Erkânı Harbiye-i Umumiye Riyaseti İlmî İstişare Kurulu ve Nato Havacılık Araştırma ve Geliştirme Grup Başkanı Doktor Theodore Von Karman, Milli Müdafaa Vekâletinin davetlisi olarak 9 Ocak 1955 günü (Bugün) saat 15.30 da özel bir uçakla Ankara'ya gelecektir. Doktor Karman'ı Amerika'nın Paris Ataşesi General Gregory, Fransız Hava Kuvvetleri Karargâ Başkanı Adlâer ve Fransız Generali Müfettiş, Amerikan Hava Kuvvetlerinden Müşavir Fuad Bono ve Nato Havacılık Araştırma Grubu Genel Sekreteri Dr. Frank Wattendorf refakat etmektedir.

Heyet Ankara'daki gerekli görüşmelerinden sonra İstanbul'a gidecek ve Dr. Karman tarafından Teknik Üniversite'de «Havacılığın İlim Bakımından Bugünkü İnkişafı» mevzulu bir konferans verilecektir. Dr. Karman uzun yıllardan beri havacılık sahasındaki ilmî araştırma ve buluşları ile şöhret yapmış bir zattır.

THEODORE VON KARMAN

Bu beynelmilel şöhretin hayatı hakkında Fuat Uluğ tarafından hazırlanan bir yazı ikinci sayfamızdadır.

Bugün şehrimize gelecek olan değerli ilim adamı Dr. Von Karman

Zafer, 09.01.1955: Esteemed Scientist Theodore von Karman is in Ankara Today

the sonic barrier and if the rockets are climbing the stratosphere with tremendous speed.

He was only twenty years old when he got his degree in mechanical engineering from Imperial Technical University in Budapest. During those days it was impossible for man to fly with a device heavier than air. In 1903 when the Wright Brothers in North Carolina flew for the first time with a machine composed of wings and an engine, nobody in Europe believed this to be possible.

Beynelmilel Şöhretler :

Theodore von Karman

Yazan : Fuad ULUĞ

Budapeşte'de, 1881 baharında dünyamızı saran havayı ilk defa teneffüs eden Theodore von Karman ile üç yıl önce bir toplantıda görüşürken, zekâ saçan bakışlarile, tatlı bir sır tevdi eder gibi bana şunları söylemişti :

«Pek küçüktüm. Evimiz (Gülbaba) nın karşısında idi. Onun güzel bahçelerinde oynadığım günleri hayatımın en tatlı hâtıraları olarak her zaman anarım.»

Bugün, biz de, bu büyük âlim! memleketimizde misafir olarak görmekle çok seviniyoruz.

Dünyaya feyiz saçan hayatı

man bundan sonraki zamanını Aachen ile Pesadena arasında taksim ederek çalıştı. 1930 da Guggenheim Aeronautics Laboratuvarının müdürlüğü vazifesini alan von Karman, Amerikaya yerleşti ve 1936 da Amerikan vatandaşı oldu. Bu büyük Enstitü, von Karman'ın idaresi altında Amerika'nın en yüksek araştırma merkezlerinden biri haline getirilmiştir. Onun sevk ve idaresiyle sesüstü uçuş için ilmî çalışmaların pek çoğu bu

Zafer, 09.01.1955: Theodore von Karman (written by Engr. Col. Fuad Uluğ)

From Imperial Technical University in Budapest. During those days it was impossible for man to fly with a device heavier than air. In 1903 when the Wright Brothers in North Carolina flew for the first time with a machine composed of wings and an engine, nobody in Europe believed this to be possible.

On a summer morning in 1906, a French journalist invited this young engineer to witness a historical trial flight for about one kilometer on a grassy field in Paris. The day he watched this historic first flight with his own eyes; the decision was made that he would devote his life to aerodynamics.

He completed one year of military service in the Austria-Hungary army. After the day he watched the first flight, his job as a research engineer in the machine factory was not impressive for him. He was hypnotized with the feeling that he must do research to uncover unknown aerodynamic laws for the improvement of flight. To increase his knowledge in mathematics and physics he entered the University of Göttingen in Germany. In 1908 he passed his doctorate examination with high honors end then he joined the teaching staff of the University of Göttingen; there he and the famous physicist Max Born developed the modern theory of the specific heats of solids.

When he was thirty years old, he was appointed as the Director of the Institute for Aeronautics of Aachen University. During the First World War he

served as an officer in the Austria-Hungary Air Force. When he returned to the Institute for Aeronautics in Aachen in 1918, this center became the world's most productive and efficient institute. Since his interests were very well diverted to several scientific fields, Dr. von Karman served as a consultant to several German aircraft industries such as Junkers and Zeppelin.

For safe flying, it was necessary to know the properties of fluids, specifically air and its effects on the objects moving through it. These feelings led him to study the vortex formation in air and he discovered his famous theory known as "vortex streets of Karman". After that he contributed numerous research to the boundary layer flow which was originated by the famous scientist Ludwig Prandtl.

The rate of development of the aircraft industry was increased tremendously with the theory of plasticity which he developed with Haar, and with the theory of stability of beams and shells beyond the elastic limits, which he developed with the famous Chinese scientist H. S. Tsien.

Merely the titles of the scientific research and discoveries of Theodore von Karman are enough to fill these columns. His discoveries and studies are utilized not only in aeronautics but also in several other scientific and engineering fields.

In 1926 he was invited to the Guggenheim Institute in the United States for the purpose of improving and developing the field of aeronautics. Here von Karman contributed his valuable advice and opinions for the construction of additional wind tunnels. In the meantime he gave several lectures all over the United States. During his world tour he contributed valuable scientific aid to the construction of the very first wind tunnels in China and Japan.

In 1928 he was invited to join the teaching staff of the California Institute of Technology. After that year he divided his time between Pasadena and Aachen. In 1930 von Karman was appointed as the Director of the Guggenheim Aeronautics Laboratories and in 1936 he became a citizen and settled in the United States. Under his leadership a great deal of study and research were conducted on supersonic flight, and he built the first supersonic wind tunnel at this laboratory. Just before the Second World War, the United States Armed Forces Research and Development Office began the study of rocket projects under his guidance.

Theodor Von Karman (ortada gözlüklü) dün ilim adamlariyle görüşürken

Jet uçaklarını yapan Von Karman izahat verdi

Theodor Von Karman, «B. 86 jet uçakları tecrübelerden sonra istenilen neticeyi verirse Mig uçaklarıyle aradaki fark çok artacaktır» dedi

Vatan, 13.01.1955: von Karman who Built the Jet Plains

Again just before the war von Karman, who was technical advisor to the United States Army at this time, supervised the study and research on the development of long range artillery rockets. He has been Chairman of the Scientific Advisory Group to the Joint Chiefs of Staff of United States Air Force from the year 1944 when it was first established.

He was the first scientist to convince the military personnel to pay special attention to the future development of rockets and jets. In 1941 he tried to convince some American industrialists to assume the project of building rockets for the Armed Forces, but none would take the risk. He did not give up since he knew that he must stimulate then with a small demonstration in order to get them started. With four of his friends at the California Institute of Technology he collected $ 8.700 and established the Aerojet Engineering Corporation, consisting of only five employees. During those days their products were used as JATO rockets. This example was sufficient to start the rocket industry in the United States.

Dr. Theodore von Karman, who hates politics as much as he loves science, is a very close friend and helper of people who hunger for knowledge and wish to be free to apply their ideas. His superior ability to gather together and organize scientists and researchers of the peace loving nations is as famous as his scientific accomplishments.

In 1953 President Eisenhower presented to him the Wright Brothers Award during the 50th Anniversary of the Aircraft Industry. D. Robinson has beautifully summarized the accomplishments and

character of Dr. Theodore von Karman when he said "Thanks to him we are able to fly faster, higher and with greater safety".

Theodore von Karman Said: "If the Experiments on F-86 Jet Planes Give the Expected Results, MiG's Will Be Left Far Behind"

Theodore von Karman, the Chairman of AGARD and group leader of NATO, Aeronautics Research and Development, arrived in our city at 3:30 p.m. yesterday. He is accompanied by Fuad Uluğ. von Karman was interviewed by one of our correspondents and he answered questions in the following manner:

"I wanted to visit Turkey, valuable member of NATO, for a long time, This was not possible due to my continuous work and research in science. My visit at this time is one of the routine visits I usually make to NATO countries".

Q: At present do you have any plans and inventions for the improvement of jet planes?

A: We are working on new types of jet planes. We are hoping that developments in jet planes will be kept parallel to present day technical improvements. F-86 is a new type of jet plane, on which tremendous effort is being concentrated at present.

Q: Would you please compare Russian built MiG with American built jet planes?

A: (The inventor of jet planes answered with a smile)

"I am happy that I am still alive; otherwise they (Russians) could have claimed the invention of jet planes themselves, I really wonder. However, MiG's which were built by German engineers have some superior qualities. For example, Russians do not place any value on the life of human beings. For that reason they are not using any safety measures for their pilots. Therefore, they are able to fly their planes faster. However, they have not reached to the level of our jet planes. Certainly if the experiments on F-86 jet planes give the expected results, there will be a great difference between these two."

Q: What do you think of the frequent jet disasters in our Air Force?

A: The same type of disasters are also present in the US. Air Force. The number of disasters is not greater than in other countries. Of course experience in these planes is a major factor in knowing how to fly them. When the crash of the jets due to technical difficulties is eliminated, the number of disasters will certainly be reduced considerably

Thedore von Karman Biography

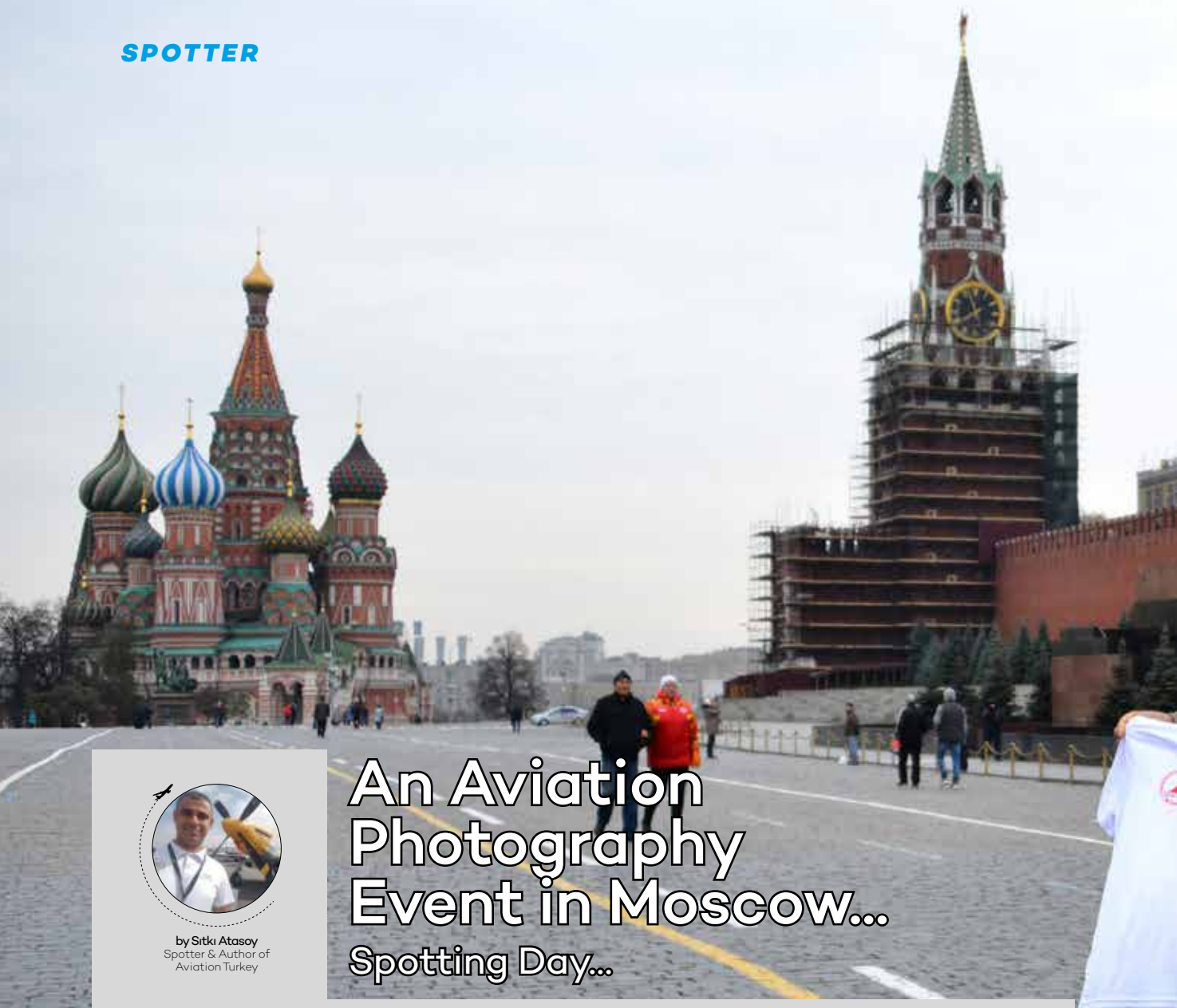
Dr. Theodore Von Karman was born in Budapest, May 11, 1881. He was trained as a mechanical engineer, graduating with highest honors from the Royal Technical University at Budapest in 1902. The next eighteen years were devoted to the founding and development of the Aeronautical Institute of the University of Aachen, which eventually became a leading aeronautical center.

Von Karman first visited the United States in 1926 under the auspices of the Daniel Guggenheim Fund for the promotion of aeronautics. In 1930 he became Director of the Guggenheim Laboratory in Pasadena, California. In 1936 he became a naturalized citizen of the United States of America,

In 1944, von Karman organized a Scientific Advisory Group to advise the US. Air Force on the role of the new technical developments. He personally was largely responsible for the establishment of the Advisory Group on Aeronautical Research and Development (AGARD) within the North Atlantic Treaty Organization. He was unanimously elected its first chairman and still holds the office.

One of the striking attributes of Dr. von Karman's scientific and technical work is its international character. Carried out in diverse geographical and technical environments and printed in diverse languages, his reports are sought by scientists and engineers all over the world.

Dr. von Karman's penetrating analysis of complex, scientific and engineering problems to discern the important and essential elements, his success in subordinating mathematical techniques to physical principles by the use of appropriate simple and rational approximate solutions and his skill in the presentation of the results in clear and logical form have made him the outstanding aeronautical scientist of our generation. He had been to the field of aeronautics what Prof. Einstein, his good friend, had been to the field of mathematics. He has been a researcher, professor, author, advisor to governments, the founder of the first industry for the manufacture of solid rocket propellants in the United States, and perhaps most important of all, the inspirational friend and teacher of brilliant students from all over the world.



by Sıtkı Atasoy
Spotter & Author of
Aviation Turkey

An Aviation Photography Event in Moscow...

Spotting Day...

Dear Readers,

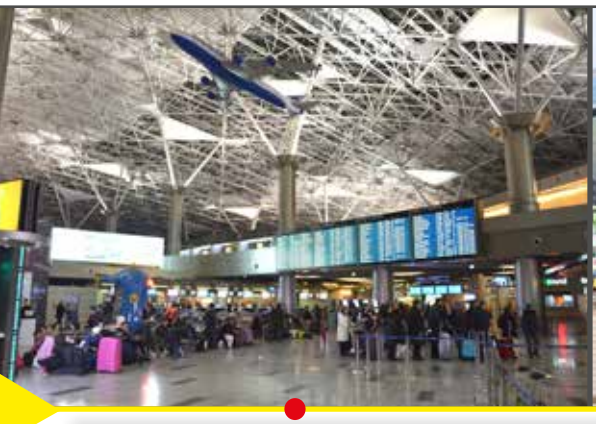
In our previous article, we touched upon what it's like for an aviation photographer to participate in an air show and the stages of shooting involved in aviation photography.

As in every article, I would like to remind our readers once again that it is always wise to make budget-friendly choices when selecting equipment. For this reason, I think it is useful to select or upgrade equipment by self-appraising based on personal enthusiasm and by recognizing the level of dedication and skill in this hobby. It should not be forgotten that in the end the photo is taken by an individual. As the number of shots, we capture increases and as we refine and compare the outcomes, we will be able to identify our needs more easily and make better decisions.

In this article, I describe my experience attending a Spotting Day event in Moscow. The preparations and stages of participation, the information required during the activity and the list of things to be done after the event will be covered along with the security measures and codes of conduct will be described through the perspective of my experiences and observations.

In October 2014, during a beautiful autumn, I happened to come across some news on a website saying that an airline company was going to conduct a flight for the first time to the Domodedovo Airport in Moscow and that a special welcoming event was going to be organized for a private airline company. I was interested, as I had been thinking of attending an airshow, so I immediately contacted a master's in aviation photography, Aktuğ Ateş who lived in Moscow and

I researched the details about the welcoming ceremony. After confirming the event, I started to follow Domodedovo Airport's announcement regarding this activity. I sent an email to the event organizer to inform them of my intention to attend the event and inquired about the requirements. They promptly contacted me and asked for my passport information, my reference photographs and information on my photography equipment. Two days after submitting the required information I was informed that my application to attend the Spotting Day aviation photography event had been accepted. In the reply, I was kindly asked to wait at Domodedovo Airport's Public Relations Counter on the day of the event. Actually, since the application process for these kinds of events are quite lengthy in our country and it is quite hard to get accepted, I didn't think that I would be accepted. I was quite surprised to receive their positive response so quickly. Then again, I was really pleased to be able to attend the Spotting Day event and to have the opportunity to take photos on the apron of an airport in Moscow, as a Turkish Aviation Photographer. I hope that with our satisfactory work and successful events in Turkey, these types of processes will take less time in our country and become more accessible to all aviation photographers worldwide.



Upon the positive response from the Domodedovo Airport, I immediately gathered the details needed such as the relevant location, runways, terminals, the angle of the sun according to the time, etc. And since this was an event carried out by the airport operator, I still had doubts about how the photography locations and positions would be identified, whether the photos would be taken under their control or the control of the photographers. I researched details about the airports in the Moscow city center and the other airports nearby, the transport duration and distance between these airports and the city center. As a result of some initial research, I decided on the required means of transportation. Then, by considering the cold in the last months of autumn in Moscow, I arranged the necessary clothing, bags, and lotions for myself, protection cover for the machines and lenses to avoid the cold.

I had been dreaming of visiting Moscow, particularly during autumn and winter for a long time. One of the biggest reasons for this was the opportunity to capture wonderful images during high winds, sleet, snowy and blizzard conditions. The images I may capture under those harsh and challenging circumstances would be quite different than the images I captured in Antalya - the city I lived in. What really mesmerized me was the chance to see the lovely reflection caused by the snow under the plane. I had examined photos such as this with falling snow and with the ground covered with snow, and the prospect of capturing my own unique images was very exciting. Another positive factor was the cost of participating in such an event. As you may have guessed, since it was winter the tickets from Antalya to Moscow and return tickets were quite affordable, sometimes they are even cheaper than the tickets from Antalya to Istanbul, Ankara, or Izmir. Also, in those days, there was no visa obligation for Turkish citizens visiting the Russian Federation; touristic visits could be conducted with just a Republic of Turkey passport.

My next step after planning my journey was to look for a cost-efficient ticket that would allow me to

arrive in Moscow early in the morning the day of the event and to return to Antalya right after the event, on the same day or night. In short, I planned to make it a day trip. After a brief search online, I came across the ticket that I was looking for. Until the flight date, I took care of the preparations I mentioned in the previous article, and instead of the airport where the event would take place, I had arranged to fly to another airport in Moscow, to Vnukovo Airport from Antalya on the night before (in the very early morning hours) the Spotting Day.

During my research on Moscow, I came across AeroExpress trains that provided transportation service from the airports in Moscow to the city center in the morning. So, I took the earliest service of this train and reached the Moscow city center. There, I met with my esteemed contact and master aviation photographer Aktuğ Ateş and we toured around fascinating Red Square. Then we took an AeroExpress train once again and we headed to the Domodedovo Airport at noon. We reached Domodedovo Airport around 13:00 p.m. and we

still had two hours before we were scheduled to gather for the event. So, we went to the second floor of the terminal, and accompanied by the panoramic view started to shoot the parking positions of the aircraft and snapshots inside the terminal and on the apron. Two hours later, we went to the designated meeting point and waited along with the other aviation photographers.

When the event started aviation photographers mostly from Moscow were gathered at the meeting point in addition to other aviation photographers from around the Russian Federation. An official from the organization checked the names of the participants one by one and started the event after handing us our entrance cards that had our titles printed on them. We were also provided with safety vests for the Domodedovo Airport Apron as our cards allowed us access to certain parts of the airport. We were then sent to the security point that was located at the end of a long and narrow corridor. There our passports and our apron entrance cards were checked and our bodies and bags were inspected at the security inspection point. After the security check, we waited in front of the gates opening to the apron and an official from the organization committee informed us of the locations, points and the times that we could take photos.

A ground service bus arrived at the apron gate and took us to the location where we would be shooting. From that time on I was on the apron in Moscow as a "Turkish Aviation Photographer."

The bus dropped us at the shooting point, which was located in a safe place, in front of the fire department and next to the taxiway at the 32R (right) and 14L (left) runway at Domodedovo Airport. The aircraft were now landing at the 14L runway and taxied in front of us. The shooting started in a designated order and all participants respected

the rules and each other, respecting the space of all the other aviation photographers. Then the direction of the wind changed, the airplanes started to land on the 32R runway and passed over us, then headed to the terminal apron for the parking position after the 'Follow-Me' vehicles that were waiting for them. In the meantime, the airplane of the airline company landed at the airport and we took its photos. After a while, the bus took us back to the spot where the airplane was waiting. Accompanied by the passengers who landed, we took photos of the airplane in a static park position.

As the sun started to set, the bus dropped us off at a spot in the middle of the 32L and 14R runway, between the taxiway and the parking place. We could easily capture photos of aircraft that were taking off, taxing of landing aircraft and cargo planes that were waiting on the cargo apron, as well as shots of traffic. After a wonderful day of shooting, the bus took us to the exit gates of the apron. There we snapped photos of the terminal apron and the aircraft waiting at the loading bridge and exited through the apron gate. After we stepped out of the bus, we passed the security check point and were transferred to the terminal.

The organizers of the event kindly asked us to share our photographs through any environment that could be accessed through social media and the internet and bid us farewell from the Domodedovo Airport. (Later on, an internet communication counter was formed at the Vnukovo Airport providing facilities that enable rapid and high-quality sharing online.)

We built great friendships during this event and were able to get acquainted with many leading aviation photographers of the Russian Federation.

It was 19:30 p.m. and the departure of my plane from the Vnukovo Airport was soon approaching.

Aktuğ Ateș and I quickly left the Domodedovo Airport went to the city center by AeroExpress train; there we bid each other farewell and I left for the Vnukovo Airport again by AeroExpress. I didn't have any luggage; I only had the bag with the equipment. So, after a swift online check-in, I passed the passport check and arrived at the gate of my flight, and I managed to get on the plane just as the gate was closing.

Despite the fatigue, I enjoyed the flight with a sense of joy as my thoughts were filled with the days moments, of aviation and the beautiful images I had captured. I returned to the point from which I started, to Antalya, after exactly 24 hours.

When you think about it, going to Moscow for a shoot may seem like hard work. And naturally, one might think that it is quite costly. However, as I mentioned, it merely costs as much as two domestic flight tickets. In this 24 hour journey I made good use of the time since the duration of my two flights equaled to the duration of two domestic flights. I captured stunning images during the event, saw various aircraft models and coatings and took a variety of photos. And this was truly the greatest reward for such a cost-efficient journey.

After this first experience, during the autumn and winter of 2014 and 2015, I went to the Vnukovo, Sheremetyevo and Domodedovo Airports under all types of weather conditions and gained diverse experience at numerous Aviation Photography and Spotting Day events that I attended. For instance, at the Night aviation photography event in February 2015, I took photos at the airport and on the apron under heavy snow and blizzard conditions with temperatures of -15 and even -20 while striving to protect myself from the blustery cold, using my equipment was an amazing experience. In addition to innovations, different airports and various weather conditions often give aviation photographers the chance to build new competencies. With good research and logistics, you may as well go to various cities, countries and airports, and make your mark with unique experiences and unforgettable photo shoots.

During my visits since 2007, I have observed the progress in aviation photography particularly in Moscow and in many other cities and airports of the Russian Federation and I have personally witnessed invitations that facilitate the efforts of aviation photographers and spotters.

I believe the regulations and granted licenses and the approach of the Russian Federation's

Ministry of Transportation as well as the aviation authorities, the operators and relevant airport administrations and last but not least the concerned parties with an advanced level of aviation culture underlay the level achieved by aviation photography events and airshows in the Russian Federation.

In this article, I've written about a day at an aviation photography event and the participation stages of the event in another country. Even so, the stages I wrote about are merely my personal experiences and preferences. Every aviation photographer captures stunning images by blending their own creativity, experiences and know-how as a photographer. After our images appear, we can analyze our photos, see the results of our parameters, make notes and observe our own performance and adjust accordingly. As our number of shots and experience increases, we can perform optimum shooting under various weather conditions with various aircraft types at new airports, in new circumstances at venues through controlling the time and conditions.

In the final section of this article, I will leave you with the pleasant interviews I made as I explored how aviation photography was conducted in Russia, whether or not it is supported by the authorities, and the country's perception of Spotters. As I believed it would enrich the article further, I asked the following three questions to renowned Aviation Photographers in the Russian Federation with whom we executed photoshoots.

1- When and how did your interest in aviation photography begin? How did you improve your capabilities in this area?

2- How would you help and support beginners in aviation photography to progress in aviation photography?

3- How does the Russian Federation approach aviation photographers? How do the aviation authorities support Spotters?

Their answers are as following pages...

We wish you pleasant reading!

Aktuğ Ateş, Advertising Photographer

Aktuğ Ateş: My interest in aircraft started when I was six. The aircraft landing at the Ataturk Airport in Istanbul used to fly above our neighborhood and I watched those magnificent birds with enthusiasm. My desire to become closer to them increased day by day and turned into a passion. As a photographer himself, my father gave me a camera as a gift and so I decided to take photos of the aircraft. I enjoyed that very much and I have been pursuing this hobby with the same level of excitement ever since. I started to improve myself in this area by learning basic photography techniques such as composition and lighting. Since we did not have any internet in those days, I used to buy aviation magazines, observed the angles used in the shooting of air vehicles and tried to do the same. By experiencing the shooting techniques, I endeavored to achieve the best in time. One should try different techniques, lenses, light and weather conditions in this hobby and see the results. In that way, one may achieve capturing successful images and step towards being a professional.

Aktuğ Ateş: The recognition of this hobby in the Russian Federation started at the beginning of the 2000s. I have been continuously carrying out photoshoots in the Russian Federation since 1998. During our photoshoots, we frequently gather with our young colleagues interested in this hobby. I share my know-how on basic techniques and other methods with them throughout the shooting. Many aviation photographers who newly started to enjoy this hobby often ask me various questions during the photoshoots, and I enjoy sharing my experiences and know-how with them either in written or verbal form. Besides, I wrote two books in Turkish and Russian that cover technical information on aviation photography as I believe such written work would be quite advantageous for beginners.

Aktuğ Ateş: In 2007 and the following years, Domodedovo Airport in Moscow organized a spotting day by gathering many aviation photographers on the apron. Numerous airports in the Russian Federation followed the Domodedovo Airport and frequently launched such spotting activities. These collective photoshoots enabled the authorities to become acquainted with the photographers and to ensure the controlled and safe execution of this hobby. Today, we are in continuous contact with the authorities. In this way, we enjoy photoshoots on the apron and capture beautiful images while the airport authorities gain a photography archive built by professionals. Nowadays, with the popularity of social media, our work is closely followed by airline companies, airports and airshow organizers. In particular, airline companies often invite us to photoshoots with various themes and based on our mutual trust, we often exceed their expectations and transform our experiences into wonderful frames.

Tatiana Belyakova - Татьяна Белякова

Tatiana Belyakova : I fell in love with airplanes when I was a child. I used to spend the summers at our summerhouse under the landing lane of the Chkalovsky Airport. I always enjoyed looking at the sky and was fascinated with the snow-white birds. The aircraft landing on the Vnukovo Airport can be clearly seen from the window of my apartment in Moscow. In 2012, I followed my desire for photography, and buying an SLR camera and I started to take photos of aircraft. First, I took photos behind the fences of the Vnukovo and then I managed to attend the first spotting event at Domodedovo Airport. Presently, photography and airplanes are a substantial part of my life. Needless to say, I had to learn about the new shooting techniques (i.e. pan shot) and buy long focus lenses to take the photos of the aircraft. Though I have not been involved with aviation photography for long, I observe an increase in the interest in spotting.

Tatiana Belyakova : Social networks bear great importance for observation, and training and improvement for the new generation. We are all following photos taken by our colleagues and help beginners in understanding camera settings, we give them clues in selecting proper lenses and recommend locations where they could take photos of the airplanes. Furthermore, I am always trying to support photographers from other cities and if I have time, I take them to interesting spots near the airports with my car.

Tatiana Belyakova : Airports have been inviting more and more people, and many new photographers wish to take part, yet the airports fail to meet all the applications, the capacity of an accepted group is usually 80 people. Vnukovo Airport holds spotting events only on the day of the launch and invites almost every photographer and offers them a day-long photoshoot. Unfortunately, there are no official spotter platforms in Moscow or other cities. We all wish for the airports to hear our voices and offer us designated spotting locations where we could easily take photos of the aircraft.

Artem Kashirin - Артем Каширин

Artem Kashirin : My enthusiasm for aviation photography emerged suddenly in a very unusual way. I have been in love with aviation for a long while, in other words, I fell in love with aviation right after my first flight to Moscow from Sochi in an IL-86! One day while I was running I realized my dream, like a star pushing me into a chair and I understood it was an endless love"And nearly 7 years ago, in 2013, when I was 30, I downloaded the Instagram application and through the hashtags, I saw that people were taking photos not only at the airport terminal but also they were taking photos of the aircraft behind the fences. So, I headed to my first spot behind the fence of the Domodedovo Airport. I took my first photo of a Boeing 777 of Transaero Airlines and grasped the happiness of watching the aircraft and taking their photos! This was the beginning of an interesting life in aviation along with my stories of flights, movies, aprons, presentations and other events. I have been attending

many events in the Russian Federation and abroad for seven years now, and I have been constantly processing my content and photography quality.

Artem Kashirin: I am actively corresponding with everyone in my Instagram network. I inform them of the spots to take photos of the aircraft, where to stand in the aircraft cabins, and which airports are available for photography.

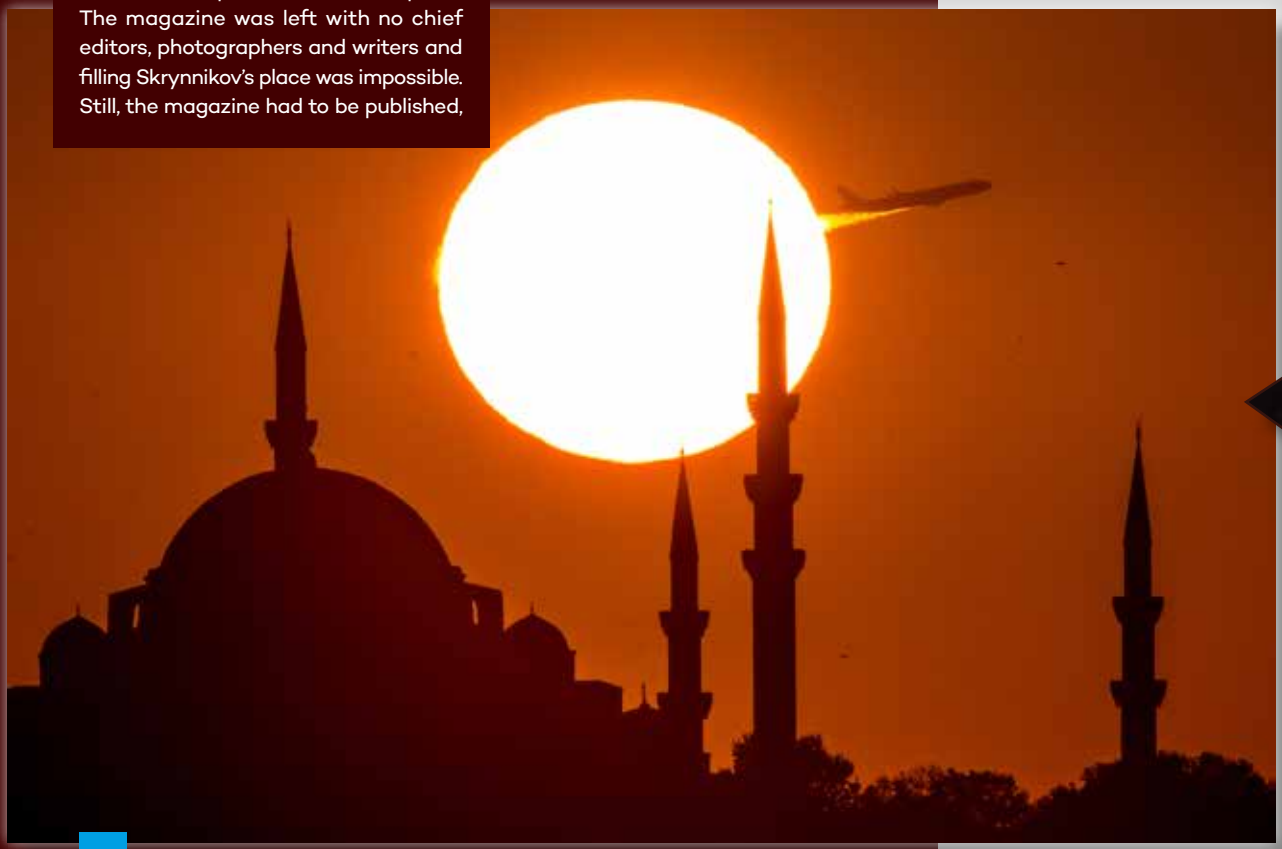
Artem Kashirin : They are treating the aviation photographers well in the Russian Federation, the airports are regularly holding events and airlines are organizing photoshoots of various events. However, unfortunately, there are no official spotter platforms behind the fences for the time being.

Marina Lystseva – Марина Лысцева, Architect

Marina Lystseva : I studied architecture; yet after my graduation, it was not possible to work in my own field as the other professions were popular in the '90s.

In 2000, by coincidence, I worked for "Aviation and Space Magazine" and Sergey Skrynnikov, regarded as one of the top five aviation photographers in the world, was the chief editor of the magazine. Skrynnikov constantly brought photos from the exhibitions of aviation shoots, and I was responsible for selecting them for the slide show. In this way, I gradually started to figure out the ways to take a good photo. I worked with Skrynnikov for over two years until one day, he did not return from a business trip, he had passed away in an An-140 crash in Iran (23.12.2002). There were nearly 50 people in this unfortunate incident and most of them were Ukrainian experts flying to Tehran for the promotion of the airplane. The magazine was left with no chief editors, photographers and writers and filling Skrynnikov's place was impossible. Still, the magazine had to be published, so I started to attend various events and took photos. My colleagues from other magazines noticed that I was good at this and started to ask for my help. With the savings I made in a few years, I bought my first digital DSLR camera. Before that, I used to take photos with a Zenith or a Nikon that I had borrowed from a friend.

Since 2005, I have been in collaboration with Russian News agencies that are buying photographs of aviation and other fields.



Self-development... One needs to strive to exceed the level they have reached. We should endlessly look for new angles and new approaches for photoshoots. Sometimes, new ideas emerge throughout the shooting and sometimes you maintain the ideas at hand for many years. For instance, in addition to airplanes, I like taking photos of the moon and the sun with any background. Here is an interesting story, I calculate the time and spot of the moonrise and its background. For example, a short while ago, I recorded a video of the moon where it switched its location over the Iver Gate at Red Square and an airplane crossed over the moon. This indeed was a great opportunity. A classical photograph...Taking a photo of an airplane in the moonlight...Yet, to do this one needs a good lens and a properly selected location. I still have not yet been able to capture the best frame shot with the moon.

Marina Lystseva : I help when I am asked for advice, but I do not wish to impose anything on anyone. I attended a few presentations where I told the stories of certain photos. Then again, usually, a good photo is almost all the time an outcome of chance and sometimes of good estimation.

A couple of times I gave some advice via aviation magazines and to friends who wish to be published without fees. You may ask for fees in the aftermath when you start to be known with your name in your profession. Still, I may claim that aviation photography hardly brings any income in the Russian Federation, it is rather regarded as a hobby here.

Marina Lystseva : In the Russian Federation, you may come across the misconception that a person with a camera particularly around the airport is thought of as an agent. This is a misconception that we have since the Soviet era. This perception which remains from the past still continues in certain regions and people may get suspicious about the spotters. Therefore, in my opinion, it is still quite challenging to hold events for spotters outside the major metropolitan cities. The airports in Moscow and various airports across the country are regularly holding spotting events and they are organizing certain competitions, and this is really wonderful. Here, aviation photography spotting is usually executed at Domodedovo and Sheremetyevo and twice a year in Vnukovo. Also, the Zhukovsky airport invites us from time to time. It is possible to attend aviation photography spotting events in the cities of Ekaterinburg, Sochi, Novosibirsk, Vladivostok, Tomsk, Simferopol, Krasnoyarsk, Tyumen, Kaluga, St.Petersburg, Habarovsk, Kurgan and Ufa, located in various regions of the Russian Federation.

General Information of the @Team

Our Mission

The @Team has come together with the aim of developing projects at home and around the world, reflecting its passion for aviation and space, with a team profile that proves that the aviation industry can appeal to people from all disciplines, regardless of their field of training.

Our Vision

The @Team underlines that everyone can seek their own future in the skies, with our team profile proving that the aviation industry can appeal to people from all disciplines regardless of their field of training, and at the same time, we aim to inspire fellow students with our ideas and projects, and encourage new creative ideas and new collaborations through an appropriate inspiring environment where are ideas free to soar.

Aviation and Space Clubs Publicity Project Mission

In Aviation Turkey magazine, the Aviation and Space Clubs Publicity Project, designed by the @Team, aims to support the activities of relevant clubs, prepare an environment for new collaborations at home and around the world by developing global relations between such clubs and to directly reach student clubs that are an important part of the aviation industry by addressing aviators of the future and aviation & space lovers, in order to contribute to the recognition of such clubs worldwide.

General Introduction of the @Team

Hi All!

We're three young people who have hearts beating in tune with aviation, and we're up to something exciting! Our mission, which brings us together in the footsteps of our mentor Can Erel, is to develop projects at home and around the world and to create cooperation within the industry, reflecting our passion for aviation and space, with a team profile that demonstrates that the aviation industry can appeal to people from all disciplines, no matter what their professional field is.

Our first stop is the Aviation and Space Clubs Publicity Project designed by the @Team in Aviation Turkey magazine. Our primary goal in this project is to draw attention to the fact that the activities of clubs, in whatever field, during student life, considerably pave the way for the social and cultural development of students and help them to become productive individuals, exploring their innovative ideas. The overall objective of this project is to support the activities of aviation and space clubs, to develop global relations between these types of clubs and to prepare the environment for new connections and collaborations at home and around the world. We aspire to directly reach out to student clubs that are an important part of the aviation industry, addressing the aviators of the future and aviation & space lovers, in order to contribute to the recognition of such clubs worldwide. Therefore, on our journey as the @ Team, our vision, which evolved with the Aviation and Space Clubs Publicity Project, we emphasize that everyone can seek their own future in the skies, and we exemplify this through our team profile as the aviation industry appeals to people from all disciplines regardless of their field of training. We look forward to inspiring our fellow students, whom we will reach out to with our ideas and projects, and we are eager to encourage new creative ideas and new collaborations in an inspiring environment where our ideas are free to soar.

It is not possible to walk alone on this journey, and our aim is not just to walk. No matter what professional field we address, we are those who seek our futures in the skies, our hearts are in the air! If you want to see the promotion of your aviation and space club from your educational institution/academy in our world-class aviation magazine, please share your club contact information with us, and let's prepare your content. Our team would like to get to know you, and we'll introduce you to the world in Aviation Turkey magazine!

Berra Nur Beşir - @Team Member, Publishing and Production

@Team Member Introductions

@Team Leader, Yağmur Gençoğlu

Yağmur was born on April 3, 1995 in Denizli. She graduated from Galatasaray High School in 2014 and from the department of Aeronautical Engineering at İTÜ in 2018. In the first year of university, she became the first scholar of the CAN'CA Scholarship of Success Program. During her university years, she took an active role in the İTÜ Aeronautical and Astronautical Engineering Society and organized the society's first iWOAW event. She served as the International Board Secretary of the European Association of Aerospace Students between 2016-2017. In her final year of university, she took part in the Very Light Aircraft project which was a joint student project of ITU and TAI and worked as part time engineer at Kale Arge. Yağmur GENÇOĞLU is continuing her master degree in Aeronautical and Astronautical Engineering at İTÜ and works as an Edison Engineer at General Electric Company and also participates in the @Team as their Team Leader.

@Team Member Hande Zeydan, Communication Executive

Hande was born on May 7, 1996. In 2020, she graduated from the department of Aviation Management at OZU. She has been working at the OzU Simulator Center since she was a freshman. For 3 years during her academic life, she participated in various university campus jobs such as Enrolment and Promotion Days. Hande has been a member of the OZU Civil Aviation Club since 2015, and she also is the most recent president of the club. She completed her mandatory internship with the International Flight Training Center (IFTC) in her third year. Besides academic projects and studies, she has participated and worked supporting many events like TEKNOFEST, İSTANBUL AIR SHOW and Hub Seminar over the last two years. Under the auspices of the DGCA, she conducted a survey in 5 big cities in Turkey to establish Turkish Civil Aviation Academy (TCAA). She is also one of the owners of Unicorn Box Braids since 2016 and she manages the store during summer seasons. Hande ZEYDAN also continues her business life as an assistant simulator flight instructor and a start-up entrepreneur, as well as participating in the @Team as their Communications Executive.

@Team Member Berra Nur Beşir, Publishing and Production Executive

Berra was born on August 25, 2000 in Samsun. She earned a degree in Comparative Literature from Eskişehir Osmangazi University in 2018. During her first year at university, she attended a preparation class in French. At the end of her first year, she earned the International French DELF Language Certificate from the Institut Français. At that time, she completed a short film project in French. After the preparation class, she completed her first year in the department with first degree and she earned the right of studying at the Sorbonne University in France for the year 2021. Therewithal, she joined her university's Hezarfen Aeronautical and Astronautical Club and took an active role as the Events & Organizations Team Leader. Additionally, she took part as an actress in Samsun Youth Centre during her high school years and won the second prize in the theatre contest which is in the Samsun city. Now, Berra Nur BEŞİR plans to establish her carrier life in media & broadcasting and the art sector, she also participates with the @Team Publishing and Production Executive

Istanbul Technical University

Since it was founded in 1773 as an Imperial School, Istanbul Technical University (İTÜ) is the pioneering university of engineering and architecture with many innovative studies in science, technology, research and development. In addition to academics, İTÜ hosts 246 student clubs that give students opportunities to socialize.

Faculty of Aeronautics and Astronautics

Faculty of Aeronautics and Astronautics was founded in 1983 after holding its presence under other faculties of the university for years. Chronologically the our faculty established the following programs: Aeronautical Engineering, Meteorological Engineering and Astronautical Engineering.

İTÜ – Aeronautical & Astronautical Engineering Association

The Aeronautical & Astronautical Engineering Association (UUMK) aims to provide students the opportunity to improve themselves both in technical and social ways by organizing and participating in the club activities and creating a center of excellence in higher education.

These activities can be both local and international thanks to our club being a member of EUROAVIA (European Association of Aerospace Students). Our members can take part in this international organization and build and widen their network and skills.

İTÜ – Aeronautical & Astronautical Engineering Association Mission

We aim to bring a joy and love for aviation to our members and help them find their path to becoming future leaders in the aerospace sector. We organize technical trips, technical educations, seminars, panels and social events to contribute to their improvement, both technically and socially.

İTÜ – Aeronautical & Astronautical Engineering Association Logo & Slogan

UUMK UÇAK UZAY MÜHENDİSLİĞİ KULÜBÜ

"Build the wings of your future!"

Board Members of İTÜ – Aeronautical & Astronautical Engineering Association

President: Anıl Alaçam - Aeronautical Engineering

Vice President: Beyza Çatalkaya - Meteorological Engineering

Secretary: Yadigar Yaren Şahin - Astronautical Engineering

Treasurer: Mete Düzgün - Astronautical Engineering

Event Manager: Bengisu Kaplan - Astronautical Engineering

R&D Manager: İrem Sezdi - Astronautical Engineering

PR Manager: Işılay Erdoğdu - Meteorological Engineering

Design Manager: Elif Eren - Aeronautical Engineering

International Contact Member: Çağın Emre - Astronautical Engineering

Executive Members: Gürkan Gür - Astronautical Engineering,

Zehra Kayış - Astronautical Engineering

The team also has a sub-committee which is autonomous for the organization of İTÜ Aviation Days and an advisory board which consists of three people.

Main Activities of İTÜ – Aeronautical & Astronautical Engineering Association

İTÜ Aviation Days which is one of the biggest conferences about aviation in Turkey, combines sportive and sectoral aviation under the same roof. During the event, aviation devotees, aerospace sector and aerial sports fans in our country gather up with "Let the wind of aviation hurl you!" motto. Every year, we welcome speakers from significant companies such as Turkish Aerospace Industry, NASA, Airbus, Boeing, Turkish Technic to the event.

We organize seminars to host well-known members of the aerospace sector. In our panels, we host people from different aviation sectors. Our Aviation Four in One Panel welcomes one fresh graduate, and people from academia, civil aviation and the defense industry. Our seminars and panels can be found on our YouTube channel. (INSERT YOUTUBE CHANNEL LINK here)

Technical Events

We organize technical trips to companies in different branches of aviation in and out of town. During our trips, we get opportunities to see our future working environment, have an idea of how companies operate, to get knowledge about the current and future projects of companies.

Model Aircraft Workshops where we build model aircraft with instructors from the Turkish Aeronautical Association (THK) and Technical Training for engineering tools that are used in the industry are examples of other technical events that we organize.

Online Events

A worldwide pandemic was declared, and schools suddenly had to make the switch to online education. Online education and the pandemic process made it impossible for us to carry out a lot of the activities that we planned for this year. The 'shelter at home process' gave us the opportunity to organize webinars on online platforms. We have held webinars with people from NASA, the European Space Agency and Silicon Valley. You can watch these webinars which, in Turkish, we call "Masabaşı Seminerleri" on our YouTube channel.

Social Events

We would like to have a great time with our members, expand their social surroundings and decrease the intensive stress of school exams. In order to do that we organize social activities such as trips, barbeques and movie nights.

Women of Aviation Worldwide Week

As UUMK, we celebrate WOAW Week hosting female guests from the aviation industry to talk about the importance of gender balance in the aviation industry, what we can do to foster gender balance equality and related challenges.

Looking to the Future

As UUMK, we want to establish teams for students so that the can improve themselves technically and at the same time we want to offer the opportunity to represent our school in national and international competitions in the best way possible.

International Event Euroavia - Emeac 2018

EUROAVIA contributes to students' professional skills with contests and workshops, and it provides a suitable environment for students to get to know different cultures and promotes the exchange of ideas.

One of the prestigious events of EUROAVIA - EMEAC 2018 took place in Istanbul hosted by our club.

The congress lasted a week with 50 participants. In addition to meetings, the participants were taken on tours to get to know our beautiful city.

Contact Information of İTÜ – Aeronautical & Astronautical Engineering Association

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Last Word

As UUMK, we care about cooperation with other aviation associations. We desire to be an inspiration for them while also being inspired by those aviation associations. Thanks to Aviation Turkey Magazine for both giving us the opportunity to introduce our association and for giving you the opportunity to get to know other aviation associations.

Özyeğin University

Özyeğin University (OZU) is a non-profit, state-recognized higher education institution established in 2007. OZU has a multicultural study environment with international students from 56 different countries at the OZU campus.

Faculty of Aviation and Aeronautical Sciences

Özyeğin University Faculty of Aviation and Aeronautical Sciences (FAAS) was founded in 2011 as a School of Aviation, then it became a Faculty by YÖK (Higher Education Institution) approval in 2016. The FAAS aspires to become an internationally recognized center of aviation in the region by admitting not only Turkish students but also international students from all over the world.

OZU – Civil Aviation Club

Özyeğin University - Civil Aviation Club was established under the Faculty of Aviation and Aeronautical Sciences in 2012 as one of the 38 student clubs sponsored by OZU. Since then, it has been one of the most active clubs at the university by organizing seminars, contests, site-visits, and movie nights. Currently, Özyeğin University - Civil Aviation club has 86 active members. The majority of members are either students of Aviation Management or Professional Flight students.

OZU – Civil Aviation Club Mission

OZU - Civil Aviation Club was established to inspire future leaders in the aviation industry by entertaining, sharing, learning, and exploring. The members lead their business, social life, and network while studying at the same time. Participants are eventually able to call themselves successful graduates of OZU with footsteps already taken in the aviation industry, and they also become social and self-confident individuals. Creating differentiation and being the most effective university aviation club is the core ideal of the club.

OZU – Civil Aviation Club Logo & Slogan

"The Core of Aviation" **(Havacılığın OZU)**

Board Members of OZU – Civil Aviation Club

President: Hande Zeydan – Aviation Management

Vice President: Gökberk Benlialper - Aviation Management

Visual Manager: Melis Tabak - Pilot Training

Event Manager: Beliz Çağlı- Aviation Management

Treasurer: Mustafa Yaman - Pilot Training

Head of Supervisory Board: Göksel Hüseyin Özçolak - Aviation Management

Members of Supervisory Board: Emin Can Siyimer - Aviation Management,

Zeynep Nur Çiğdem - Aviation Management

Main Activities of OZU – Civil Aviation Club

The events and meetings of the club are regulated and approved by the Social Club Responses from OZU managers. The club organizes events for all the students at the university and they support the faculty activities as well. For example, one of the most remarkable aviation seminars in Turkey is hosted by OZU - FAAS is an Istanbul Hub Seminar. The Seminar aims to discuss the latest topics and trends in aviation at the Istanbul Hub. OZU - Civil Aviation Club members support the seminar by welcoming and navigating guests from all around the world. The club also organizes movie nights and social responsibility activities as well.

Seminars

Crew Resource Management (CRM)

Sectoral Evaluations

International Aviator Women's Week

Turkish Flight History

Panels with Pilots and Managers

General Aviation Development in Turkey

Thematic Career Days

The OZU - Civil Aviation Club determines a specific theme for each event and hosts the most effective names of the sector on campus. The guests share theoretical and practical knowledge and experience that they have acquired throughout their career. Students are also totally free to ask and interact with the guests at the end of the presentations.

Kahoot! - Civil Aviation Acknowledgement Prize Competition

Kahoot! play is a traditional game at Özyeğin University. It has been played from English prep school to graduation, in many courses and events. The Aviation Club plays and gives prizes to students ranking the highest. The questions mainly focus on civil aviation culture and theoretical knowledge. Generally, lots of students from other faculties have participated and could also answer

the questions. The important clue to win is being fast and being confident with the answer.

Pilot Farewell Cocktail

OZU Professional Flight Training students transition from the campus education in the second years' second semester and continue flight training and flights at Hezarfen Airport. Thus, OZU - Civil Aviation Club members have organized a farewell ceremony for them in the evenings. Every student dresses up for the event in formal clothes and drinks cocktails, eats from the university's Le Cordon Bleu's restaurant, and has fun thanks to the support of the OZU - Music Club's songs and the OZU - Dance Club members' show.

Model Aircraft Contests

OZU - Civil Aviation Club members rebuild or fly model planes and its own drones on campus regularly. Additionally, this year it was regulated by a prized paper plane competition to fold the best paper plane and achieve the most flight time thanks to the best aerodynamics.

Cooperative Event Women of Aviation Worldwide Week

OZU - Civil Aviation Club welcomes various women aviators each year from flight crew to ground operations. This year, a question-answer seminar and discussion was arranged with an experienced female pilot on the subject of gender discrimination in employment and the mind-set in Turkey's aviation industry

with the contribution of the HeForShe Club.

International Event

Haaga – Helia University of Applied Sciences & OZU

Özyeğin University has a contract with Haaga-Helia University of Applied Sciences. OZU - FAAS, Aviation Management students are able to do their Erasmus in Finland and 20 students from that university visit Turkey and OZU - Civil Aviation Club members have accompanied them and have shown them around Turkish Airlines and Istanbul International Airport.

Looking to the Future

Our vision is organizing worldwide events with other international clubs in other countries as well as companies and authorities to give official certificates to members for their professional accomplishments. OZU - Civil Aviation Club members aim to become well rounded individuals and to be able to understand and cover all the necessities in the aviation industry.

Contact Information of OZU – Civil Aviation Club

@aviationozu

Last Word

As OZU - Civil Aviation Club, taking into consideration the demands and desires of members, our objective is to supply them with activities and experiences that engage them socially as well as academically in an efficient way. Our sustainability is grounded in the fact that we can learn and share experiences with each other, and this is always enjoyable and makes us happy. Thus, it is a huge honor to have this opportunity to inspire new and existing aviation clubs via Aviation Turkey Magazine.

Dufry - New Duty Free Shop Operator at Istanbul Sabiha Gökçen International Airport

Dufry, the world's leading travel retailer, will operate a duty free area that spans a total of 3,900 m2 in the Sabiha Gokcen Airport terminal building until 2032. The operating concession contract was signed between Sabiha Gökçen Airport operator ISG and Dufry companies on September 14, 2020.

Swiss-based Dufry will operate a duty free area spanning a total of 3,900 m2 in the terminal building of Istanbul Sabiha Gokcen International Airport (ISG), Turkey's 2nd and Europe's 12th largest airport until 2032. The operating concession contract was signed between Sabiha Gökçen Airport terminal operator ISG and Dufry companies on September 14, 2020. The related concession covers the operation of a 2,800 m2 duty free area on the departure floor and a 1,100 m2 store space on the arrival floor. According to the same concession, Dufry will take over eight existing stores as of November 2020 to provide the best service in the terminal building and will renew the retail space in line with new trends and needs in the sector.

Performing services since 1993 in Turkey, Dufry is one of the world's oldest and largest duty free operators. Headquartered in Basel, Switzerland, Dufry has been providing services in the field of travel retailing at more than 400 points worldwide such as airports, cruise lines, seaports, railway stations and etc. Operating currently the duty free areas and stores located at Antalya, Kayseri and Kütahya Zafer airports in Turkey, Dufry will be increasing the number of airports it serves in Turkey to four with the addition of Sabiha Gokcen Airport.

Airbus Delivered 196 Aircraft the First Half of the Year

Airbus delivered 36 commercial aircraft in June 2020, bringing the total for the first half of the year to 196 deliveries. Airbus delivered 389 deliveries in H1 (Half-Year) 2019. The decrease reflects the impact of the COVID-19 crisis. By aircraft type, a total of 11 A220s, 157 A320 Family, 5 A330s and 23 A350s were delivered in the first half of 2020. In H1 2020, Airbus booked a total of 298 net commercial aircraft orders. This compares to 88 aircraft in H1 2019.

EASA Completes its Boeing 737 MAX Test Flights

The European Union Aviation Safety Agency (EASA) has completed its test flights of the Boeing 737 MAX on September 11, 2020. Took place in Vancouver, Canada due to COVID-19 travel restrictions.

As the next step in its evaluation of the aircraft for return to service, EASA is analysing the data and other information gathered during the flights in preparation for the Joint Operations Evaluation Board (JOEB). The JOEB is scheduled to start next week in London, Gatwick in the United Kingdom. EASA has been working steadily, in close cooperation with the FAA and Boeing, to return the Boeing 737 MAX aircraft to service as soon as possible, but only once they are convinced it is safe.

Boom and Rolls Royce Teams will Work Together to Address Sustainability in Overture Design and Operations

Boom Supersonic, an aerospace company and Rolls-Royce, an industrial technology company, announced an engagement agreement to explore the pairing of a Rolls-Royce propulsion system with Boom's flagship supersonic passenger aircraft, Overture on 30 July 2020, in Denver.The goal of the new agreement is to work together to identify the propulsion system that would complement Boom's Overture airframe. The engagement will involve teams from Boom and Rolls-Royce collaborating on engine-airframe matching activities for Boom's flagship supersonic passenger aircraft, Overture. The teams will also examine certain key aspects of the propulsion system. The teams will investigate whether an existing engine architecture can be adapted for supersonic flight, while Boom's internal team continues to develop the airframe configuration.The priorities of this engagement are informed by Boom and Rolls-Royce's shared commitment to sustainability. Both companies recognize that supersonic passenger travel has to be compatible with a net-zero carbon future, and the two teams will work together to address sustainability in Overture design and operations. Overcoming the technological challenges of supersonic flight provides a unique opportunity to accelerate innovation sustainably.

FAI Technik Appointed as Honeywell Channel Partner

FAI Technik GmbH, the maintenance division of Germany's FAI Aviation Group, has been appointed as an authorised Channel Partner for Honeywell Aerospace. The agreement allows FAI to supply and service Honeywell avionics parts and systems. It covers all Honeywell Aerospace business aviation avionics products including its range of connectivity solution and services, cockpit and cabin upgrades.

As a Channel Partner, FAI Technik will be able to offer detailed Honeywell system upgrades, installation solutions, EASA and STC (Supplemental Type Certificates) certification as well as Honeywell parts at the most competitive prices. Additionally, as part of the global Honeywell network, FAI will

collaborate with the global aerospace manufacturer to develop marketing strategies, identify business opportunities and bring the best value to customers.

Euramec and GeoSim Team up with Vulcan, the Unique Aerial Firefighting Simulation Solution for Europe

Euramec, the European flight simulation solution providers team up with Australia's GeoSim to deliver Vulcan, a unique aerial firefighting simulation solution on August 25, 2020.

"Development of the GeoSim Vulcan Firefighting Simulation solution was already well under way before these devastating wildfires in Australia in 2019," Charles Du Plessis, MD GeoSim explained. "Our country is a on the frontline of this annual battleground as you could see on the horrific images portrayed in the press in 2019. We believe that our Aerial Firefighting Simulation Center will assist in further preparing our brave and skilled aerial aviators as they enter into the 2020/21 fire season and Vulcan could well prove to be a real lifesaver in this annual battle."

The aim of the Vulcan Simulation Center is to prepare our Aviators for the unexpected emergencies that can and do occur when flying into areas at low altitudes in adverse climatic conditions. Vulcan is designed to also support joint training exercises so that fire and rescue professionals are well practiced in mission preparation, communication, situational awareness and terrain familiarisation before they start to work as an effective team.

The new GeoSim firefighting sim solution is aimed at two important market segments: Search and Rescue (SAR) and Aerial Firefighting (AFF)

Both involve exposure to unusual risk - especially in adverse conditions such as fighting wildfires.

GeoSim is teaming up with Euromec to market and promote Vulcan as the turnkey aircrew training solution of choice for specialist SAR and AFF professionals.

"With its global sales and support network, and a proven track record of close personal attention to customer relationships around the world, Euromec is a preferred international flight simulation partner."

Euromec is partnering with GeoSim Technologies to ensure that the simulators used in the Vulcan Center fully comply with EASA FNPT-II standards.

"Government agencies and private operators now have a powerful tool at their disposal with the Vulcan aerial firefighting sim solution. We look forward to serving the Aerial Firefighting communities around the world and protecting our natural resources and communities." Bert Buyle, Ceo Euromec said.

TSI Seats Design and Engineering Competition Award Winners

The Aircraft Seat and Parts Design and Engineering Competition organized for university students for the 2019-2020 academic year by TSI Seats, which has had great accomplishments since its foundation in 2012, has been concluded.

The competition was organized for the first time this year to support innovative ideas on seating and seat spare parts, and the level of participation was impressive. Seating and seat parts account for an important share in the aircraft cabin interior market, and this competition established ground work for the design and development of indigenous and modern products with high added value that will increase the competitiveness of our country in the international aviation market. Through these awards students are given an opportunity to actively participate with industry, promoting and encouraging the design culture in Turkey and to carry out activities in parallel with the 2023 export strategy.

A total of 36 students from 21 different universities participated in the competition, and 29 projects were submitted for evaluation by the jury. TSI Managing Suat Sağıroğlu, Design and Program Management Director Tamer Açıkel, Sales and Marketing Manager Ahmet Özyılmaz and academicians from Istanbul Technical

University, Faculty of Aeronautics and Astronautics Prof. Melike Nikbay and Asst. Prof. Hayri Acar were the jury of the competition. The winning projects among the creative projects prepared about passenger experiences, needs emerged during the pandemic process, cost reduction targets, creating a comfort zone, etc. were announced at the award ceremony held online on August 26th.

Based on the scoring as per the scores and the number of students participating in the competition, Kocaeli University Faculty of Architecture and Design received the "Faculty Special Award" with the highest score in total.

Honorable mentions were awarded to Kumsal Kurt, a student from Özyeğin University Department of Industrial Design, with the project named "Holdup" designed for the easy use of electronic devices such as mobile phones, laptops, and tablets during the journey, and to Tuncay Çalışkan, a graduate student from Sakarya University Manufacturing Engineering, with the project named "Mono Leg" designed with the aim of a more affordable and easy installation, different from the existing leg design.

Gazi University Department of Industrial Product Design students Zeynep Beyza Özergin and Emine Asude Çırkan won the third prize with their "Only Aircraft Seat", designed considering the social isolation measures – the topical issue of the pandemic.

Ferhat Küçükşakalak, a student from Selçuk University Department of Industrial Design, won the second prize with his "Aero Economy Class Aircraft Seat", designed as a modular product family to meet the needs of low-budget, domestic or short-haul flights of airline companies.

In the competition held for the first time in the 2019-2020 academic year, Marmara University Department of Mechanical Engineering student Bazar Tuvakov was granted the first prize with the seat that was designed considering the importance of safety, comfort, seat weight and technological opportunities.

Airlines and Airports Agree on Conditions for European Winter Slots Waiver

Facing the most difficult winter season in aviation's history, airlines and airports have agreed to abide by a set of conditions together with slot coordinators under which an extension of the waiver of the "use-it-or-lose-it" rule could be applied for the entire 2020-2021 winter season. Continued uncertainty about a second wave of the pandemic and haphazard travel restrictions have caused passenger demand to plummet, leading to a slower recovery in European air transport and making the need for an extended slots waiver more urgent than ever.

To facilitate a prompt decision by the European Commission, ACI EUROPE, Airlines for Europe (A4E), Airlines International Representation in Europe (AIRE), the International Air Transport Association (IATA) and the European Association of Slot Coordinators (EUACA) have agreed on specific conditions to ensure a timely return of slots not planned for use this winter. This represents a significant achievement given the extraordinary circumstances airports and airlines find themselves in.

It is critical that the European Commission formalizes an extension of the slots waiver and clarifies how the conditions will be implemented. Industry and slot coordinators require a clear signal from the Commission as to the rules of the game for the coming winter season.

"Decisions must be made now to enable the timely return of slots for the winter season once the waiver is granted. This will give airports and airlines certainty in planning their schedules and operations and ensure that passengers know what to expect in the tough months ahead. Further delays will paralyze the winter planning process and add millions in costs for all parties," said Olivier Jankovec, Director General, ACI EUROPE.

"Restoring passenger confidence is a top priority for the entire aviation sector and indeed the European economy. Given the constantly changing government restrictions, it is vital that the upcoming winter schedules provide passengers with as much predictability as possible," said Thomas Reynaert, Managing Director, A4E.

"Only a full-season slots waiver will ensure that the flying of empty planes is avoided and enable flights to be operated in the most sustainable way possible. Airlines and airports in Europe stand ready to apply the agreed conditions as soon as the full-season waiver is granted and call on the European Commission to endorse this agreement and authorise the waiver immediately," said Rafael Schvartzman, IATA Regional Vice President for Europe.

VD Gulf & Satair Sign Long Term Supply Agreement and Start Strategic Partnership

VD Gulf, an independent maintenance, repair and overhaul (MRO) service provider in the Middle East, has signed a supply agreement with Satair, an Airbus services company. The signing took place in Sharjah by Mikhail Khoroshaev, Director General, VD Gulf and Terry Stone, Head of Sales & Support EMEA, Satair.

The agreement, which covers Satair's portfolio of products and services, will increase regional availability and will include set contracted pricing for various aircraft parts and hardware. Satair will utilize its regional footprint to support the customer on-site via its Dubai warehouse with right-on-time spares availability. VD Gulf will receive fixed pricing on a yearly basis to support financial planning for upcoming material requirements.

The signing marks an intensified partnership between VD Gulf and Satair, a collaboration that started more than five years ago.

Airbus Canada Transfers A220 Material Management Services to Satair

Airbus Canada Limited Partnership has officially transferred the overall A220 material management services offer to Satair, as part of the program integration into Airbus. Since July, Satair, an Airbus services company, has taken the lead on global material support and services for A220 operators, working in close coordination with the A220 program team at Airbus Canada.

The transfer represents a key milestone for Airbus and a significant step in the overall further integration of the A220 program. "All A220 customers will benefit from the same level of service and global network offered by Satair on all other Airbus platforms", said Rob Dewar, Senior Vice President, A220 Customer Services, Customer Satisfaction and Product Policy. "This is a significant contributor to improving the overall satisfaction of our growing A220 customer base worldwide."

"Satair's footprint of service centers and warehouses will contribute to a greater scope of spare parts available for all A220 operators. Customers can look forward to leveraging Satair's global presence", said Bart Reijnen, CEO of Satair. "We are very proud to be supporting the A220 aircraft with our strong Satair organization."

The A220 material management services transition to Satair started officially on July 1st, 2020. Overall Satair is now in charge of a wide range of value-adding activities including planning & inventory; purchasing; quality inspection; certification; warehousing & distribution; customer order handling; 24/7 AOG handling; initial provisioning and tool lease. Over time, as the A220 fleet grows and also gains maturity, Satair will also develop the areas of parts lease, repair and exchange for the A220. The customer order handling of the A220 program is solely managed in the Satair | OEM parts and services channel with its global group of Satair companies.

The A220 program headquarters are located in Mirabel, Canada together with main customer services functions, such as engineering expertise and a 24/7/365 Customer Response Center.

Benefitting from the latest technologies, the A220 is the quietest, cleanest and most eco-friendly aircraft in its category. Featuring a 50% reduced noise footprint compared with previous generation aircraft, 25% lower fuel burn per seat and 50% lower NOx emissions than industry standards, the A220 is a great aircraft for neighbourhood airports.

The A220's order book comprises 642 A220 aircraft on firm order as of the end of July 2020.

As of the end July 2020, 118 A220s have been delivered to seven operators and are being flown on routes in Asia, America, Europe and Africa, proving the great versatility of Airbus' latest family member.

Otto Aviation Completes 31 Successful Test Flights with its Groundbreaking Celera 500L

Otto Aviatioin introduced the Celera 500L, the most fuel-efficient commercially viable passenger aircraft in the world. The full-scale prototype has completed 31 successful test flights that validate its operating performance goals. Otto Aviation currently holds seven patents, further contributing to the credibility and potential of the aircraft. The aircraft has a maximum cruise speed of 450 miles per hour, a range of over 4,500 miles, a large stand-up cabin and an astounding fuel economy of only 18 to 25 miles per gallon. The dramatic reduction in fuel consumption makes the Celera 500L the most environmentally friendly airplane in its class and presents a major leap forward in the effort to develop a zero-emission air transportation system. The Celera 500L utilizes extensive laminar flow over the fuselage, wings, and tail surfaces to reduce drag and achieve superior aerodynamics, speed, and fuel efficiency. The manufacturing detail delivers cruise efficiencies unmatched by conventional aircraft while offering a clean-sheet design that will completely alter the way people and parcels travel. “Innovation at its core is solving a problem without conventional bias. Our goal was to create a private aircraft that would allow for direct flights between any city pair in the U.S. at speeds and cost comparable to commercial air travel,” said William Otto Sr., Chairman and Chief Scientist of Otto Aviation. “In many cases, individuals and families will be able to charter the Celera 500L at prices comparable to commercial airfares, but with the added convenience of private aviation. We believe when the price of private air travel is competitive with commercial air travel, an enormous market opportunity will result.”

Otto adds, “We believe the Celera 500L is the biggest thing to happen to both the aviation and travel industries in 50 years. Beyond using our aircraft for passenger travel, it can also be used for Cargo operations and military applications. Since the results from our prototype test flights have been so promising, we’re ready to bring the Celera 500L to market.” Otto Aviation has designed the aircraft to meet the highest level of safety and compliance with FAA and international aviation regulations. In addition, the ability to fly privately has become very attractive to passengers due to the current global health crisis.

Singapore Airlines and Temasek Foundation Partner to Support World Food Program and the Global Covid-19 Response

Singapore Airlines and the Temasek Foundation are partnering with the World Food Programme (WFP) to support the global Covid-19 response to help transport essential medical supplies and other health and humanitarian items by air to points of need around the world.

Providing the logistics backbone for global Covid-19 efforts, the WFP operates a network of hubs and passenger and cargo airlinks to ensure a steady flow of supplies and support to the frontlines of the pandemic. Since these services commenced in May, the WFP has managed more than 800 humanitarian flights to 159 countries, with enough cargo to fill 188 jumbo jets that are expected to require WFP transport in the coming weeks.

"While demand for WFP Common Services grows every week, resources are stretched incredibly thin and additional support is urgently needed," said Amer Daoudi, the WFP's Covid-19 Corporate Response Director. "We are very grateful to Singapore Airlines and the Temasek Foundation for stepping up so we can continue delivering life-saving supplies to those who need them most."

Under this agreement, SIA is conducting ad-hoc charter flights and making pace for freight in its scheduled services available on a cost-recovery basis, with flight costs being covered by a contribution of up to US$6.5 million from the Temasek Foundation.

Chin Yau Seng, Senior Vice President Cargo, Singapore Airlines, said: "It is a pleasure for SIA to partner with the WFP and the Temasek Foundation in this meaningful program. This will allow us to draw on our expertise as a global airfreight provider and use our international network to deliver essential supplies to the points of need and help to make a positive impact on the communities that have been directly affected by Covid-19."

Mr. Ng Boon Heong, CEO of the Temasek Foundation, said: "We are pleased to partner with the WFP and SIA to help make these flights possible. Together, we will be more capable in combating the Covid-19 global pandemic when we enable synergistic collaborations in the international community. This partnership is one way for us to ensure that essential supplies reach communities with the most need, even if they are separated by distance. We are pleased to enable two of the best in their respective fields to make this partnership possible."

An estimated US$965 million is required to sustain the WFP's Common Services on behalf of the humanitarian and health community. To date only 21 percent of this sum has been received. The WFP's passenger and cargo flights are likely to grind to a halt at the end of August if no additional support is received.

During this challenging period, the SIA Group has stepped up to support the global fight against the Covid-19 pandemic. The SIA Group has facilitated multiple repatriation flights to bring back individuals stranded away from their home countries. SIA Cargo has also been transporting medical relief supplies and personal protective equipment to places where they are needed and playing its part in keeping supply lines for essential goods open at a critical time. The Group has also donated items such as blankets and helped to supply meals to communities that have been affected by the pandemic in Singapore.

Flying-V made its Maiden Flight Successfully

The Flying-V made its maiden flight sucessfully at an airbase in Germany. After a period of extensive wind tunnel testing and a series of ground tests in the Netherlands, researchers, engineers and a drone pilot from TU Delft were ready to see the Flying-V's first flight and obtain an impression of the flight characteristics.

Project leader Dr Roelof Vos and his team of researchers and engineers took the 22.5 kg and 3 m wide scale model of the Flying-V for flight tests to a well-guarded airbase in Germany, where they could work together with a team from Airbus. The pilot's task was to take-off, fly a number of test manoeuvres and approaches until the batteries were nearly empty and then land. And he succeeded. Vos: "One of our worries was that the aircraft might have some difficulty lifting-off, since previous calculations had shown that 'rotation' could be an issue. The team optimized the scaled flight model to prevent the issue but the proof of the pudding is in the eating. You need to fly to know for sure." Rotation on take-off was performed easily and occurred at a speed of 80 km/h. The plane's thrust was good and flight speeds and angles were as predicted.

But testing new technology is never straightforward. The team had a challenging week in which they had to change the center of gravity of the aircraft and fix the antenna to improve telemetry. The flight has now also confirmed that the current design still shows too much 'Dutch roll', causing a slightly rough landing. The next step for the team is to use the data collected during the flight for an aerodynamic (software) model of the aircraft. This will make it possible to program it in a flight simulator to be used in future research, while further improving the flight characteristics. The team will also prepare the scale model for future flight tests.

The Flying-V

The Flying-V is a design for a highly energy-efficient long-distance aeroplane. The aircraft's design integrates the passenger cabin, the cargo hold and the fuel tanks in the wings, creating a spectacular V-shape. Computer calculations have predicted that the aircraft's improved aerodynamic shape and reduced weight will reduce fuel consumption by 20% compared to today's most advanced aircraft. KLM has been a partner in the project since 2019. Also due to their support, the project team has been able to build this scale model. It was first presented at the 100th anniversary of KLM in October 2019. Various business partners are now involved in the project, including Airbus. Airbus is also an explicit supporter for the first flight. The partners are working together on a research plan to fine-tune the concept. Next step: providing the Flying-V with sustainable propulsion, taking into account that the design seems highly suitable to carry liquid hydrogen instead of kerosene.

Emirates Refunds US$ 1.4 Billion to Customers

Emirates reveals that it has returned over AED 5 billion (US$ 1.4 billion) in COVID-19 related travel refunds to date, making strong and steady progress on its commitment to customers to complete pending refunds.

More than 1.4 million refunds requests have been completed since March, representing 90% of the airline's backlog. This includes all requests received from customers around the world up until the end of June, with the exception of a few cases which require further manual review.

Since the pandemic hit, Emirates has invested additional resources to ramp up its processing capability. The airline also continues to work with industry partners to facilitate refunds for those who have booked their Emirates flights through travel agents, this includes enabling direct refunds processing via global booking systems (GDS).

Sir Tim Clark, President of Emirates Airline said: "We understand that from our customers' standpoint, each pending refund request is one too many. We are committed to honoring refunds and are trying our utmost to clear the massive and unprecedented backlog that was caused by the pandemic. Most cases are straightforward, and these we will process quickly. But there are cases which will take a bit more time for our customer teams to manually review and complete. We are grateful to our customers for their patience and understanding."

As global travel markets slowly re-open, Emirates has gradually restarted its passenger operations around the world, always ensuring that it provides customers with a safe and smooth travel experience.

The airline has introduced a series of industry-leading initiatives to provide customers with additional reassurance and confidence when they travel – from bio-safety measures at every step of their journey, to free COVID-19 medical coverage, and flexible booking policies.

Emirates currently offers flights to over 80 cities. Customers can stop over or travel to Dubai as the city has re-opened for international business and leisure visitors. Ensuring the safety of travellers, visitors, and the community, COVID-19 PCR tests are mandatory for all inbound and transit passengers arriving to Dubai (and the UAE), including UAE citizens, residents and tourists, irrespective of the country they are coming from.

SunExpress offers Covid-19 Tourist Protection and Support Insurance

SunExpress, which is the backbone of Turkish tourism by being an air bridge between Turkey and Europe, is offering COVID-19 Tourist Protection and Support Insurance with Covid-19 coverage in collaboration with Güneş Sigorta to visitors for a safe and enjoyable vacation in Turkey.

Taking all the necessary measures to provide its passengers and crew with a healthy and safe flight experience in close cooperation with national and international health and aviation authorities, SunExpress has announced that it has begun offering Covid-19 travel insurance options in cooperation with Güneş Sigorta to its guests to make their trip as flawless and comfortable as possible both on the ground and up in the air.

SunExpress passengers who are traveling from abroad to Turkey will be able to obtain health insurance coverage against coronavirus by choosing one of the insurance alternatives available while booking their flight. This service guarantees that the treatment and hospitalization costs after a definitive diagnosis of Covid-19 will be covered by Güneş Sigorta. With this service offered at advantageous rates, passengers will be able to benefit from the best health care services during their stay in Turkey without any additional treatment costs. SunExpress guests can visit the airline's website to find out more about this advantageous offer.

SunExpress brings European holidaymakers to Turkey's most popular holiday destinations and also carries Turkish citizens living in Europe to their home country and loved ones. The airline offers direct and scheduled flights from 14 cities in Turkey to 29 destinations in Europe.

Dassault Aviation Planned First Flight of Falcon 6X

Dassault Aviation is making progress toward an early 2021 planned first flight for its latest and roomiest aircraft, theFalcon 6X, despite the upheaval caused by the coronavirus epidemic.

Electric, hydraulic and fuel system tests have been completed and testing of the Falcon 6X's advanced digital flight control system have begun. Ground fatigue and damage tolerance testing has also been initiated. This test cycle will later be extended to include stress testing to maximum load limits and beyond.

The Falcon 6X sets a new industry benchmark for cabin comfort, long-range performance and flying efficiency. It offers the largest cabin cross section of any purpose-built business jet (6'6" tall by 8'6" wide) and its 5,500 nautical mile range capability allows it to connect far flung routes such as Paris to Tokyo or Los Angeles to Moscow.

The new twinjet is also equipped with the latest innovative technologies, including a new-generation Digital Flight Control System (DFCS) that provides unmatched maneuverability in flight. The new DFCS controls all moving surfaces including a new multifunction control area called a flaperon, adapted from Dassault fighter aircraft.

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